THE REVOLT OF THE MAJORS: HOW THE AIR FORCE

CHANGED AFTER VIETNAM

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Marshall L. Michel III

Certificate of Approval:

_____	_____
William Trimble Professor History	Larry Gerber, Chair Professor History
_____	_____
Daniel Szechi Professor History	Owen Coté Professor Political Science MIT, Cambridge, MA

_____

Stephen L. McFarland
Acting Dean
Graduate School

THE REVOLT OF THE MAJORS: HOW THE AIR FORCE CHANGED AFTER VIETNAM

Marshall L. Michel III

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Marshall Louis Michel III

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Marshall L. Michel III

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DISSERTATION ABSTRACT

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CHANGED AFTER VIETNAM

Marshall L. Michel III

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During the Vietnam War, the United States Air Force had performed inconsistently and after the war was faced with a number of challenges. Many of the Air Force senior leadership felt that the challenges could be resolved by the use of high technology weapons systems, especially the advanced McDonnell-Douglas F-15 "Eagle." At the same time, many young fighter pilots who were veterans of the most difficult air combat over the Hanoi area of North Vietnam felt that the Air Force needed a complete culture change and a new emphasis on realistic training.

The frustration of these young officers, the "iron majors," with the Air Force culture is described, and well at their push for new training methods. After the 1973 Middle East War General Robert Dixon, commander of the Air Force's Tactical Air Command (TAC), encouraged a complete reevaluation of TAC's training. The "iron

majors" soon developed a very realistic exercise called Red Flag that was quickly expanded to the rest of the American military. At the same time, under budgetary pressures the Air Force decided to buy a small, high performance fighter-bomber, the F-16, to supplement its F-15s .

In 1978, the new commander of TAC, General Wilbur Creech, began to push for very expensive, high technology weapons as well as continuing the emphasis on realistic training. These weapons were intended to give the Air Force a long range, all weather strike capability. But the new weapons were expensive and, since the Air Force chose to buy systems instead of spare parts because of limited budgets, the new systems were often grounded. In the late 1970s and early 1980s, the Air Force was pressured a group of Critics who claimed the Air Force was poorly led and pressed to eliminate high-technology weapons. These arguments, as well as how the Air Force successfully resisted them, are described, as well as the Gulf War success of the high-tech weapons manned by crews trained at Red Flag.

Today the arguments against high-tech weapons still rage, but as long as American military operations are successful, it seems the commitment to high tech weapons and, more important, realistic training will continue.

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INTRODUCTION

The United States Air Force came out of the Vietnam War in an undiagnosed schizophrenic state. Superficially, it had not been noticeably unsuccessful. While politically the bombing of North Vietnam had been controversial, the Air Force had not suffered heavy losses, nor had it been seen as impotent – in fact, just the opposite. American military leaders, frustrated by the rules that had limited them throughout most of the war, gave the Christmas 1972 B-52 bombing of Hanoi credit for ending the war.[1] The Air Force had not been successful in air-to-air combat, but a new Air Force fighter, the McDonnell-Douglas F-15 “Eagle," was beginning flight tests and would solve this problem. Other new Air Force technologies, notably laser guided bombs, showed tremendous potential for use in future conflicts. Because historically Air Force innovation meant technological innovation, the service’s future prospects seemed bright to most of the Air Force leadership.

However, the large, expensive F-15, designed as a pure air-to-air fighter, had been controversial since its inception. It had to overcome initial opposition from those who wanted a multi-role fighter-bomber instead of a single mission, air superiority fighter, and once development started, there was ongoing opposition from a small group of Pentagon dissidents inside and outside the Air Force who thought the F-15 was too expensive and complex. These dissidents – whom I call the “Critics” -- wanted a very small, light,

simple, inexpensive fighter instead of the F-15. Nevertheless, the Air Force fell in solidly behind the F-15, and the Critics were left carping on the sidelines.

While Air Force technological innovation was proceeding apace, there were many in the service who did not feel the service had performed well during the Vietnam War and that the fault was not with its systems. These were mainly young fighter pilots who had flown the difficult combat missions to the heavily defended Hanoi area, especially during the 1972 Linebacker operations, when a small number of North Vietnamese MiGs savaged American strike flights. This group – whom I call the "iron majors" -- felt the solution to the Air Force problems that materialized over North Vietnam was not only a technological one but also a new, innovative program of realistic, combat-oriented training far removed from the safety-oriented training programs the Air Force had used before and during the war.[2] However, innovative reforms in Air Force training – significant alternations in the philosophy accompanied by the associated practical changes -- seemed doomed from the start. The Air Force, even though it was the newest of the American armed forces and had a forward-looking image, was highly doctrinaire and had the most embedded culture, a culture that seemed to be immune to change.

The Air Force culture was a spin-off of the strategic bombing doctrine taken from the Royal Air Force after World War I by the leaders of the American Army Air Corps.[3] Because strategic bombing was a unique mission best performed by its own experts, these post-World War I Air Corps leaders saw it as a way for the airmen to become independent from the United States Army, on the model of the independent Royal Air Force. From the early 1930s, the Army Air Corps began to implement its own strategic bombing doctrine of daylight precision bombing with unescorted heavily armed bombers

and used it to develop the four-engine B-17 and other strategic bombers. The Army Air Corps was renamed Army Air Force (AAF) and, soon after America entered World War II, the AAF took its strategic bombing doctrine into war over Europe, and one of the enduring images of World War II is huge formations of American four-engine bombers streaming contrails on their way to targets in Germany. In fact, the doctrine proved a disaster in combat. It took the development of long-range fighter escorts and all-weather bombing systems -- which changed the doctrine from precision bombing to area bombing -- to make strategic bombing successful.[4]

The advent of the atomic bomb, which had to be delivered by an airplane, led in 1946 to the formation of a separate "atomic" force, the Strategic Air Command (SAC). While SAC was technically a separate command, it consisted entirely of Air Force officers and made the formation of an independent Air Force inevitable. Once the independent Air Force was established in 1947, most of the leaders came from strategic bombers, and they set about to make that mission the dominant one in the new service. As the Cold War developed during the Truman and Eisenhower administrations, SAC became the military force of choice for American political leaders because a strategic bomber force was inexpensive when compared to the number of conventional forces needed to maintain the American doctrine of containment.

Under the leadership of one if its early commanders, the charismatic General Curtis LeMay, SAC's strategic nuclear attack doctrine became the main mission of the Air Force. SAC's culture -- a high degree of discipline, tight top-down guidance and control, the supremacy of the SAC staff over the line crews, new ideas coming only from SAC headquarters, and strict flying safety regulations – gradually became the Air Force's

culture. This cultural development was significant because, as Williamson Murray, a historian of military innovation, notes

> identifying new strategic requirements and translating them into new tasks…is only half the battle… senior officers, who had established themselves by satisfying traditional criteria for performance, had the necessary power [for]…creating promotion paths along which young officers specializing in the new tasks could be promoted.[5]

SAC generals soon ruled the Air Force, and while there were small subcultures in the service – notably the tactical fighter pilots – that resisted SAC culture, the only result was the fighter pilots had low promotion rates and little influence on the service.

SAC's doctrine and values were firmly embedded in the Air Force when the Kennedy administration took office in 1961, but Kennedy and his new Secretary of Defense, Robert McNamara, were appalled by the cost of the strategic systems the SAC commanders wanted and by SAC's lack of flexibility. Ironically, soon SAC – which had begun as the inexpensive defense option -- priced itself out of the leading role in American defense strategy.

McNamara immediately began a series of innovative changes in the Department of Defense (DoD), notably a focus on flexible doctrine and conventional weapons, as well as the use of systems analysis as the basis for procuring new weapons systems. McNamara's changes followed a classic pattern of innovation described by Barry Posen, who posits that civilians are best at bringing major peacetime changes to military doctrine developed by the normal hierarchical, conservative military culture.[6]

While McNamara changed American military doctrine and forced the Air Force to buy tactical systems, mainly fighters, instead of strategic bombers, he did not change the Air Force culture. LeMay simply put SAC officers in charge of the rapidly expanding

fighter forces with orders to make the fighter force – notably the Tactical Air Command (TAC) – just like SAC, only flying smaller aircraft. There is nothing to indicate LeMay would not have succeeded in making TAC an organization with top down guidance, strict control, and an emphasis on flying safety under peacetime conditions, but the Vietnam War intervened.

For the Air Force, fighting the Vietnam War – known in the service as "SEA" (Southeast Asia) – caused the service to make a number of internal decisions that had major, unintended consequences. Probably the most important was a critical personnel decision the Air Force made early in the war – no aircrew member would be sent back for a non-voluntary second tour until everyone had flown his first tour. The result was that over the course of the eight years of the war, virtually every aircrew member in the Air Force flew a combat tour.[7] The next consequence was that while these officers were in combat, they became part of an entirely new culture that emerged, a "combat culture" that emphasized flexibility, individual responsibility, little top-down control, and a "get the job done" attitude that was entirely different from the strict supervision and emphasis on flying safety in the stateside Air Force. The young aircrews, not surprisingly, preferred the combat culture.

After four years of war, beginning in 1968, there was a four-year break in the bombing of the heavily defended areas of North Vietnam. The United States Navy, dismayed by heavy losses to MiGs, developed the realistic "Top Gun" training course to improve air-to-air performance. The Air Force, on the other hand, left its training programs intact, mainly because the Air Force leadership blamed its losses to MiGs –

about the same kill:loss ratio as the Navy's -- on the political limitations of the war and saw no reason to alter its flying safety culture for perceived high-risk realistic training.

After the four-year hiatus, the US began bombing the Hanoi area again in 1972. The Navy did extremely well in air-to-air combat, shooting down eight MiGs for every aircraft it lost, while the Air Force suffered heavy losses among the aircrews whose stateside training had sacrificed realism for flying safety. It was the losses during this period that made some of the Air Force's young, combat hardened veterans, the soon to be "iron majors," determined to change the Air Force's "fly safe" culture to one of realistic training.

It seemed a Sisyphean task. Historically the Air Force was committed to innovation by technology, not training. By the end of the Vietnam War the service had developed a new, high-technology air-to-air fighter, the F-15, which was expected to dominate Soviet fighters, basically ignoring a small group that complained the F-15 was overly complex and expensive. Adding to the iron majors' problems was that military historians and pundits considered realistic training impossible. However, this did not diminish the iron majors' vigorous efforts to change the way the Air Force trained. They won a few victories, notably the formation of an "Aggressor Squadron" to fly against American units, but despite the failures of Vietnam, but it took the 1973 Middle East War to give the iron majors' ideas traction. During the first few days of the war, a Third World manned air defense system, using the latest Soviet equipment, humbled the vaunted Israeli Air Force, and this added urgency to the iron majors' quest for better training.

It was at this time that General Robert Dixon took over the Tactical Air Command, the "fighter command," and Dixon was determined to improve TAC's training. After the

1973 Middle East War, General Dixon and Israeli Air Force commander Major General Benjamin "Bennie" Peled became friends and fellow travelers. After talking to Peled and reading reports of the war, Dixon's interest in improving Tactical Air Command training became an obsession.

At the same time, some of the iron majors stationed in the Pentagon, notably Major Richard M. "Moody" Suter, developed an idea for a large, remarkably realistic exercise program, called Red Flag, in the Nevada desert. After going through a thorough and at times difficult Pentagon vetting process, Suter presented the idea for Red Flag to General Dixon at TAC, who enthusiastically embraced the concept. Dixon took advantage of the fact that he was the sole leader of a basically self-contained organization -- a situation that is very conducive to quick innovation -- to abolish the "fly safe" culture in TAC, replacing it with a culture that emphasized realism, flexibility, and local control.

The first Red Flag exercise took place in late 1976 and the program was an instant success. A new "realistic training" culture quickly took hold, helped by the fact that Vietnam-era fighter pilots were beginning to dominate the Air Force. Dixon was able to keep the Red Flag exercise program on track despite a number of early accidents, and soon "realism" became the key to Air Force training, and Red Flag became a model for the other services. This was a remarkable innovation for a service that, until that time, had completely eschewed improvement by "training the man" for improvement by technology.

Dixon's replacement at TAC in 1978, General Wilbur Creech, brought back the emphasis on technology but wisely kept Dixon's training programs in place. Creech accelerated the push for new technologies to give the Air Force the capability to do long-

range, all-weather bombing, as well as new, improved air-to-air missiles. The systems proved costly and difficult to develop, but both Presidents Gerald Ford and Jimmy Carter supported the systems in principle because they provided unique capabilities that were aligned with the American national strategy of having conventional forces that could fight a conventional war in Europe, Korea, and later the Persian Gulf. During this period, the Air Force – under some duress – agreed to buy the small, relatively inexpensive General Dynamics F-16 as a fighter-bomber to augment its F-15 force.

The Ford and Carter administrations' relatively small defense budgets and a series of Air Force decisions resulted in a lack of spare parts for the F-15s and F-16s, This lack of spares and difficulties with the F100 engine that powered both fighters led to more and more problems through the late 1970s, especially with the F-15. The problems with the F-15 led to heavier and heavier criticism from a small but vocal group of defense Critics who maintained America needed larger numbers of less costly systems, but their calls generally went unheeded until the liberal journalist and neoliberal James Fallows joined the Critics' ranks in 1979.[8] Fallows was anti-military and a perfect example of Samuel Huntington's thesis of significant tension between American liberal beliefs and the naturally conservative military establishment.[9] At the time, Fallows was researching an article for *The Atlantic Monthly* considering new ideas about how to cut the military budget, and to find those who agreed with this view he went out on the "fringes" of the defense establishment. He became interested in the Critics, whom he found "kookie but convincing." In the resulting October 1979 article, "Muscle Bound Superpower," and later works Fallows decreed the Critics were military combat "experts" and unquestioningly took up their basic arguments: the American national defense strategy

was flawed because the military leadership was incompetent, the weapons acquisition process corrupt, and high defense budgets were linked to high inflation; what America needed was a new strategy that embraced a much greater number of simple, reliable, and less expensive systems. Unspoken was the idea that the money saved would go into social programs.[10]

Fallows tried to bring about these changes in national security policy in a new way. Rather than trying for a bureaucratic victory from inside the government, he launched a political-style campaign, presenting the compelling argument of "simpler, more reliable, more combat capable, and cheaper weapons" to what he termed the "editorial elites" of the press who, he believed, could influence American policy. Beginning with his 1979 article, Fallows began to generate an audience for the Critics.

The Critics' calls to change American defense policy and cut the defense budget seemed to be overwhelmed by the 1980 election of the hawkish conservative Republican Ronald Reagan, but Fallows and the Critics actually became more popular during the Regan administration as defense budgets soared. In 1981 Fallows' book, *National Defense*, highlighted the Critics' main arguments and became a bestseller and book award winner.[11] Fallows' and the Critics' calls for more defense for less money struck a chord, and not just with liberal Democrats. Led by Senator Gary Hart (D-CO), Congress formed a Military Reform Committee that soon numbered more than fifty members from all sides of the political spectrum in the House and Senate. The Committee gave the Critics – now called the Defense Reform Movement (DRM) -- a very sympathetic hearing, and by the early 1980s conventional wisdom in the popular press and parts of

Congress was that American high-tech weapons were too expensive and unreliable, and actually provided less combat capability.

While the Critics were rising, TAC commander General Wilbur Creech had been relentlessly pushing his high-tech weapons programs, exactly the kind of systems the Critics opposed. The Critics' popularity surprised Creech and the Air Force, who considered the Critics' arguments simplistic and often disingenuous, if not dishonest. During the early 1980s, the Air Force and the Critics engaged in a long, running battle over the future of America's high-tech weapons procurement.

It was a battle fought on two different fronts. The Critics, with Fallows' help, ran their political-type campaign in the news media, basing it on the premise that the "voters" had little in-depth knowledge of the issues and voting mainly on their intuition. The Critics argued their case in the popular media and with simple briefings to members of Congress and other supporters, combined with sharp criticisms of military leadership.

At the same time, Creech, Air Force Chief of Staff General Lew Allen, and the Chairman of the Joint Chiefs of Staff, Air Force General David Jones, realized the service's arguments were too complex and nuanced for the general public. They worked closely with the administration, especially Secretary of Defense Caspar Weinberger, to develop ways to appeal to a different audience, the Congress. Their approach was to treat the case as a trial and prepare all of their arguments in detail. The Air Force published numerous very specific arguments for its high-tech weapons in its own professional journals, and continued these arguments in the congressional armed services and appropriations committees where expertise in military systems was the norm and Air Force generals and DoD officials were treated with respect. At the same time, Congress

was made aware that the Air Force and the new administration were taking aggressive and effective steps to solve its identified problems. In the end, Creech and the Air Force got the high-tech tactical systems they wanted, and by 1985, the Critics' push for large numbers of inexpensive, low-technology systems had been effectively stymied.

Still, the Critics' arguments refused to die, and when America moved to the Persian Gulf in 1990 to counter the Iraqi invasion of Kuwait the two points of view were put to what the Critics called "the acid test of combat." According to the Critics, American forces would be poorly led and their high-tech equipment would be unreliable and ineffective, especially in the harsh desert environment. This did not happen. The Coalition forces, led by America's high-tech air power, were wildly successful. Most of the Air Force officers who were associated with the campaign, from top to bottom, give some credit to the high-tech weapons, but greater credit to the realistic training they received in Red Flag and other exercises. They also believed that the cultural change that had swept the Air Force and the other services as a result of the realistic training revolution brought on by Dixon and the iron majors, and maintained by Creech, was a major cause of American success. The Critics, on the other hand, were unrepentant and claimed it was their unspecified changes that brought about the victory.

This author concludes most of the credit for the success of the US Air Force in the 1991 Gulf War must be given to the successful innovations in training and "combat culture" that took over the Air Force after Vietnam, led by Moody Suter, the iron majors, and General Robert Dixon, and to the expansion of these programs under General Wilbur Creech. While video tapes of the high-tech weapons may have mesmerized TV viewers, in fact most of the Air Force strikes in the Gulf War carried Vietnam-era weapons but

used tactics developed at the various Flag exercises and depended on the successful suppression of the air defenses.

While the Critics proved to be completely wrong about American leadership and weapons, they had been roughly treated by scholars and military analysts even before the 1991 Gulf War. The Critics' failure to influence policy was generally attributed to their inability to form a coherent message, their unwillingness to work within the system to bring about change, their inaccurate evaluations of weapons systems, and their inability to influence Congress.[12] Commentators found the Critics' arguments shallow, simplistic, and too focused on their personalities instead of their arguments. The Critics' also lacked an understanding of the interconnectedness of military weapons systems and the procurement process and had too many personal agendas not focused on the national interest. These personal agendas meant the Critics were unwilling to enter into coalitions with like-minded military people – and there were many – to work to bring about change.

Another reason Fallows and the Critics failed was that Fallows' fundamental theory – that an election style campaign that won over the elite press could change American defense policy – was flawed. The Critics were outmaneuvered by the Air Force, which presented enough serious, carefully crafted detailed arguments to Congress that they carried the day.

However, despite the Critics' failure to influence the weapons acquisitions process and the successes of the high-tech weapons they deplored in the Gulf War, the Critics did not disappear. By the mid-1990s, Fallows and other supporters insisted that the Critics' unnamed reforms made America's victory possible, and one of the Critics, Air Force Colonel John Boyd, was practically deified for his "contributions" to American defense.

Today it seems fair to say that some of the Critics' arguments -- the weapons procurement process is corrupt, that high-tech weapons are too expensive and do not fit America's needs -- still receive a hearing in the elite popular press and are still regularly advanced by those who want to reduce American defense budgets (the Critics' argument that the military is poorly led came a cropper in the desert in the first Gulf War and has been dropped).

Nevertheless, despite the Critics' continued resonance in the popular press, the selection of weapons systems is still done by what they would call the usual cabal – military professionals, the Department of Defense, and the congressional armed services committees. *Plus ça change, plus c'est la même chose.* However, the weapons systems are only part of the story. Today it is the realistic training of American military forces more than their high-tech systems that sets them apart from other countries -- realistic training that, until General Dixon, the iron majors, and the development of Red Flag, had been considered impossible.

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1. Marshall Michel, *The Eleven Days of Christmas* (San Francisco: Encounter Books, 2002), 234-235.

2. The group consisted of very experienced fighter pilots with extensive combat records, many (but not all) either from the Fighter Weapons School or pilots who would attend the Weapons School at some point in their careers. At times they were called the "Fighter Mafia" because of their closeness and agreement on most issues that involved the fighter force, but they should not be mistaken for the Critics' "Fighter Mafia," which was composed of very few pilots, none with experience in Vietnam. The "iron majors" included Moody Suter, Roger Wells, John Vickery, John Corder, Charles "Chuck" Horner, William Kirk, Will Rudd, and James "Snake" Clark.

3. Doctrine deals with the military means of implementing national strategy; it defines the means that will be employed and the method they will be employed, and is the basis how the military is structured and for what weapons the military will procure. Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, NY: Cornell University Press, 1984), 13, *passim.*

4. Alfred Price, *Battle Over the Reich* (New York: Scribner and Sons, 1973), 89-96. For a fuller account and the results, see Stephen L. McFarland and Wesley P. Newton, *To Command the Sky: The Battle for Air Superiority Over Germany, 1942-1944* (Washington, DC: Smithsonian History of Aviation and Spaceflight, 2002).

5. Williamson Murray and Allan R. Millett, eds., *Military Innovation in the Interwar Period* (Cambridge, UK: Cambridge University Press, 1998), 12.

6. Posen, 225-226.

7. Jacob van Staaveren, *Gradual Failure: The Air War Over North Vietnam 1965-1966* (Washington, DC: Air Force History and Museums Program, 2002), 23, 75, 146-149.

8. The Critics included, among others, Air Force Colonels John Boyd and Everest Riccioni, DoD analysts Pierre Sprey and Franklin "Chuck" Spinney, as well as Senator Gary Hart (D-CO) and his staffer William Lind.

9. Samuel Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations* (Cambridge, MA: Belknap Press of Harvard University Press, 1957), 193.

10. Robert Rothenberg, *The Neoliberals: Creating the New American Politics* (New York: Simon and Schuster, 1984), 112-133.

11. James Fallows. *National Defense* (New York: Random House, 1981). http://www.nationalbook.org/nbawinners1980.html, (August 2005).

12. The scholars include Samuel Huntington, Eaton Professor of the Science of Government and Director of the John M. Olin Institute for Strategic Studies at Harvard University; William Perry, former Secretary of Defense and currently Michael and Barbara Berberian Professor, Stanford University, and codirector of the Preventive Defense Project Institute for International Studies, a research collaboration of Stanford and Harvard Universities; Dr. Williamson Murray, Professor Emeritus, Ohio State University, former Charles Lindbergh Professor, Air and Space Museum, Horner Professor of Military Theory, Marine Corps University, Centennial Visiting Professor, London School of Economics and author of numerous books in both air power and military innovation; Dr. Serge Herzog, a Swiss military affairs consultant, neutral observer and author of probably the definitive work on the Critics and TACAIR, *Defense Reform and Technology: Tactical Aircraft* (Westport, CN: Praeger, 1994).

CHAPTER ONE: ALIGNMENT

THE INDEPENDENT UNITED STATES AIR FORCE AND AMERICAN GLOBAL STRATEGY

The United States Army Air Force entered World War II with two basic theories: daylight precision bombing could win a war, and bombers could fight their way into and out of the target without fighter escort.[1] Both of these theories proved invalid. The cloudy weather over Europe and the high altitude jet streams over Japan destroyed the idea of daylight precision bombing, and in October 1943 the Luftwaffe shot to pieces the idea that bomber formations could fight their way into and out of the target unescorted.[2]

While the bomber enthusiasts of the Army Air Force had proved singularly inept at producing combat doctrines, they were much more successful in the post-war bureaucratic battles that made the Army Air Force an independent service. A post-war *Strategic Bombing Survey* attempted to validate the need for an independent Air Force based on the unique capabilities of strategic bombing, but the atomic bomb provided the final argument for what became the United States Air Force. It seemed that the combination of long-range bombers with atomic weapons would give the United States a major advantage in any war in the near future.[3]

The atomic bomb and the bomber force also led to the development of a new strategic doctrine, "deterrence," where deterring a nuclear war became the main purpose of the

military. The new weapons and the need for development of the practical aspects of this doctrine clearly called for a specialized group of experts, the Army Air Force "bomber generals," who became the backbone of the Strategic Air Command (SAC) when it was created on 21 March 1946. SAC took the bulk of the AAF's bomber forces to organize and equip them for nuclear warfare, which became the postwar extension of the Air Force doctrine of strategic bombardment.[4] To emphasize that their mission was deterring war rather than combat, SAC adopted the slogan "Peace is Our Profession."[5]

The United States Army Air Forces became the United States Air Force on 18 September 1947, when President Harry Truman signed the National Security Act, symbolically on the presidential Army Air Forces airplane, the *Sacred Cow*. That same day, Stuart Symington became the first Secretary of the Air Force and General Carl A. Spaatz the first Chief of Staff.[6]

The new Air Force consisted of three commands – SAC, the Tactical Air Command (TAC) composed mainly of fighters for tactical, non-nuclear operations, and the Air Defense Command (ADC) to defend the United States against strategic nuclear attack. The new Air Force's stated primary mission was "gaining and maintaining general air superiority and establishing air superiority where and as required," but almost immediately the service placed its highest priorities on SAC's mission of long-range, independent offensive nuclear operations against the Soviet Union and Communist China.[7] The Truman doctrine of "containment" depended on SAC, and in 1948 the command began a meteoric rise when the charismatic, cigar-chomping General Curtis LeMay took over SAC.[8] Soon SAC became the backbone of American defense and iconic

LeMay would tower not only above SAC and the Air Force but over American national defense policy until the early 1960s.[9]

For the first few years of SAC's existence, Truman tried to balance the small defense budget equally between the services, but soon the issue became the amount of security these limited defense budgets would buy.[10] It became clear that, in an era of limited defense budgets, the unique capabilities of SAC's nuclear-armed, manned bombers, despite their shortcomings, married the most important considerations in American defense policy, containment and deterrence, at a low cost. To win the "battle of the budget," the Air Force embraced SAC's strategic nuclear bombing doctrine even more strongly and the Air Force's Tactical Air Forces (TAF), whose mission was to support the Army, were pushed out of the Air Force mainstream.[11]

On 14 April 1950, Truman received NSC 68, "A Report to the National Security Council by the Executive Secretary on United States Objectives and Programs for National Security." The report was based on the premise that nuclear weapons and command of the air were critical and would remain so as the Soviets increased their nuclear capability. Truman agreed with the findings but struggled with the budgetary issues the report raised until the Korean War broke out, allowing him to make large increases in the defense budget. Nevertheless, despite the conventional nature of the Korean War and a conventional forces buildup in Europe, most of the budget increases for the Air Force went to SAC. In 1951 alone SAC almost doubled its personnel and had a 20 percent increase in new heavy bombers, mainly the huge, expensive and controversial B-36.[12]

By the summer of 1952, the Air Force projected the United States could not afford both a nuclear deterrent and a large army to fight conventional wars, so the service became more and more strident about its demands that it be the "keystone of American military power" with the budget to support it.[13] When Dwight Eisenhower became president in November 1952, this theory fit into his clear set of defense priorities. Using the threat of SAC's nuclear capability, he ended the Korean War, and SAC also helped with his next priority, to preserve the doctrine of containment with as low a military budget at possible – "security and solvency."[14] Truman's last budget projected a deficit of almost $10 billion out of outlays of less than $80 billion, and the 1953 defense budget was 62 percent of federal spending. Eisenhower felt that the Truman strategy, particularly NSC-68, would bankrupt the country and wanted to find a way to sustain containment for the indefinite future, but in a way that would not destroy the American economy in the process, so Eisenhower committed his administration to reducing the budget deficit and decided defense would have to take major, even draconian, cuts, a plan called the "New Look."[15]

In April 1953, the administration committed to the "New Look" defense policy and nuclear deterrence became the main, almost sole, national defense strategy of the United States. In an attempt to make the point to the Soviets that any war would become total war, and to make that prospect so frightening it would deter all wars, the Air Force --- actually SAC, now almost the synonym for the Air Force – was expanded and modernized while the Navy and Army were cut. Eisenhower's new nuclear strike doctrine made SAC's targets virtually all the Soviet cities, euphemistically called "urban

industrial complexes," as well as most Soviet military bases, especially bomber and missile bases."[16]

As SAC became the focus of American defense, SAC commander Curtis LeMay trained and prepared SAC for a single, fully mobilized nuclear attack on the Soviet Union, which LeMay called the "Sunday punch." The "Sunday punch" was not just intended to incapacitate the Soviet military, but to destroy the Soviets' "will" and ability to wage war. By March 1954 SAC had designated 118 of the 134 major cities in Russia for attack with casualties in these cities projected to be between 75 and 84 percent of the population.[17]

The doctrine linked the number of bombers and thermonuclear bombs to the number of military, industrial and economic targets in the Soviet Union, and thus gave SAC planners an incentive to find an ever increasing number of targets. As Soviet capabilities increased, SAC added more aircraft and bombs to its inventory, and the "New Look" became the "sorcerer's apprentice."[18] In December 1960 SAC finalized a war plan, the Single Integrated Operations Plan (SIOP), to use all of these weapons at once in an integrated fashion. One scientist briefed on the SIOP said "it seemed that the purpose was simply to strip mine the USSR."[19]

The budgetary aspects of the "New Look" had far reaching and crippling effects on the rest of the American armed forces. During the Eisenhower administration SAC received 48 percent of the total defense budget, while the Army's 1955 budget was cut from $13 billion to $10.2 billion and the service reduced in size by almost one-third. 1955 was actually the Army's high water mark under Eisenhower, who believed that the

Army's main job would be to maintain order in the US after a nuclear exchange.[20] In the 1956 defense budget the Army was further cut to $7.4 billion and the Navy to $9.4 billion, while the Air Force received $12.7 billion. In 1957 the Air Force budget increased to $15.7 billion, while the Army's share dropped to $7.3 billion and the Navy's to $9.1 billion.[21]

The cuts caused consternation in the Army and Navy, not only because of the reduction in force structure but also because of the overall strategy.[22] The cuts especially dismayed General Matthew Ridgeway, the Army Chief of Staff, who said the New Look "will lead us to disaster."[23] In 1955 General Maxwell Taylor replaced Ridgeway and continued to argue for an army capable of fighting a limited war. When the Eisenhower administration continued to emphasize American nuclear capability, in 1959 Taylor resigned and wrote a book, *The Uncertain Trumpet*, criticizing Eisenhower's defense doctrine. At this time, as MIT's Harvey Sapolsky has noted, "the Army became Democrats."[24] But despite these objections, at the end of the 1950s SAC reflected almost perfectly American national strategy and, importantly, it did it at reasonable cost.

SAC AND THE AIR FORCE CULTURE

Military historian Williamson Murray describes military culture as "the most important factor not only in military effectiveness, but also in the processes involved in military innovation, which is essential in preparing military organizations for the next war."[25] LeMay and SAC had developed a unique culture and, not surprisingly, because of LeMay's power, personality, and the importance of SAC in the Air Force, SAC's culture became the Air Force's culture. The culture emphasized innovation by technology, and

LeMay constantly pressed for any system that offered promise of allowing more of his bombers to get through to their targets -- new bombers that could fly "higher, faster, and farther," as well as new thermonuclear bombs and nuclear delivery systems on fighters. [26] There was, however, one notable exception. LeMay and the rest of SAC were opposed to any sort of nuclear weapons delivery system that threatened to replace manned nuclear bombers. LeMay became a strong, if at times subtle, opponent of long-range, intercontinental ballistic missiles (ICBM).[27]

Since SAC's doctrine called for a massive, coordinated, single-strike nuclear attack, LeMay's all out "Sunday punch," SAC designed its planning, organization, and training for this mission. The SAC headquarters staff had to plan the massive strike beforehand down to the minutest detail, and because of the importance of this planning, LeMay had SAC's "best and brightest" officers brought to SAC headquarters in Omaha, Nebraska. Thus LeMay's SAC culture put a premium on being a member of the staff, not on being a member of an aircrew.[28]

For the aircrews, "control" was the watchword. To insure adherence to its plans, SAC's tactics were simple so they could be standardized and used by all crews. SAC's crews and crew members were expected to be interchangeable, so SAC developed training that emphasized rote repetition of tasks without deviation, relying heavily on rigid adherence to checklists, rehearsals and drills. To insure uniform training across the command, SAC established a massive control organization, called Standardization and Evaluation (STANEVAL), to ensure all SAC crews were following all checklists, rules

and directives. A position in a flying unit's STANEVAL section was the first step to the coveted SAC staff.[29]

Because SAC depended on top-down control and on all of its crews precisely executing each single mission in the coordinated "Sunday punch," in SAC culture the SAC solution was the only correct solution for every problem. The command studiously avoided any attempt at innovation at the lower levels because it might detract from the centralized command and control and the grand design of the SIOP. The culture that evolved, not surprisingly, featured a lack of low-level initiative and an unwillingness to act without orders from above. But it was the system LeMay wanted – and needed – so SAC and the Air Force as a whole accepted it.[30]

In the late 1950s, beginning with the acquisition of the large and expensive B-52, SAC's bombers became more expensive and thus fewer in number. Because each bomber had its part in the "Sunday punch," to keep from losing any of them in accidents "flying safety" and "risk avoidance" became dominant themes in SAC training.[31] In early 1960, one Air Force publication noted, "Throughout the Strategic Air Command it is well understood that flying safety takes precedence over all other operational requirements. No program receives more emphasis than flying safety."[32] The culture of flying safety so dominated SAC and the Air Force that the service officially advocated that an aircrew member should not fly if he did not feel "up to it," and said his supervisor had to respect, support, and even encourage him in his decision not to fly.[33]

Additionally, because it dealt with nuclear weapons, SAC adopted a program of "Zero Defects." "Zero Defects" meant, in essence, that everything had to be done

perfectly. The philosophy worked well with nuclear systems – the Navy had basically the same program on its nuclear submarines – but SAC applied the principle to every aspect of the command's functions, and then expanded it to the entire Air Force.[34] A young officer who later became a senior management analyst remembered that as a lieutenant in the Air Force in the late 1950s:

> I was introduced to the concept of "Zero Defects," or "ZD." On the flight line, airmen checked, double-checked, triple-checked the tightness of every rivet, every screw, every bolt of every aircraft. Those writing intelligence reports avoided like the plague misspellings or improperly placed commas. From the generals to the senior noncommissioned officers, nothing but "Zero Defects" was expected. And, that's what they got…
>
> It wasn't because the troops were perfect. We achieved zero defects because the brass put us in charge of the reporting. What outfit would have the temerity to actually report fifteen defects? We just lied.[35]

While SAC was only a part of the Air Force, LeMay wanted to ensure SAC and its culture to dominate the service. One officer noted that "SAC's methods, their procedures, became the only ones allowable, and they [SAC} refused to tolerate any deviations. They did their best to standardize everything for which they had responsibility and manuals and directions became the order of the day."[36] LeMay began by promoting or ensuring the promotion of his "boys," those he knew and were SAC -- and LeMay – loyalists, and then set up a system whereby all low-ranking SAC officers would have an advantage in promotion system.[37] Congress had limited by law the number of officers that a service could have at the higher ranks, so in December 1949 LeMay developed a system to promote SAC officers in a way that would avoid the congressionally imposed ceilings. These were temporary promotions, called "spot promotions," which gave the selectees

the pay as well as the insignia of the higher grades. They were "legal" because they were only temporary, and the members went back to their previous grades when they left their aircrews or were rated deficient in operational evaluations. The result was that SAC officers who were "spot promoted" received the extra pay commiserate with their new rank, and on their officer effectiveness reports (OER) the "spot promotion" showed they were ready for the next grade. As a result, SAC officers were promoted at rates far higher than those in any other part of the Air Force.[38]

Given SAC's unique mission, it is difficult to criticize the internal logic of its philosophy and method. The problems arose when LeMay forced SAC's culture on the entire Air Force, including the parts that had entirely different missions.

THE ROLE OF THE TACTICAL AIR FORCE

Under Eisenhower's "New Look," by the late 1950s the emphasis on SAC meant the TAF was only 12 percent of the Air Force, and the fighters' role had changed. Air Force doctrine now called for fighters either to defend against enemy bombers or to fly offensive tactical nuclear strike missions at low level, popping up to lob a nuclear weapon on a target. Tactical fighters sat tactical nuclear alert and their criteria for bombing accuracy was hitting within 750 feet of a target, considered "close enough" with a nuclear weapon.[39] Conventional dive bombing and air-to-air combat training received little emphasis, because the aim was to destroy the enemy air force on the ground with nuclear weapons. One Air Force general noted about this period, "General LeMay had deliberately loaded the Air Staff with 'bomber guys,' who were not well acquainted with things like 'air superiority' or air-to-air combat, and who wanted to destroy enemy

aircraft on their airfields." In 1957, LeMay actually tried to eliminate the TAF, but the possibility of the Army developing its tactical air support arm overrode this idea, and later that year LeMay reluctantly gave the TAF more funds to keep its mission from being turned over to the Army.[40]

SAC TAKES OVER

SAC's domination of the Air Force had a major effect on a separate but traditionally important Air Force subculture, the tactical fighter culture. Because strategic bombers and tactical fighters flew entirely separate types of missions, they had vastly different cultures. Bomber missions are, to a great extent, relatively inflexible, since bombers have a specific target and a set time to strike it, with success measured by their ability to work their way through the defenses and bomb the target. The generally accepted virtues of bomber pilots are perseverance, discipline, and organization of their multi-person crew. Fighters, on the other hand, are allowed much more freedom in searching out their targets – exemplified by the famous *diktat* of World War One German ace Manfred Von Richthofen: "a fighter pilot must roam his allotted area, find the enemy, and shoot him down. Anything else is rubbish." Fighter pilots put a premium on aggressiveness and independent innovation which, as might be expected, led to a freewheeling tactical fighter pilot culture that collided head on with the SAC top-down control and "fly-safe" culture.[41] One author noted:

> When a fighter pilot was in training, his superiors were constantly spelling out strict rules about the use of the aircraft and conduct in the sky…but somehow the message got out to the young fighter pilots that if a man truly *had* it he could ignore these rules…and that in some strange unofficial way, peeking through his fingers, his instructor expected him to challenge all the limits.[42]

Additionally, fighter pilots were alone in the cockpit, and this bred a culture of individualism. As the noted writer Richard Bach remembered from his time flying fighters, "there is no space allotted for another pilot to tune the radios in the weather or make the calls to air traffic control centers or to help with the emergency procedures….There is no one else to make decisions. In a war…If I die, I will die alone."[43]

Air Force aircrew and leaders, both fighter and bomber, would not have disputed these descriptions of the two cultures. Both sides agreed on the characteristics of SAC culture and the fighter pilot culture; there were simply diametrically opposed views about whether each was good or bad. The TAF's fighter pilots ridiculed SAC's "fly safe" and "Zero Defects" culture while LeMay famously said, "Flying fighters is fun, flying bombers is serious."[44]

Because SAC had the most important mission, SAC dominated the post-World War II Air Force, and few fighter pilots were promoted to high rank. By the late 1950s, as the Eisenhower administration came to an end, SAC had for all practical purposes taken over the United States Air Force and was the dominant arm of the American military. The leading Air Force generals were virtually all "bomber generals" steeped in SAC doctrine. Air Force culture was SAC culture, and the Air Force became known for its emphasis on innovation by technology, top-down guidance with no inputs from below, and rigorous adherence to standardization and flying safety.[45]

1. There are several iterations of name changes that the reader should be aware of. The United States Army Air Corps (USAAC) was established on 2 July 1926. It became the United States Army Air Forces (USAAF) on 20 June 1941, and the United States Air Force on 18 September 1947. Bernard Nalty, *Winged Sword, Winged Shield: A History of the United States Air Force, Volume One, 1970-1950* (Washington, DC: Air Force History and Museums Program, 1997).

2. For a short explanation of how this doctrine was developed, see Perry Smith, "The Role of Doctrine," in *American Defense Policy, Fifth Edition,* ed. John F. Reichart and Steven Sturm (Baltimore, MD: Johns Hopkins Press, 1982), 651-657.

3. Lee Kennett, *A History of Strategic Bombing* (New York: Scribner, 1982), 384.

4. Ibid., 388.

5. David A. Anderton, *Strategic Air Command: Two-Thirds of the Triad* (New York: Scribner, 1971), 12.

6. Herman S. Wolk, "The Quest for Independence," in Nalty, *Winged Sword,* 374.

7. For a full account from the Navy point of view see Jeffery Barlow, *The Revolt of the Admirals: The Fight for Naval Aviation 1945-1950* (Washington, DC: Naval Historical Center, 1994). For a shorter summary, see Stephen L. Rearden, "U.S. Strategic Bombardment Doctrine Since 1945," in *Case Studies in Strategic Bombardment*, ed. Stephen Reardon (Washington, DC: Air Force Museums and Studies Programs, 1998), 221.

8. Executive Order 9877 (change to 9950 Executive Order 9950) Revoking Executive Order No. 9877 of 26 July 1947, prescribing the Functions of the Armed Forces; Signed: 21 April 1948; Federal Register: 13 FR 2191, 23 April 1948. (Washington, DC: GPO, 1948).

9. Author's interview with Wayne Thompson, former Air Force historian, and biographer of General Curtis LeMay, September 2005, February 2006.

10. Kennet, *A History of Strategic Bombing* , 392; Wolk, "The Quest for Independence," in Nalty, *Winged Sword,* 380, *passim.*

11. Warren A. Trest and George Watson, "Framing Air Force Missions," in Nalty, *Winged Sword,* 402-404, *passim*; Richard H. Kohn and Joseph P. Harahan, ed., *Strategic Air Warfare: An Interview with Generals Curtis LeMay, Leon W. Johnson, David A. Burhinal, and Jack J. Catton (*Washington, DC: Officer of Air Force History, 1988), 51, 60, *passim.*

12. Rearden, "U.S. Strategic Bombardment Doctrine Since 1945," in *Case Studies in Strategic Bombardment*, 221. For an in depth look at the controversy from the US Navy's point of view, see Jeffery Barlow, *The Revolt of the Admirals: The Fight for Naval Aviation 1945-1950* (Washington: Naval Historical Center, 1994).

13. Rearden, "U.S. Strategic Bombardment Doctrine Since 1945," in *Case Studies in Strategic Bombardment,* 214.

14. Andrew Bacevich, "Generals versus the President: Eisenhower and the Army 1953-1955," *Civil-Military and Military-Media Relations* (Fall 1985): 219, 223.

15. Ibid., 221.

16. Robert Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force* (Maxwell Air Force Base, AL: Air University Press, 1989), 276.

17. Rearden, 409; Also see Kohn, 109, for SAC general officer comments.

18. Paul Dukas, *L'apprenti sorcier,* 1897.

19. Rearden, *Case Studies in Strategic Bombardment*, 423; Warren A. Trest and George Watson, "Framing Air Force Missions," in Nalty, *Winged Sword*, 410-411.

20. Bacevich, 224.

21. Futrell, 278-280.

22. Warren A. Trest, *Air Force Roles and Missions: A History* (Washington, D.C: Air Force History and Museums Program), 166-167.

23. Bacevich, 94. Maxwell D. Taylor, Gen. USA, *The Uncertain Trumpet* (New York: Harper & Brothers, 1959); for a summary see Maxwell D. Taylor, Gen. , USA. "The Uncertain Trumpet," speech before the US Army War College, Carlisle Barracks, PA, 5 February 1950, Air Force Historical Research Agency, Maxwell AFB, AL (hereafter AFHRA).

24. Author's lecture notes from 16 October 2005 lecture in "The Politics of Defense," course taught by Professor Harvey Sapolsky, MIT.

25. Williamson Murray, "Does Military Culture Matter?" *Orbis***,** Winter 1999, 27-28.

26. Carl H. Builder, *The Icarus Syndrome* (New Brunswick, NJ: Transaction, 1994), 5-6, *passim*.

27. Rearden, 413-414.

28. Kohn and Harahan, 90-91.

29. Trest and Watson, 407; Mike Worden, *The Rise of the Fighter Generals: The Problem of Air Leadership 1945-1982* (Maxwell AFB, AL: Air University Press, 1997), 11-12, *passim.*

30. Worden, 14; LeMay in Kohn and Harahan, 90.

31. The accident rates SAC had to deal with were quite high. See Kenneth P. Werrell, "Those Were the Days: Flying Safety During the Transition to Jets, 1944-1953," *Air Power History* (Winter 2005): 40-53, especially the chart on 48.

32. Perry M. Hoisington, Brig. Gen, USAF, "Supervision Down the Line," *Flying Safety* 16 (January 1960): 16.

33. Francis D Hessey, "Editor's View," *Flying Safety*, 16 (January 1960): 3.

34. John F. Lehman, *Command of the Seas* (New York: Scribner, 1988) 22-24.

35. Eric Zoeckler, "Manager's Memo," *Snohomish (WY) County Business Journal*, June 2003, 12.

36. Tom Clancy and General Chuck Horner, USAF, *Every Man a Tiger* (New York: Putnam, 1999), 117.

37. General Curtis LeMay with MacKinlay Kantor, *Mission With LeMay: My Story (*Garden City, NJ: Doubleday, 1965), 231.

38. Worden, 17, *passim.*

39. Worden, 24. The standard measurement for bombing error is Circular Error Probable (CEP). The standard at this time was a CEP of seven hundred fifty feet, which

meant 50 percent of the bombs had to fall within a circle with a seven hundred fifty foot radius around the target. Bernard Appel, Lt Col. USAF, "Bombing Accuracy in a Combat Environment," *Air University Review*, July-August 1975. http://www.airpower.maxwell.af.mil/airchronicles/aureview/1975/jul-aug/appel.html (accessed May 2004). This article in also an excellent, if slightly technical, explanation of the problems of dropping unguided bombs from fighters with conventional sights – "dumb bombs from dumb airplanes."

40. Futrell, 279, 288, 468.

41. This is well documented in World War II data compiled by several countries, both allied and Axis. A good summary is *Feasibility Study to Predict Combat Effectiveness in Selected Roles: Fighter Pilot Effectiveness,* ARDA Contract Study MDA 903, 76 C0169, MDC E1643, (St. Louis Missouri: McDonnell Douglas, 29 April 1977), 4-1-4-13.

42. Tom Wolfe, *The Right Stuff* (New York: Bantam Books, 1980), 24.

43. Richard Bach, *Stranger to the Ground* (New York: Harper and Row 1963), 96.

44. Worden, 27.

45. Worden, 26; LeMay in Kohn and Harahan, 41. Hoisington's full article gives a wonderful "feel" for the atmosphere in the late 1950s.

CHAPTER TWO: REALIGNMENT

KENNEDY, MCNAMARA, AND A NEW NATIONAL STRATEGY

As a senator and presidential candidate, John F. Kennedy had been highly critical of the Eisenhower strategy and defense program, viewing its complete reliance on massive retaliation with few options as unrealistic. Kennedy wanted to move the US from almost total dependence on nuclear deterrence to a commitment to intervention by conventional forces, supplemented by a limited policy of nuclear deterrence. After Kennedy was elected, to implement his new national security strategy and build American military conventional forces to match American commitments around the world, Kennedy named businessman Robert Strange McNamara, formerly president of Ford Motor Company and an Army Air Force statistical control officer in World War II, as Secretary of Defense. It was a fateful decision. McNamara quickly began to use the moribund additional powers granted to the Secretary of Defense in the Defense Reorganization Act of 1958, and in his long tenure he became both highly controversial and perhaps the most powerful and influential Secretary of Defense in American history.[1]

The new national strategy, "Flexible Response," would use strategic nuclear weapons and conventional weapons in a system of "graduated response," rather than LeMay's all-out nuclear warfare scenario.[2] Later, in Vietnam, McNamara carried the concept of graduated response over to conventional warfare, with highly controversial results.[3]

To bring military credibility to the new strategy, Kennedy called one his military advisors, retired former Army Chief of Staff Maxwell Taylor, back to active duty in 1962 and named him Chairman of the Joint Chiefs of Staff to help structure the military for "flexible response." The Air Force did not embrace Taylor, and one Air Force general – not a SAC "bomber general" -- said later "[Taylor's] *Uncertain Trumpet* was a lot of crap…and Taylor played a leading role in developing the ruinous strategy – gradualism -- that led to eight plus years of agony in Vietnam."[4]

McNamara and Kennedy not only rejected SAC's "Sunday punch" doctrine because of its lack of flexibility, but also because the cost was enormous. SAC had continued to develop more targets and to demand more weapons and systems to strike them, and SAC's 1963 SIOP called for attacking 8,400 Sino/Soviet targets with nuclear weapons, and the command had calculated that by the end of fiscal year 1970 it would need 3,000 Minuteman, 110 Atlas, and 70 Titan ICBMs, as well as 840 new RS-70 bombers with appropriate "heavy bombers of a more advanced nuclear-powered design" to continue assuring SAC's set goal of a 90 percent destruction of selected Sino-Soviet bloc targets.[5] But Kennedy and McNamara felt the US could not afford such a large, inflexible force and build up its conventional forces at the same time, so they dropped the "New Look" for a new American nuclear doctrine, "Flexible Response," which required a small and less expensive strategic force. Ironically SAC, which had become the mainstay of America's defenses in the 1950s because of its perceived cost effectiveness, had priced itself out of the game.[6]

Initially Kennedy told McNamara that he should not be constrained by the "arbitrary budget ceilings" that had forced a reliance on nuclear weapons in the 1950s but rather to proceed with acquiring general purpose forces based on "what type of conflicts we anticipate, what countries we choose to assist, and to what degree these countries can assist themselves; in short, what contingencies we prepare for."[7] However, the number of conventional forces required to meet this ambitious goal was staggering, so in 1962 McNamara and his DoD staff developed an intellectual basis for force structure development.[8] It was a "two and a half war" scenario, where the United States would have enough forces to fight a war against the Soviets in Europe, China in Asia, and a smaller insurgency anywhere in the world.[9]

MCNAMARA, THE WHIZ KIDS, AND THE PPBS

Before McNamara, a Secretary of Defense would impose limits on overall defense spending but provided little other guidance, and if the military said a weapon filled a "military requirement," that was enough.[10] McNamara's view was different. He came to DoD to lead and believed that DoD needed central planning, some method to prioritize needs other than the individual services's desires, and a way to find options other than those presented by the uniformed military. As soon as he took over, McNamara surrounded himself with a staff mainly drawn from RAND and the academic community, and then began to work on the new conventional forces and deciding how to pay for them.[11] In the process of systematically analyzing defense requirements, McNamara's staff produced probably the most important and lasting result of the McNamara years, the five-year Programming, Planning, and Budget System (PPBS), which become the heart

of the McNamara management program. McNamara also introduced the rolling Five Year Defense Program (FYDP) for long-range planning, but the FYDP only provided general fiscal guidance.[12]

The initial aims of PPBS were to set up a long-range, rather than year-to-year, budget process using analytical tools to develop explicit measures for which weapons systems the country needed, considering the military needs and costs together. Decisions in the PPBS, FYDP and other DoD initiatives were to be made by "Systems Analysis" (SA), which used economics and applied mathematics, especially statistics and algorithms, to analyze complex weapons programs, and quantitative "common sense" factors such as cost effectiveness to provide a scientific basis for decision making. One of the "Whiz Kids," Alain Enthoven, defined system analysis as a way to use "the simplest, most fundamental concepts of economic theory, combined with the simplest quantitative methods."[13] Enthoven said that through systems analysis "every decision should be considered in as broad a context as necessary…to reduce a complex problem to its component parts for better understanding. Systems analysis takes a complex problem and sorts out the tangle of significant factors so that each can be studied by the method most appropriate to it." [14]

To provide the analytical staff needed to develop these analyses of alternatives for the top policymakers, McNamara established an office that quickly became one of the most powerful in the Pentagon, the Office of Secretary of Defense for Systems Analysis, OSD/SA, and named Enthoven to a newly created position, Assistant Secretary for Systems Analysis. PPBS allowed OSD/SA to become advocates for positions, and they

often produced Draft Presidential Memorandums (DPM) for McNamara based on their analysis. McNamara used DPMs to send to his suggestions for actions, notably on weapons systems, without military approval (and at times without even discussion) to the White House for adoption, and often the DPM was used to cancel programs the military wanted, such as LeMay's pet Mach 3 RS-70 bomber, without military input.[15]

McNamara relied on civilians like Enthoven for advice rather than military officers because he wanted "independent" points of view of force planning, and the establishment of OSD/SA marked a centralization of authority in the hands of the civilians on the DoD staff. It soon became clear that McNamara would be less attentive to military advice than had previous secretaries, and this was to cause a major rift with military officers, who placed a high value on experience and whose natural want is to cover as many risks as possible. Enthoven and his OSD/SA staff, on the other hand, focused on the resource constraints that limited risk coverage, and approached problems with methods that seemed abstract and unrealistic to the military – and, as it would become clear, to Congress. [16]

When McNamara and his staff took over many of the functions that had been part of the uniformed military's portfolio it made them unpopular with the service leaders, but they were merely following a long established characteristic of the American political tradition which Samuel Huntington identifies in his seminal *The Soldier and the State* as the "popular strand." This popular strand is part of the "citizen soldier" legend, the belief that any American can excel in the military art. It is, as Huntington notes, the logical result of the constant tension between a professional military and a liberal state, and this

popular strand in American political tradition meant that few outside the uniformed military objected when McNamara took on additional powers as Secretary of Defense.[17]

Needless to say, the military did not welcome McNamara's initiatives based on the popular strand approach. Popular strand disregarded the fact that the service leaders believed that they were professionals, like lawyers or doctors, and many scholars such as Huntington agreed that the military were professionals. According to the "military as professional" school of thought, military officers possess the three characteristics of a professional -- expertise, responsibility, and corporateness -- and a central, unique skill, the management of violence. As professionals, their function is not only to conduct successful armed combat operations but also to organize, equip, and train their forces as well as planning the direction of the operations both in and out of combat.[18]

LeMay and his Air Force cohorts disliked systems analysis not only because their advice was systematically disregarded and because the decisions went against cherished Air Force programs, but also because it required a new way of thinking, analysis and even speaking that was unfamiliar to the generally poorly educated Air Force leadership.[19] LeMay and the other generals were used to what they saw as due deference, and the systems analysis jargon was especially difficult for them to master (though there is little evidence they tried), and they fell back on their only strength, experience. McNamara and his staff chose to interpret this lack of sophistication in the Air Force's arguments as a simple "appeal to authority" by a group that had no rationale for its programs. Enthoven especially attributed ulterior motives to the uniformed military, saying "much of the controversy over PPBS, particularly the use of systems analysis, is

really an attack on the increased use of the legal authority of the Secretary of Defense and an expression of a view about his proper role."[20] Thus, by using reasoning methods and jargon unfamiliar to the military, and by impugning motives to the uniformed military critics of systems analysis, McNamara and his staff were able to disregard the military's arguments rather than deal with them. The result was that the first year of the Kennedy administration, the Air Force lost every battle with McNamara and his staff.[21]

In retrospect, McNamara's handing of the military was unfortunate. The DoD under McNamara and the military had two different views, DoD putting the major emphasis on the economic impact of weapons selection while the military believed that the economics of weapons selection was only a part of the problem; the main problem was finding the right technology to meet the national defense strategy.[22] Had McNamara and his staff reflected more on the human aspects of systems analysis and the choices that humans had to make in the analysis, they might have been more modest in their expectations and more interested in the military's judgments. Nevertheless, LeMay and the other generals must bear some of the responsibility for having such a tin ear to the new developments; had they been more flexible, they might have smoothed some of the tensions.

One long-term result of the Whiz Kids' era was that, when the military services found themselves being regularly outmaneuvered by McNamara's systems analysts, they began to send some of their brightest young officers to various civilian management schools to become experts in modern management techniques. Soon, many uniformed military men had become expert in systems analysis, budget issues, and the management of various programs. While there was a great deal of internal discussion about how military men

were now becoming "managers" instead of "leaders," the education programs continued because the military simply saw no choice if they were to be able to keep control of their programs. By the mid-1960s, the Air Force had formed its own Studies and Analysis agency full of officers who had learned the systems analysts' "tricks" to find the right numbers to defend their positions. The Air Force began to take on OSD/SA at its own game – and, with support from Congress, increasingly won.[23]

NEW DOCTRINES AND THE END OF SAC'S DOMINATION

To keep continuity and credibility and, to a lesser extent, to keep the military mollified, Kennedy appointed LeMay as Chief of Staff of the Air Force in 1961, but the mood in SAC and the Air Force remained one of apprehension. The apprehension was soon justified as McNamara began cutting or reducing some of the Air Force's – meaning LeMay's -- most cherished programs.[24] McNamara accelerated the phase-out of the B-47 nuclear bomber fleet, suspended the development of a nuclear-powered bomber, and curtailed work on LeMay's top priority, the high-altitude, MACH 3 RS-70 bomber, begun during the Eisenhower years as a replacement for the B-52.[25] McNamara also canceled a planned wing of B-52s and the air-launched Skybolt, a ballistic missile with a 1,000-nautical mile range designed for launching from B-52 bombers.[26] Further, to the Air Force's dismay, McNamara showed a clear preference for missiles, the Air Force's ICBMs and the Navy's solid fuel, submarine-launched Polaris intermediate range ballistic missile, and expressed publicly his belief that the manned bomber as a strategic weapon had no long-run future; the intercontinental ballistic missile was faster and less

vulnerable.[27] In 1962, the Air Force received its last B-52 bombers, and more than twenty-five years passed before the Air Force acquired a new strategic bomber.

NEW CONVENTIONAL SYSTEMS

As McNamara had the military acquire more conventional weapons systems, he became concerned about the rapidly rising development cost of these systems. A 1962 study of twelve major weapons systems showed that the average program ended up costing 220 percent of the original estimated costs.[28] Between 1962 and 1965, to counter this trend of over-budget programs, McNamara and his staff developed a program known as Total Package Procurement (TPP), which continued the trend towards centralized decision-making authority in the offices of the Secretary of Defense.[29] The central idea of the TPP was that OSD/SA analysts would undertake studies to define mission areas, specify performance measures, analyze feasibilities, and estimate costs for weapons. A company's bid on the system had to incorporate all these costs in the bid, including initial design, final design, manufacture, testing, training, and spare parts, and the contractor was to be held to its bid cost, thus in theory eliminating cost overruns. Once the contact was signed, the contractor pursued the entire program – engineering, development and production -- with little involvement or oversight from the government.[30]

Because the doctrine of flexible response would call for a large increase in the number of Air Force tactical fighters, McNamara was especially interested in rising unit costs of tactical aircraft, which meant procurement of ever smaller numbers of ever more complex and expensive fighters. The soaring costs led McNamara and his systems

analysts to rethink fighter roles and missions with the aim of lowering these costs. There were many options, and McNamara settled on three for the TPP.

First, for fiscal reasons McNamara dropped full-scale development and prototyping, where several contractors each built a single prototype aircraft they thought would meet a military requirement, and then service pilots flew the prototypes to select the winner.[31] Under TPP, there would be no prototypes, only "paper airplanes" described in the contractors' bids. The arguments for and against this approach were obvious. By having flying prototypes, at least the most basic problems would show up, which was extremely important since an aircraft was selected and the award made to the contractors, it was difficult to cancel no matter how poor the aircraft's performance. On the other hand, because "paper proposals" without aircraft were relatively low cost, if the contractors did not have to build a prototype more would be willing to submit proposals, and thus provide more options.[32] This was a startlingly innovative approach, but whether or not it would be successful depended on how accurately the "paper" airplane and its systems would reflect the real one. The decision to use TPP was testimony to how committed McNamara was to his philosophy of systems analysis, which he believed could predict how a paper airplane would perform. It also showed how little attention McNamara and his staff paid to the uniformed services, which were strongly against the idea.[33]

The second and third areas McNamara focused on were areas that made no sense to him, the use of specialized fighter aircraft for different missions and the use of different aircraft by the Air Force and the Navy for what seemed to be the same mission. Both these questions had a long history. At the beginning of World War II, the air arms of the

warring countries had numerous mission-specialized aircraft, notably dive-bombers, but gradually the single mission aircraft disappeared, phased out in favor of pure fighters that became fighter-bombers when they became obsolete or when they were not required for air-to-air combat. Nevertheless, after World War II both the U.S. Air Force and Navy returned to specialized aircraft. Both had interceptors and both bought specialized ground-attack aircraft, the Air Force under SAC's nuclear philosophy of using jet fighter-bombers to deliver nuclear weapons and the Navy for specialized conventional attack.[34] On McNamara's second point, the Air Force and the Navy usually used different aircraft for the same missions because of the Navy's requirement for aircraft to be stressed to land on a carrier, with concomitant weight increases and performance compromises. Since the late 1930s there had never been a land-based aircraft that was successfully adapted for carrier operations, and only a few carrier aircraft had been successful as land-based aircraft because of this extra weight.[35]

"COMMONALITY"

To McNamara, these ideas seemed inefficient and out of date. He wanted fighters be designed from the beginning for "dual use" in both the air superiority and ground attack roles, and he made a commitment to the concept that henceforth both the Air Force and Navy should use the same tactical aircraft -- "commonality" -- because they were flying what he saw as essentially the same missions.

Commonality gave McNamara a quick victory. The Navy had bought a remarkable new fighter, the two-seat, twin-engine McDonnell F-4 Phantom II, as a specialized air-to-air interceptor for defense of their carrier task forces. The F-4 also could carry a large

bomb load, and McNamara began his drive for commonality by pressuring the Air Force to buy the Phantom. The Air Force was reluctant at first, but it needed a new fighter, had no serious design proposals for a fighter of its own in the wings, and the performance of the F-4 was exceptional. It quickly became clear that it would not only be a capable air-to-air fighter but also a ground attack and reconnaissance aircraft. With the F-4, the idea of commonality was off to a rousing start, though McNamara said "we started too late [on the F-4]."[36]

After the F-4, the services were looking forward to two new aircraft programs, a Navy interceptor to replace the F-4, an Air Force long-range interdiction/strike aircraft, and an Air Force close air support aircraft. At this point, based on "commonality" and "multi-role" considerations provided by OSD/SA, McNamara told the services to develop a single basic aircraft into different versions for each service. The base design was the Air Force's long-range interdiction/strike aircraft, designated the Tactical Fighter Experimental (TFX), and intended to penetrate Soviet air defenses at low altitude and high speed to deliver tactical nuclear weapons. McNamara told the Navy to develop a modified TFX using a new missile system as replacement for its proposed new interceptor, though the Navy argued strenuously that a single aircraft could not adequately perform both missions. While the F-4 had been successful, the Navy said the TFX was trying to merge incompatible requirements from the outset.[37] Nevertheless, McNamara and his OSD/SA analysts stuck with the decision, and the TFX was to become a milestone in the postwar history of fighter development and the poster child for commonality and the TPP.

Two companies, Boeing and General Dynamics, were the finalists for the paper TFX design, and both entries featured a variable geometry “swing” wing, which would allow the aircraft to land slowly when the wings were placed forward while having very high speed at low level when the wings were swept back. The Air Force and Navy preferred the Boeing design, but McNamara overrode their choice and awarded the contract to General Dynamics on 24 November 1962, in part because his OSD/SA systems analysts said that the Boeing proposal was not realistic and that the General Dynamics design promised to be more affordable and allow greater commonality.[38] There was a great deal of controversy about the choice because it showed how vulnerable systems analysis was to personal interpretation, and it was also widely noted that General Dynamics was located in Fort Worth, Texas, the home of Vice-President Lyndon Johnson.[39]

The TFX, renamed the F-111, was large and heavy, with a fully loaded takeoff weight of 96,000 pounds, because the titanium originally intended for much of the airframe to save weight proved prohibitively expensive. The F-111 variable geometry "wing box" was heavy, and the trade off between the extra weight and complexity of the mechanism made the performance benefits debatable. Overall, the F-111 pushed the envelope of aircraft, engine, and avionics design in a number of areas.[40]

THE “SACEMCIZING” OF THE TACTICAL AIR FORCES

The Cuban missile crisis of October 1962 solidified McNamara’s and Kennedy’s belief in improved conventional forces. While SAC’s capabilities and Kennedy’s threat to use them helped stabilize the situation, McNamara credited the peaceful outcome to mutual recognition by the U.S. and the Soviets that a nuclear exchange would be

mutually suicidal and to U.S. conventional forces enforcing the quarantine. LeMay, not surprisingly, disagreed.[41]

The new emphasis on conventional warfare meant the Air Force's tactical air force (TAF), in disarray at the end of the 1950s, began to grow. In 1961, SAC had almost 6,000 bombers, while the TAF had less than 2,000 fighters, but under McNamara, fighters moved to the top of the DoD budget, following only ICBMs. TAF wings increased from 16 at the end of FY1961 to 21 in FY1965, with plans calling for even greater increases.[42]

However, the rise of the TAF did not mean the Air Force culture changed. LeMay, now Chief of Staff of the Air Force, simply moved the SAC culture to the TAF, attempting to make it a "mini-SAC," the only difference being that it had fighters and tactical missions. He moved SAC "bomber generals" to take over the two primary TAF commands, United States Air Forces Europe (USAFE) and the critical stateside Tactical Air Command (TAC), and by October 1961 all major commanders and the vast majority of the Air Staff leaders were "bomber generals."[43]

LeMay's most important appointment was naming General Walter Sweeney, a pure bomber general, to take over TAC with Lt. General Charles B. Westover, another pure bomber general, as his deputy. As soon as Sweeney took command in October 1961, he set about "SACemcizing" TAC, and immediately focused on getting tighter control of what he saw as seen as an organization of undisciplined fighter pilots. [44]

Up until this time, TAC had been under a system of benign neglect. While the TAF had less money and older equipment than SAC, the pilots were able to fly the fighters they loved with relatively little supervision from the Air Force. In contrast to SAC, the

measure of merit in the Tactical Air Force was flying skill, and the TAF pilots fought like wolves to stay out of staff positions and in the cockpit. Because they avoided staff positions and were not in the Air Force nuclear bomber mainstream, not surprisingly promotion rates for fighter pilots were lower than their SAC counterparts, but that mattered little to them. The fighter squadrons had a regular inflow of excellent new pilots who were willing to give up promotion opportunities to do the kind of flying they enjoyed, and the fighter pilot culture flourished without growing. [45]

SAC members considered TAC to be the "raggedy ass militia" with a "flying club" mentality, and indeed flying fighters during this period was a lark.[46] From the period comes some of the most lyrical flying writing ever produced – Richard Bach, James Salter, Thomas Wolfe – but TAF "training" bore little relation to preparation for combat.[47] Daily fighter training missions consisted of going to a local ground attack range for a number of standardized bomb, rocket, and strafe deliveries, then skylarking at low level followed by unauthorized air-to-air combat – "dog fighting" or "hassling" – with any other fighters in the area or, failing that, with each other. There was a general but unsubstantiated belief that any kind of dogfight against any kind of aircraft was useful, but the main aim of the fighter pilots was just to compete, and the prevailing attitude was that "winning was everything."[48] There were few rules for such "training." Strict Air Force restrictions for low-altitude flying were honored in the breach, and young pilots were simply thrown into air-to-air dogfights and beaten badly, but rarely taught what they had done wrong. They learned by doing and, along the way, they picked up many bad habits. Few Air Force fighter pilots could explain what they were doing, and in

many ways air combat skill was generally considered a gift, not subject of study. The belief in the "gift," plus the general feeling that the next war would be a nuclear exchange that would not involve fighters except as delivery vehicles, promoted a casual attitude that offered no incentives to work on formations, escort tactics, or other aspects of air combat that were to prove necessary in wartime.[49]

This approach resulted in many accidents, which in Sweeney's new "Peace is Our Profession" TAC was unacceptable. One of Sweeney's first steps was increased emphasis on flying safety, and one of his subordinates wrote in an Air Force flying safety magazine as Sweeny was taking over TAC that "I can assure you that…General Walter C. Sweeny, down through his staff and on down into the field, [will] concentrate on eliminating pilot and supervisory errors."[50]

Sweeny accurately saw the TAC fighter pilot culture and training as ego-driven and undisciplined, with little interest in improvement, the opposite of the way SAC trained its crews.[51] SAC had a fixed set of techniques to improve the individual's performance, because an individual's performance reflected on the crew specifically and SAC in general. Sweeny set about to make TAC training the same as SAC's. Each TAC fighter pilot had to complete a series of quarterly training events -- X number of 30-degree dive-bombing runs, Y number of instrument approaches, and other events -- and carefully log them. To check on the effectiveness of the training, Sweeny brought in the SAC system of Standardization/Evaluation, though he did rename it Tactical Evaluation (TACEVAL), and periodic Operational Readiness Inspections (ORIs) for TAC's flying wings. ORIs were tests, not learning exercises, and passing ORIs was critical for a wing commander's

career. Under Sweeny's regime the measure of merit for TAC training became (1) no accidents (2) passing the ORI and (3) having all crews complete their standard events.[52]

The training was, by Air Force measures, successful, especially in the safety area. In 1959, just before Sweeny took over, TAC had 472 Class A accidents, but under Sweeny the accident rate steadily declined even measured in absolute numbers.[53] By 1965, the number of Class A accidents dropped to 262 because of adherence to rigorous new TAC safety guidelines, and notably TAC achieved this low accident rate as the command was expanding and increasing its training programs to supply crews to fly in the Vietnam War.[54]

Sweeny accepted Air Force doctrine of the day, that in the event of a war in Europe "to achieve air superiority, the most lucrative method is to destroy enemy air capability when it is on the ground by attacking his airfields and parked aircraft."[55] Since air superiority meant knocking out the Soviet air force on the ground, there was little need for unsafe air-to-air training for the pilots. One Air Force general noted later, "between 1954 and 1964, the USAF training curriculum for fighter pilots included little, if any, air-to-air combat. The omission was partly as part of doctrine, which regarded fighters primarily as a means for delivering nuclear ordinance, but mainly out of a concern for flying safety."[56] The strictly enforced virtual prohibition on air-to-air training met with much grumbling in TAC, and TAC pilots were also dismayed that they were criticized – harassed, they felt – for such "noncompliance with directives" as not using the aircraft checklist properly and "incomplete" briefings, not having TACEVAL team members on

special orders, and in general not being what the new command structure deemed "professional."[57]

Sweeny seems to have been an extraordinarily difficult commander to work for, and he and his programs generated "tremendous resentment" in the fighter community as he made changes that struck at the heart of TAC.[58] One of his most devastating changes was forcing a SAC system known as "centralized maintenance" on the tactical fighter wings. Prior to Sweeny, each TAC squadron had its own distinctively marked aircraft, each aircraft with its own maintenance crew chief and its own pilot with their names on "their" aircraft. Under the Sweeny system, all maintenance was taken away from the squadron and moved to the next highest level, the wing, where all squadron and personal markings were removed. This led to a loss of identity and the ending of the *esprit* that the flying members of the squadrons had established with their maintenance personnel. [59]

Sweeny also began to push SAC's "Zero Defects" program intended to completely eliminate mistakes. While "Zero Defects" was necessary working with nuclear weapons, it was simply impossible to fly the number of missions a tactical wing flew every day – about 60 – without mistakes. One TAC officer who became a four-star general later in his career remembered the results of Sweeny's Zero Defects era. "Few commanders can afford integrity in a 'zero defects' environment. Telling the truth ended careers quicker than making mistakes or doing something wrong."[60]

Sweeny's changes began to change TAC, making it more organized, better documented training, and many fewer accidents, the command appeared to be prospering. While the new system caused obvious morale problems, the falling morale did not appear

on Air Force measures of merit, and malcontents were dealt with in the standard way – they were moved out of TAC to different, non-flying assignments (radar stations in Thule, Greenland were a favorite) or given minor jobs and not promoted.

Sweeny became ill with pancreatic cancer in January 1965, but he refused to turn command over to his deputy and for the six months Sweeny's aide, Captain Wilbur Creech, did much of the day-to-day work until General Gabriel P. Disosway, the commander of United States Air Forces, Europe (USAFE), replaced Sweeny in July 1965.[61] Though Disosway had been the deputy commander of TAC and a fighter pilot before to World War II, he flew almost no combat during World War II and none in Korea. His career had been a succession of staff jobs in various areas, including personnel and weapons evaluation.[62] In 1965 there was nothing to suggest that in a few years, left to its own devices, TAC would be anything other than a "mini-SAC," with the emphasis on flying safety, filling training squares, and centralized top-down guidance. The attempt would almost certainly have succeeded except for one thing – the Vietnam War. It was to change completely the Air Force culture, probably forever. Suddenly flying fighters became important.

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1. Lawrence Lynn and Richard Smith, "Can the Secretary of Defense Make a Difference?" 7, 1 *International Security* (Summer 1982): 61.

2. For Kennedy's defense policies, see *Public Papers: Kennedy*, 24, 230-232, quoted in Robert Futrell, *Ideas, Concepts, and Doctrine: Basic Thinking in the United States Air Force 1961-1984, Volume II* (Maxwell Air Force Base, AL: Air University Press, 1989), 24-25.

3. Richard H. Kohn and Joseph P. Harahan, ed., *Strategic Air Warfare: An Interview with Generals Curtis LeMay, Leon W. Johnson, David A. Burhinal, and Jack J. Catton.* (Washington, DC: Office of Air Force History, 1988), 121-123.

4. Wilbur Creech, Gen. USAF, Oral History Interview by Hugh Ahmann, 19 June 92, K239.0512, AFHRA, 53.

5. Stephen L. Rearden, "U.S. Strategic Bombardment Doctrine Since 1945," in *Case Studies in Strategic Bombardment*, ed. Stephen Reardon (Washington DC: Air Force Museums and Studies Programs, 1998), 428..

6. Warren A. Trest and George Watson, "Framing Air Force Missions," in Bernard Nalty, *Winged Sword, Winged Shield: A History of the United States Air Force. Volume Two 1950-1997* (Washington, DC: Air Force History and Museums Program, 1997), 191.

7. Donald M. Snow, "Levels of Strategy and American Strategic Nuclear Policy," *Air University Review* 35 (November-December 1983): 64.

8. A good summary is found in William W. Kaufmann, *Planning Conventional Forces, 1950-1980* (Washington, DC: The Brookings Institution, 1982), 5-7, including Tables 1-2.

9. Allan Enthoven and K. Wayne Smith, *How Much is Enough?* (Santa Monica, CA: Rand Corp., 2005), 5-6, *passim*.

10. Alain Enthoven, "Economic Analysis and the Department of Defense," *The American Economic Review* 53 (May 1963): 414-416.

11. Keith Clark and Lawrence Legere, ed., *The President and the Management of National Security: A Report by the Institute of Defense Analysis* (New York: Praeger, 1969), 12-15.

12. Enthoven, "Economic Analysis," 416-418.

13. Ibid., 422; Richard Sanders, *The Politics of Defense Analysis (*New York: Dunellen, 1973), 13.

14. Enthoven, *How Much is Enough?,* 6.

15. Futrell, 29-30.

16. Ralph Sanders, *The Politics of Defense Analysis* (New York, NY: Dunellen, 1973), 34, 41, *passim.*

17. Samuel Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations* (Cambridge, MA: Belknap Press of Harvard University Press, 1957), 193.

18. According to Huntington, professionals are defined by the possession of the following acquired skills. Expertise: knowledge and skill in a significant form of human endeavor, acquired by prolonged education and experience. Responsibility: being a practical expert working in a social context and performing a service to society. Corporateness: the collective sense of organic unity and consciousness of themselves as apart from laymen. Huntington, 8-11.

19. Mike Worden, *The Rise of the Fighter Generals: The Problem of Air Leadership, 1945-1982* (Maxwell AFB, AL: Air University Press, 1997), 35, *passim;* C.R. "Dick"

Anderegg, Col. USAF, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, DC: Air Force History and Museums Program, 2001), 39-43.

20. Enthoven, *How Much is Enough?,* 13.

21. Kohn and Harahan, 89-90.

22. This is best seen in the full text of Enthoven's "Economic Analysis."

23. Futrell, 170-171; Thomas Clayton, "Air Force Operations Analysis," in *Encyclopedia of Operations Research and Management Science,* ed., Carl Harris and Saul Gass (Norwell, MA: Kluwer Academic Publishers , 2001). http://www.mors.org/history/af_oa.pdf. (accessed Feb 2006).

24. Trest, 188-189.

25. Rearden, 427.

26.Trest, 163,188.

27. Robert S. McNamara, *The Essence of Security: Reflections in Office* (New York, NY: Harper and Row, 1968), 20, 34, *passim.*

28. McNamara, 78-80.

29. Ibid., 86-88, *passim;* Enthoven, *How Much is Enough?,* 24-24, *passim.*

30. Enthoven, "Economic Analysis", 414-415.

31. Mark A. Lorell and Hugh P. Levaux, *The Cutting Edge: A Half Century of Fighter Aircraft R&D (*Santa Monica: Rand, 1998), 90-91.

32. Enthoven, *How Much is Enough,* 30.

33. Arthur C. Agan, Lt. Gen. USAF, Oral History Interview by Jacob Neufeld, 10 February l973, K.239.0152-857, AFHRA, 8-9; John P. Flynn, Maj. Gen. Oral History Interview, 13 August 1981, K239.0512-1187, AFHRA, 23-24, *passim.*

34. The US Navy ground attack aircraft were designated "A" for Attack (A-1, A-3, A-4) while air-to-air fighters were designated "F" for Fighter (F-8, F-4). The Air Force used "F" for all fighters and fighter-bombers. Lorell and Levaux, 12. In the author's mind, the most incongruous use of the prefix was on the later Air Force F-117 "Stealth" aircraft, which carried no air-to-air weapons at all, only two laser guided bombs.

35. For the conversion of air superiority fighters to ground-attack aircraft, one good source is Philip Jarrett's *Aircraft of the Second World War The Development of the Warplane 1939-1945* (London: Putnam Aeronautical Books, 1997), 79-82, *passim*. The difference between land-based and carrier-based aircraft is a well documented aspect of military aviation. See, for example, David Brown, *Carrier Fighters 1939-1945* (London: McDonald and Jane's, 1978), 7-9.

36. Congress, House Committee on Appropriations, *Hearings on Military Posture and H.R. 9714,* Statement by Secretary of Defense Robert McNamara, 87th Congress, 2nd sess., 14 February 1962, (Washington, DC: GPO, 1962), 3343-3345.

37. Robert F. Coulam, *Illusions of Choice: The F-111 and the Problem of Weapons Acquisition Reform* (Princeton, NJ: Princeton University Press, 1977), 56-58, *passim.*

38. Ibid., 64-67.

39. Futrell, 479-482.

40. Jeruald Gentry, Maj. USAF, "Evolution of the F-16 Multinational Fighter" (Student Research Paper, #163, Industrial College of the Armed Forces, 1976), 4.

41. Futrell, 84-85.

42. Ibid., 468.

43. Michael R. Worden, *Rise of the Fighter Generals: The Problem of Air Force Leadership (*Maxwell Air Force Base, AL: Air University Press, 1998), 89.

44. Tom Clancy and Chuck Horner, Gen. USAF, *Every Man a Tiger* (New York: Putnam, 1999), 76-79, for Horner's bitter view of Sweeney's impact on TAC. Worden gives a slightly more balanced approach, 25-28.

45. After graduating from undergraduate pilot training (UPT), the new pilots were given assignments from a list given out by the Air Force based on their rank in class - #1 received first choice, #2 second, and so on. There were only a few fighter assignments on each list, but they went quickly to the best pilots in the class, since few planned on staying in the air force. It was simply a pleasant alternative to the other options presented by the draft. Author's interview with James Salter (Horowitz), September 2005, South Hampton, New York.

46. Creech, Oral History, 97-98.

47. See James Salter's *The Hunters* (New York: Harper, 1956) as well as the previously noted Bach's *Stranger to the Ground* (New York: Harper and Row, 1963) and Wolfe's *The Right Stuff* (New York: Bantam Books, 1980).

48. Fredrick C. "Boots" Blesse, Brig. Gen. USAF, *Check Six: A Fighter Pilot Looks Back* (New York: Ivy, 1991), 54-55.

49. Bruce K. Holloway, Gen. USAF, "Air Superiority in Tactical Air Warfare," *Air University Review* 19, 3 (March-April1968): 8; Agan, 12.

50. Edward Hoisington, Brig. Gen. USAF, "Supervision Down the Line," *Flying Safety* 16 (January 1960): 18.

51. Creech, Oral History, 71. Creech was Sweeny's aide during this period.

52. Clancy and Horner, 77.

53. At that time the Air Force defined a "Class A" accident as one that resulted in a death, permanent disability, loss of an aircraft, or damage of more than $1 million. James A. Colley, Major, USAF, "Red Flag – Is Realism Worth the Cost?" (Student Thesis, US Army War College, 196), 23.

54. Statistics from Air Force Safety Center, quoted in Colley, 4-5.

55. Gabriel P. Disoway, Lt. Gen. USAF, "Tactical Air Power: Past, Present, and Future," *Supplement to the Policy Letter for Commanders from the Office of the Secretary of the Air Force,* 19 June 1963, 9.

56. Richard P. Hallion, "A Troubling Past: Air Force Fighter Acquisition Since 1945," *Air Power Journal (*Winter 1990), 54-64.

57. "TAC eval," *Tac Attack,* December 1961, 14.

58. Creech, Oral History, 72.

59. Robert Dixon, Gen. USAF. Oral History Interview, 21 September 1988, K239.0512-1591, AFHRA, 230, *passim.* Creech shared Dixon's views. Slife, 76-78.

60. Horner and Clancy, 117.
61. Creech, Oral History, 94-96.
62. http://www.af.mil/bios/bio.asp?bioID=5235. (accessed April 2005).

CHAPTER THREE: THE VIETNAM WAR AND THE DEVELOPMENT OF A NEW AIR FORCE CULTURE

THE AIR WAR

Combat air operations during the Vietnam War – known in the Air Force as "SEA" (Southeast Asia) -- took place in three distinct areas -- South Vietnam and later Cambodia, Laos and southern North Vietnam, and deep into North Vietnam. Each area had its own characteristics, determined mainly by the defenses. Defenses were relatively light over South Vietnam and Cambodia. Though they caused some problems for low flying (under 2,000 feet) aircraft, especially helicopters and other propeller driven "slow movers," in general South Vietnam was considered low threat for jets. From combat missions in South Vietnam and Cambodia the Air Force learned that it needed a new ground attack aircraft to support the Army, an aircraft that could carry a large bomb load, take damage, and loiter for long periods waiting for targets.[1]

Many areas of Laos, known as "Steel Tiger" in the south and "Barrel Roll" in the north, and in southern North Vietnam, known as Route Pack One or "Tallyho," had significant amounts of light and medium unguided automatic anti-aircraft (AAA), and occasionally surface-to-air missiles (SAMs), though the SAMs suffered from a poor command and control system and were generally ineffective.[2] The defenses were heavy enough that there were altitude restrictions – no flying below 4,500 feet – and it was highly dangerous (almost always fatal in some areas) for helicopters. In Laos, the North

Vietnamese were protecting their supply route south, the Ho Chi Minh Trail, and the supplies moved on the Trail mainly at night, like the Chinese in the Korean War, because the United States air forces lacked a serious night target location/attack capability. While the services developed many stopgap measures, notably the Lockheed AC-130 "Spectre" gunship, they were vulnerable to defenses. From trying to interdict the Ho Chi Minh trail, the Air Force learned it needed aircraft with the capability to locate and attack targets at night and in bad weather in defended areas.[3]

The bombing campaigns over the heavily defended Hanoi/Haiphong area, called "Route Package Six" or simply "Pac Six," had the greatest impact on the Air Force.[4] The campaigns into Route Package Six were divided into two periods, "Rolling Thunder" (February 1965 until April 1968) and, after a break of four years, Operations "Linebacker I" (April-October 1972) and "Linebacker II" (December 1972). These air campaigns over North Vietnam, flown against advanced Soviet systems and most closely approximating the kind of defenses the Air Force would meet in Europe, received the most attention from the Air Force.[5]

When the air war over North Vietnam first began early in 1965, it was an adventure for fighter crews. At the beginning of the war, aircrews were sent to bases in Thailand on temporary duty (TDY) to attack initially lightly defended areas in Laos and North Vietnam. [6] However, as the attacks increased the North Vietnamese defenses became stronger, especially in the Hanoi area, and American fighter squadrons, mainly F-105 fighter-bombers, moved full time into Thailand in mid-1965. By late 1965 the North Vietnamese, with the help of Soviet advisors and equipment, had established the

beginnings of a Soviet-style integrated air defense system (IADS) with large amounts of unguided AAA and an increasing number of early warning radars, as well as ground control radars to vector a small number of Korean War vintage MiG-17 fighters to attack American fighter-bombers. By mid-1966, the North Vietnamese received radar-guided AAA, then surface-to-air missiles (SAMs), and finally the latest Soviet MiG-21 fighters.[7] American losses steadily increased, and the losses brought a cultural change to the fighter community. Flying fighters was no longer a lark separate from the important business of SAC but a serious, dangerous affair, and the fighter crews quickly became professional in their attitudes toward the missions. They also began to take a perverse pride in flying the toughest missions – the "heavies – to the Hanoi area."[8]

RULES OF ENGAGEMENT

The bombing of North Vietnam was highly controversial at many levels. President Lyndon Johnson, Secretary of Defense Robert McNamara, and a small group of advisors directly supervised all attacks. Johnson famously (and accurately) said, "They [the pilots] can't bomb an outhouse without my permission."[9] Very strict and restrictive "rules of engagement" (ROE) formalized the control, and the result was that the Rolling Thunder bombing campaign from 1965 through 1968 was one of the most tightly controlled bombing campaigns in history. American aircrews were forced to fly routes designated by the White House to and from their targets to avoid overflying "sensitive" areas, and for most of Rolling Thunder the White House refused to allow the bombing of targets such as MiG airfields and supply depots in the cities of Hanoi and Haiphong, as well as strikes anywhere there might be the possibility of causing casualties among the Soviet

and Chinese military advisors. The most egregious example of the restrictive ROE happened in mid-1966 when surface-to-air missiles arrived in North Vietnam from the Soviet Union. The American political leadership refused to allow attacks on the elaborate sites while they were being built and were relatively defenseless, and it was not until the sites shot down two American aircraft that President Johnson allowed attacks on the positions. By then the defenses around the areas were so strong the Americans lost seven aircraft in the attack and failed to hit the sites.[10]

The claimed rationale for the ROE was to insure that the Chinese were not provoked into entering the war, but it was also a part of the same Kennedy/McNamara/Johnson "gradual escalation" philosophy that drove American nuclear strategy. Under "gradual escalation," US aircraft bombed major North Vietnamese targets one at a time, to try to pressure the North Vietnamese into stopping their support for the war in South Vietnam. Not only did the White House limit the air strikes, but from time to time it would initiate bombing halts to "send a message" to the North Vietnamese that America was willing to stop the bombing and negotiate. In the event, the North Vietnamese ignored the "messages" and used the pauses in the bombing campaign to disperse many potential targets and to build up defenses on the ones that could not be moved.[11]

Air Force Chief of Staff LeMay and the rest of the Air Force leadership had violently disagreed with "gradual escalation" as a nuclear strategy, and they disagreed equally vehemently with it as a conventional strategy. From the beginning of the war, LeMay wanted to launch a conventional version of his nuclear "Sunday punch" against North Vietnam, using B-52s and tactical aircraft to hit ninety-four critical major targets, the

Rolling Thunder Target List (RTTL, pronounced "rattle") the staff had identified as vital to the North Vietnamese war effort. To LeMay's disgust, Johnson and McNamara repeatedly refused to allow such an attack.[12]

The aircrews flying into Route Package Six thought the "gradual escalation" policy and the ROE were not only responsible for the heavy American losses but also were keeping the US from winning the war. They felt the policy offered no incentive to the North Vietnamese to move the peace process forward and simply resulted in more American losses and more aircrew killed or taken as prisoners of war (POWs). One senior former F-105 pilot, Colonel Jack Broughton, wrote two scathing books, *Thud Ridge* (1970) and *Going Downtown: My Battles with Hanoi and Washington* (1973), about these restrictions, and the books were widely read by Air Force and Navy fighter pilots.[13] Broughton's books reflected the crews' bitterness directed at not only McNamara and Johnson but also at the uniformed military, especially Air Force, leadership for not resigning to protest the crews lost because of the ROE. Most of the Air Force leadership Broughton was referring to were former SAC officers, and the close control over North Vietnam smacked of SAC rules and regulations. The fighter crews flying over Hanoi – incorrectly, in this author's mind -- lumped Johnson and McNamara, the Air Force leadership, and SAC into one group they blamed for the restrictions that handicapped the air strikes and caused the heavy losses.[14]

The pilots who flew the "heavies" over Hanoi returned highly decorated and with the credibility that the military bestows on combat veterans. The normal tour for pilots flying over North Vietnam was 100 missions, which took about five months. From 1966 to

1968, more than 2000 pilots survived their tours over North Vietnam, so the number of pilots directly affected by the limitations of the *Rolling Thunder* campaign was significant.[15] When they returned from the combat zone they told the story of the ROE and the losses it caused, and the tales quickly spread throughout the entire service, not just the fighter community. One of the reasons these stories spread quickly and became part of Air Force lore was that a common assignment for younger fighter pilots after a combat tour was as an instructor in one of the flying schools, where they had an audience of students eager to hear about the "big war" and the problems with the ROE, McNamara, and the SAC generals commanding the Air Force.

PERSONNEL DECISIONS

As the war intensified, the Air Force made a personnel decision that would have massive long-term consequences for the service. Because the length of the war was uncertain, the Air Force personnel officers reasonably decided it would be best to spread the danger (and the glory) evenly throughout the rated force, and made the decision that no aircrew member would be forced to fly a second, non-voluntary combat tour until everyone had flown their first.[16] The result was that during the eight years of the active war (1965-1973) most young (below the rank of lieutenant colonel [O-5]) Air Force aircrews flew a combat tour. [17]

The Air Force was able to implement this policy because, unlike the Navy and most other air arms in the world, it did not separate pilots in flying school. In the rest of the world, the best pilots in flying school automatically went to fighter/attack aircraft while the others moved to a track to initially become copilots of large, multi-engine aircraft

such as transports, bombers, and tankers. This idea of splitting pilots by flying skill in pilot training was anathema to the bomber-dominated Air Force, because from the time it became an independent service, the Air Force refused to accept the idea that fighter pilots were more skillful than bomber pilots. The result was an Air Force personnel policy that said that any pilot who graduated from pilot training was a "universal pilot" who could be trained to fly any type of aircraft, though in practice prior to the Vietnam War virtually no pilots from multi-engine aircraft were moved to fighters. The "universal pilot" force gave great flexibility to Air Force personnel officers when it came to assigning crews to new aircraft for combat tours, but it was to have severe unforeseen consequences.[18]

CULTURE SHIFT

The aircrews arrived in the SEA combat zone trained in the "fly safe" environment of the stateside Air Force, but once in combat they developed an entirely different culture. The stateside Air Force emphasized flying safety and ensured control with large numbers of inspectors and checks to make sure the crews were "following the book," but in SEA the Air Force could not afford such control measures. With combat units spread across Vietnam and Thailand, it was impossible to devote the resources to inspect each one to make sure they were following the rules -- everyone was simply too busy fighting the war. In SEA combat units, Air Force leaders had no choice but to decentralize and give individual commanders and aircrews control over the operations. This meant great freedom of action and few of the stateside rules -- as one commander put it to his newly arrived pilots, "your mission here is to fly, fight, and go to the bar."[19] The result was that the twenty-something-year-old aircrews had both responsibility and freedom to exercise

their own initiative with no one looking over their shoulders. Not surprisingly, most of them liked this arrangement.

In this combat culture, a new model of behavior, the "macho man," emerged. It honored pilots who were willing to "hang it out," to take chances, and who showed coolness under fire. In the rank order of "macho men," the fighter pilots who flew the missions deep into the heavily defended areas in Route Package Six in North Vietnam and suffered the most losses had the most status. One commander noted that, after his first mission to Route Package Six, a pilot "would feel like a real man. And he is."[20] At the same time, while aggressiveness was valued, the realities of combat made the fighter pilots' "flying club" atmosphere disappear, especially in the units that went to Route Package Six. Combat was serious business, and there was a push to minimize "stupid" losses. Informal rules quickly sprang up – never fly alone, don't go below 4500 feet, don't turn with MiGs – but the rules were enforced by the crews themselves, not by higher headquarters. The new model was the responsible, cool-headed but still aggressive pilots and flight leaders who "knew when to hold 'em and when to fold 'em."[21]

Over the long course of the war, virtually all of the Air Force's aircrew flew combat tours, and they provided a critical mass that would lead to a major culture change. The "Peace is Our Profession" motto disappeared, replaced informally with a new slogan – "The Mission of the Air Force is to Fly and Fight, and Don't You Forget It!" The slogan was quickly adopted by TAF fighter units around the world.

The new Air Force culture and behavior patterns that developed in this atmosphere of freedom and lack of controls seem to be best explained by the theory of "emergent

behavior." Emergent behavior is an unpredictable change that can appear when single agents (individual aircrew members) interacting in the same environment form different group behaviors. Previous standards have little or no effect on the emerging behavior, so the group behaviors that emerge cannot be predicted by the previous behavior or indoctrination of the individuals (the Air Force's "fly safe" culture). Because the number of interactions increased with the number of new aircrew, there were an enormous number of interactions and concomitant changes. [22]

The crews found combat a condition of high uncertainty, stress, and complexity, and also found that fast-moving combat situations tended to reward aggressiveness, flexibility, and innovation. A much more aggressive attitude replaced the stateside, non-combat Air Force philosophy that "flying safety is paramount to the completion of the mission." In combat, there was an emphasis on "getting the job done." If it could be done by the book, fine, but if not…. Air Force aircrews always went in to help American – or Army of the Republic of Vietnam (ARVN) – troops in trouble, whatever the circumstances.

Contributing to the aggressive attitude was the fact that accidents were not an issue. For bureaucratic reasons, in SEA an airplane lost or damaged for any reason, safety violation or not, was simply written off as a "combat loss." It saved paper work, encouraged aggressive flying, and gave Air Force units in Southeast Asia a spectacularly good flying safety record, which in turn helped the unit commanders' chances for promotion. [23]

The emphasis on getting the job done also had an effect on what was the normal hierarchal pattern of the Air Force. Command was necessary for promotion in the Air Force, and rank almost always determined who received stateside commands. However, in most SEA combat units, high-ranking officers who were lacking in skill or aggressiveness were sent to staff positions, and unit commands given to others of lower rank who had the skills needed in combat. At the lower levels, leadership roles were even more a matter of merit. If a young lieutenant was a better pilot and flight leader than a more senior officer, the lieutenant became a flight leader and the senior officer stayed a wingman. The combat culture was also wary, if not downright hostile, to those in staff positions and the senior leadership.[24] If the hippies of the time were saying "don't trust anyone over thirty," the SEA combat culture motto might have been "don't trust anyone who doesn't wear a flight suit."

THE WAR'S EFFECT ON PROMOTIONS

The newly emerging combat culture had another major impact on the Air Force as a whole. The overall command of the Air Force was still in the hands of LeMay's SAC protégés, but almost unnoticed in the long, drawn-out war was a change in Air Force promotion patterns that would make the Air Force command structure in the late 1970s completely different from its structure in the late 1960s.

On 28 December 1965, the Air Force Chief of Staff, Gen. John P. McConnell, terminated the Strategic Air Command Spot Promotion Program, which had given SAC officers a significant advantage in promotions. Now SAC officers had to compete for promotion on an equal footing with the rest of the Air Force, just as the Vietnam War was

becoming serious. As the war progressed, while senior three-star and four-star SAC generals still controlled the Air Force, there was a change in the overall promotion patterns, a change supported by the Secretary of Defense.[25] SAC was America's front line of deterrence, so the command had always been able to rationalize a larger share of Air Force promotions because SAC officers had more "responsibility." But the Vietnam War had changed the definition of responsibility, and SAC was slow to realize this. The command hurt itself in the promotion competition by trying to keep its more senior officers out of combat and on the SAC staff while the Air Force established a large number of fighter wings and fighter squadrons in both Vietnam and in Thailand, each of which was a command opportunity for lieutenant colonels and colonels. Additionally, the unit commands turned over quickly, usually every six months, unlike commands outside the combat zone, which usually lasted two years. This meant more tactical officers became commanders, and because a successful command in a combat zone was a virtual guarantee of promotion, more tactical commands meant more promotions for tactical commanders at the expense of SAC officers.[26] At the same time, SAC's oppressive culture had made it highly unpopular with young officers, and the Vietnam War offered them the opportunity to leave SAC by volunteering to fly a combat tour. This led to the exodus of many of SAC's best young officers, the ones who normally were promoted quickly.[27]

As the war dragged on, the "no second tour until everyone has flown first tour" policy began to bite, and more and more of SAC's older, higher-ranking officers had to fly combat tours. But once in combat, former SAC officers faced challenges in the SEA

combat culture. They had spent their careers in SAC's "Peace is Our Profession" and "by the book" atmosphere, and many were unable to adjust to the flexibility needed in combat operations. Others, especially those selected to fly fighters, had difficulty flying the small, agile, fast moving tactical aircraft. Some washed out of training, while others did poorly in combat. Still others moved to staff positions, unaware in that in the SEA combat culture the staff was considered the "penalty box" for officers that could not perform combat flying duties. For these reasons, relatively few former SAC officers received combat commands, which cut into their promotion possibilities.[28]

For the lower ranking officers, the dynamic was somewhat the same. A captain with a combat tour had been given a great deal of responsibility, often leading large flights on complex and dangerous missions and generally doing things that were easily explained in an Officer Effectiveness Report (OER). Additionally, an officer competing for promotion after a combat tour displayed a chest full of ribbons on his official photograph, and the photograph was the first thing a promotion board saw in a promotion folder. This gave him a significant advantage over an officer who had never been in combat and had few ribbons. As the war progressed, more officers with combat tours were promoted, and this began to have a synergistic effect. As an ever-increasing number combat veterans sat on promotion boards, combat tours became an important aspect for promotion. Fighter pilots with outstanding records were particularly likely to be promoted, often early, giving them a significant head start to becoming Air Force leaders and general officers. [29]

SAC did send its KC-135 tankers and B-52 bombers to the combat zone, but the tankers, while performing a vital mission, stayed well away from enemy defenses. The

B-52s flew regular bombing missions but at very high altitudes over areas of South Vietnam and Laos where no defenses could reach them. This was a violation of the combat culture, and the tactical combat crews who faced real enemy defenses every day developed a new slogan – "Peace is Our Profession, War is Our Hobby" – to mock SAC crews.[30]

COMBAT OPERATIONS

Over North Vietnam, the rules of engagement generally prohibited attacks on MiG airfields, so the only way to eliminate the MiG threat was to destroy the MiGs in the air. But air-to-air combat with the North Vietnamese MiGs proved more difficult than the Air Force or Navy expected. The F-4 was a highly capable aircraft but it was large and easy to see, had relatively poor visibility for the crew, and was saddled with flight envelope and radar limitations. More important, armament limitations undercut its effectiveness in the air-to-air role. F-4s carried AIM-9 "Sidewinder" heat-seeking missiles and AIM-7 "Sparrow" radar-guided missiles designed to be fired at bombers, but for most of the war F-4s did not carry cannon for close-range, maneuvering engagements. The Rules of Engagement usually required visual identification of enemy aircraft, so US pilots could not fire the long-range AIM-7 until they saw the enemy, which cut into the missile's efficiency. In hard turning combat – a "dogfight" – the AIM-7s and AIM-9s, which had a minimum range of half a mile, were often useless, and the cannon-armed MiGs had an edge over the missile-only F-4. Nevertheless, for most of Rolling Thunder the F-4:MiG kill ratio for both services was about 2.5:1 in favor of the Americans, which the Air Force leadership considered adequate. While the exchange ratio obtained in the Korean War

between USAF F-86s and Soviet-flown MiG-15s had been 10:1, the Air Force leadership explained the differences away as simply a reflection of the political ROE and inadequate US missiles.[31]

Then, towards the end of 1967, there was a disturbing shift in air combat over North Vietnam. The North Vietnamese MiGs became more aggressive, and in a series of shocking reverses from October 1967 to April 1968, the Air Force and Navy kill ratio against the North Vietnamese MiGs dropped to under 1:1. During 1967, MiGs accounted for 7 percent of the US losses over North Vietnam, but in 1968 North Vietnamese MiGs accounted for 22 percent of US losses.[32] Before the Air Force fully appreciated the importance of this development, in April 1968, President Johnson announced a bombing halt over the Hanoi area that soon expanded to a bombing halt over all of North Vietnam.[33] With the end of the raids into North Vietnam, encounters with MiGs ended, for all practical purposes, for the next four years.

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1. Arden B. Dahl, Maj. USAF, "The Warthog: The Best Deal the Air Force Never Wanted" (Student Thesis: National Defense University, 2003), 2-3.

2. The Air Force defined "light" as small arms and automatic weapons up to 14.5mm, and "medium" as 23mm, 37mm, and 57mm cannon. Chapter 2, "Defenses," *432nd Tactical Reconnaissance Wing Tactics Manual* (Udorn, Thailand, 1970), 7-8. Author's collection.

3. Robert Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force* (Maxwell Air Force Base, AL: Air University Press, 1989), 307; for the results of this problem on Air Force weapons systems selection, see James C. Slife, Lt. Col. USAF, *Creech Blue: General Bill Creech and the Reformation of the Tactical Air Forces, 1978-1984* (Maxwell Air Force Base, AL: Air University Press 2005), 34, *passim.*

4. Like North Korea in the Korean War, North Vietnam was divided into "Route Packages" to deconflict Air Force and Navy Strikes. The Air Force had Route Packages I, V, and VI, the Navy II, III, IV, and what was known as VIA, the Haiphong area. Wayne

Thompson, *To Hanoi and Back: The U.S. Air Force and North Vietnam, 1966-1973* (Washington, DC: Smithsonian Institution Press, 2000, and Washington, DC: Air Force History and Museums Program, 2000), 297 (map).

5. Ibid., 280-284.

6. The air bases in South Vietnam were full of aircraft being used to support the ground forces. The government of Thailand allowed the USAF to use Royal Thai Air Force Bases (RTAFB) as long as the missions were flown into Laos and North Vietnam, not South Vietnam. Jacob van Staaveren, *Gradual Failure: The Air War Over North Vietnam 1965-1966* (Washington, DC: Air Force History and Museums Program, 2002), 23, 75, 146-149; Thompson, 5-6.

7. Istvan Toperczer and Mark Styling, *MiG-21 Units of the Vietnam War* (London: Osprey, 2001), 4-5, *passim.*

8. Jack Broughton, Col. USAF, *Thud Ridge* (Philadelphia: Lippincott, 1969), 4.

9. Futrell, 288-289; Van Staaveren, 84, *passim;* for a summary, 312-324.

10. Van Staaveren, 161-165.

11. Ibid, 108, *passim.*

12. Tilford, 106; also Richard H. Kohn and Joseph P. Harahan, ed., *Strategic Air Warfare: An Interview with Generals Curtis LeMay, Leon W. Johnson, David A. Burhinal, and Jack J. Catton.* (Washington, DC: Office of Air Force History, 1988), 13, *passim.*

13. Broughton's books were also very popular in the Israeli Air Force; *Thud Ridge* was translated by one of their leading aces, Brigadier General Asher Snir. Author's journal while Air Attaché to Israel, 1977-1980.

14. See, in addition to Broughton's books, Tilford and most notably H. R. McMaster, *Dereliction of Duty: Lyndon Johnson, Robert McNamara, the Joint Chiefs of Staff and the Lies That Led to Vietnam* (New York, N.Y.: Harper Collins, 1997). The US Navy aircrews had the same feelings. This was the theme of the popular 1990 film *Flight of the Intruder* and was based on the novel by the same title by Stephen Coonts (Annapolis MD: Naval Institute Press, 1986).

15. At different times in this narrative, the author will use the term "pilots" and at other times "aircrew," and this is deliberate. The F-4 had two crew members, early in the war two pilots and later a pilot and a navigator, generally called a Weapons Systems Operator (WSO, or "wizzo"). Though the WSOs shared the same risks as the pilots, in terms of influence, promotions, leadership positions, and virtually all other measures of merit, pilots dominate the Air Force and navigators are relegated to a distinct "second class citizen" role, and their promotion rates and other measures are the same as non-flying officers. Many F-4 pilots deplored this, but it was a fact. Thompson, 7-8, *passim.*

16. Van Staaveren, 145-146. "Rated" is the Air Force term for officer aircrew – pilots and navigators. Worden, 4.

17 While many SAC crews flew short "combat" tours (six months or less) in B-52s or KC-135 tankers, these did not count as tours, mainly because of the low risk involved

in the missions. Marshall Michel, *The Eleven Days of Christmas* (San Francisco, CA: Encounter Books, 2001), 18-20.

18. This policy was identified as the main reason for a variety of problems over North Vietnam, including high losses later in the war. *Red Baron III, Vol. 1, Summary* (Nellis AFB, NV: Tactical Fighter Weapons Center, 1975), 3-4, *passim.* The Red Baron Reports originated with a request from the Department of Defense Research and Engineering (DDR&E) to the Weapons System Evaluation Group (WSEG) to begin a study of air-to-air engagements in SEA to identify research and development projects for the years 1970-1975. The results were four volumes dated October 1967, April 1968, September 1968, and February 1969, that covered 765 encounters. Red Baron II was conducted by the military services and evaluated 625 encounters through 30 June 1972in a five-volume report dated January 1973. Red Baron III was a five-volume study that covered 394 encounters during the rest of the war. *Red Baron III, Vol. 1, Summary* (Nellis AFB, NV: Tactical Fighter Weapons Center, 1975), 1.

19. Bill Griffin, Lt. Col. USAF, 14th Tactical Fighter Squadron Operations Officer, Udorn, Thailand, to author during author's orientation briefing, October 1970.

20. Broughton, 6.

21. Ibid., 23; C.R. "Dick" Anderegg, Col. USAF, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C: Air Force History and Museums Program, 2001) 11-14.

22. Emergent behavior is common and can be seen in the World Wide Web (WWW), urban traffic patterns, and the stock market. For a full explanation, see Steven Johnson, *Emergence: The Connected Lives of Ants, Brains, Cities, and Software* (New York: Scribner 2002).

23. John Schlight, "The War in Southeast Asia," in *Winged Sword, Winged Shield: A History of the United States Air Force. Volume Two, 1950-1997,* ed. Bernard Nalty, (Washington, DC: Air Force History and Museums Program, 1997), 278-79; Mike Worden, *The Rise of the Fighter Generals: The Problem of Air Leadership, 1945-1982* (Maxwell AFB, AL: Air University Press, 1997), 27-28.

24. Anderegg, 26.

25. McNamara, for example, sent back a promotion list to LeMay because it had too many SAC officers on it. Drue L. DeBerry, "Flexible Response: Evolution or Revolution," in Nalty, 175.

26. Worden, 112.

27. Michel, *Eleven Days,* 15-16.

28. Walton S. Moody and Jacob Neufield, "Modernizing After Vietnam," in Nalty, 350-352; Worden, 118-119.

29. Worden, 121.

30. Broughton, *Thud Ridge,* 6-7, *passim*.

31. William W. Momyer, General USAF, *Air Power in Three Wars: World War II, Vietnam, and Korea* (Washington, DC: Department of the Air Force, 1978), 172, passim.

32 *Red Baron Reports, Volume Three* (Nellis AFB, NV: Tactical Fighter Weapons Center, 1975), 5.

33. Thompson, 139, *passim*.

CHAPTER FOUR: STATESIDE TECH WARS

THE FIGHT FOR AN AIR SUPERIORITY FIGHTER

In 1963, the Tactical Air Command began the formal process of replacing the F-4 by sending the Secretary of Defense a Requirement of Operational Capability (ROC) for an air-to-air fighter to replace the Phantom. Nevertheless, it was not until early 1965 that Major General Arthur Agan, the Air Force Director of Plans and Operations (XO), formed an Air Force panel to develop a "Tactical Air Superiority Study" to consider the requirements for the F-4 replacement.[1] Agan was an advocate of pure, single-role air-to-air fighters, and as vice commander of the United States Air Forces, Europe (USAFE) had said, "I wanted to rename our so-called fighters, the F-105 and the missile-armed F-4, 'attack aircraft' because that's what they were. If I had been commander of four wings of Russian fighters I could have wiped us [the US F-4/F-105 force] out in a single morning of air-to-air combat…we [would have been] totally destroyed."[2] To give his panel authority, Agan included former fighter pilots who had ten or more air-to-air kills in World War II and Korea. The Agan panel focused on improved technology for the new fighter, the standard form of Air Force innovation. It was taken as a given that Air Force pilots were well trained.

Much of the impetus for a pure air-to-air fighter came because the F-111 was a long-range attack aircraft with no air-to-air capability, and also because it was shaping up as a

disaster that Air Force generals privately called the "switchblade Edsel."[3] Expensive from the start, many of the F-111's systems were unsuccessful, resulting in massive cost overruns and performance shortfalls. By 1965, its flyaway cost had soared to $103M a copy, and it proved to be an operational failure as well. Its first combat operations over North Vietnam were so unsuccessful after a few months the force had lost half its aircraft and the surviving F-111s returned to the United States.[4]

The requirement for a pure air-to-air fighter would, the panel knew, be controversial. Secretary of Defense McNamara and his DoD staff had insisted on multi-role fighter-bombers, and Assistant Secretary of Defense for Systems Analysis Alain Enthoven seemed focused almost entirely on aircraft for the Vietnam War. He was far more interested in a small, simple, ground-attack aircraft for immediate use in combat than on a new fighter for a future conflict with the Soviet Union. General Agan viewed this as very shortsighted and thought many of the problems with the OSD staff came from its fixation on Vietnam. Agan felt this tunnel vision not only drove the kind of weapons OSD wanted, but also led the OSD to forget the situation in Europe, where the U.S. Air Force could expect a huge battle for air superiority in the event of a war with the Soviets. Agan noted "[the OSD] staff were all thinking about Vietnam…where we had air superiority given to us. This wouldn't happen against Russians [in Europe] who had more air-to-air combat capability and where we will have to win air superiority."[5] McNamara reinforced this perception when he sent a memo to Secretary of the Air Force Eugene Zuckert directing that when considering a new ground-attack fighter, the Air Force "should assume air superiority."[6]

As for the multi-role issue, the Agan panel knew that in World War II, Korea, and Vietnam virtually all the effective fighter-bombers on every side began their service lives as air-to-air fighters, and then became fighter-bombers when they became obsolescent or when there was no longer an air-to-air threat. But the process did not work in reverse -- no aircraft designed from the start as a multi-role fighter-bomber by any nation had been successful as an air-to-air fighter.[7]

The Agan panel validated the requirement for a pure air-to-air fighter, and in February 1966 Agan arranged an unprecedented meeting among the three Air Force four-star generals who controlled the TAF, the commanders of TAC, USAFE, and the Pacific Air Forces (PACAF). After this meeting, the three four-star generals sent Air Force Chief of Staff General John McConnell a "twelve-star" letter supporting the idea of a fighter primarily dedicated to air-to-air combat. This was the first "twelve-star" letter in the history of the Air Force and marked an unprecedented unity of opinion.[8] For the first time, all three commanders of the TAF agreed to a requirement and significantly, General Gabriel P. Disosway, the new commander of TAC and a traditional supporter of multi-role fighters, seemed to agree to a pure air-to-air fighter.[9] More important, this was a seminal doctrine change.[10] "Air superiority" now meant destroying enemy aircraft in the air, not just destroying them on the ground. From doctrine flows systems, and so when McConnell agreed to the new doctrine he also agreed to the specialized air-to-air fighter it would require.

When the Agan panel report reached Enthoven's Office of Systems Analysis, the OSD/SA staff began considering the requirement, now called the "F-X."[11] Despite

Agan's report, there was a great division of opinion in OASD/SA about whether the new fighter should be a multi-role aircraft designed from the beginning for air-to-ground and air-to-air missions, or strictly an air-to-air fighter. This air-to-air/multi-role debate was to persistently haunt the development of the F-X, but the pressure for a multi-role fighter was somewhat relieved when the Air Force, under pressure from McNamara and the Army, agreed to buy an aircraft solely for close air support (CAS).[12] CAS was when aircraft attacked so close to friendly troops they had to be actively controlled, and because it involved close contact with the Army, and, as one Air Force historian notes, "of all the forms and uses of air power, [CAS was] the most contentious."[13] The Army wanted the mission for itself and was developing an advanced attack helicopter to would take the mission from the Air Force, but for a variety of reasons, mainly chauvinistic, the Air Force was unwilling to turn the CAS mission over to the Army. To comply with McNamara's request, many in the Air Force wanted a dual role aircraft, the Northrop F-5, capable of both close air support and air-to-air combat. But after much discussion in the Air Force and in OSD, in the end the Air Force yielded to McNamara's continuous prodding for commonality and, in November 1965, agreed to buy the Navy's A-7 attack aircraft virtually "off the shelf" for the CAS mission.[14] The decision was not a happy one for the Air Force senior leadership because it meant for the next ten years the Air Force tactical fighter force would consist mainly of Air Force versions of the Navy F-4, the Navy A-7, and McNamara's multi-role F-111. Still, the A-7 proved in many ways a blessing. It was a fine aircraft with long range, accurate bombing systems, was capable of carrying a very heavy bomb load, and was highly regarded by its pilots, who dubbed it

the "SLUFF."[15] In the end, the most important contribution the A-7 made to the Air Force was that it gave the service a modern ground-attack aircraft, so the Air Force was free to develop a single-role fighter for air superiority.[16] As one Air Force general later noted, "It broke the back of OSD's insistence on multipurpose fighters across the board, [and] set the stage for the F-15."[17]

There also arose a separate debate over the characteristics of a "pure" air-to-air F-X. There were two schools of thought. One, the "higher, faster" school, believed that improvements in a fighter meant having it fly higher and faster and fire advanced missiles at long range to shoot down enemy aircraft flying below it. The other school, the "turn and burn" school, believed the main criteria of an air-to-air fighter should be outstanding maneuverability and acceleration at low and medium altitude and the ability to make kills with conventional missiles and guns. [18]

The leading advocate for the "higher, faster" F-X was the renowned Lockheed designer, Clarence "Kelly" Johnson, developer of the U-2, the SR-71, and later the F-117 Stealth fighter, as well as a number of less successful aircraft like the F-104 Starfighter and the Navy's XFV-1 "Pogo" vertical takeoff fighter. Johnson's F-X was essentially a scaled-down SR-71 that would be made of titanium and would fly at Mach 3.2 at 80,000 feet.[19] At about the same time, the Air Force Systems Command (AFSC) recommended an F-X similar to the F-111, a large, heavy (60,000 pounds), twin-engine, two-seat fighter with variable geometry wings.[20] Both the Lockheed and the AFSC aircraft would have a high wing loading making them incapable of turning combat in low and medium altitude dogfights. [21] The "higher, faster" F-X would also require what seemed to some as "magic"

– completely new radar and new missiles that would require separate, expensive development programs. The success of the "higher, faster" F-X would be dependent on these separate programs.[22] Additionally, both "higher, faster" F-Xs would follow the trend in fighter development towards larger, heavier, and much more expensive fighters.

These two proposed fighters confirmed the worst fears of Agan and the advocates of the "turn and burn" F-X. The cost and high technology of Johnson's aircraft seemed to them to be exactly the opposite of what the Air Force should be procuring, and the ASD-proposed new fighter, with complicated and heavy variable geometry wings, quickly became known as the "baby TFX." The opponents of the "higher, faster" fighter proposals had seen intelligence reports of new Soviet air-to-air fighters that had high performance at low and medium altitude, as well as disturbing initial reports from the air war over North Vietnam. The F-4 was having some difficulty in dogfights with North Vietnamese flying old Soviet MiG-17s, and there was the fear that the newer Soviet fighters, the MiG-19 and MiG-21, would prove to be superior to the American fighters.[23] They were also concerned about the failures of American air-to-air missiles thus far and the fact that the "higher, faster" F-X would not carry cannon. What the "turn and burn" F-X advocates wanted was an aircraft with relatively conventional avionics and weapons – including cannon -- but with the engine power and aerodynamics to defeat any Soviet fighter in turning dogfights at low and medium altitudes. Such a fighter would be much cheaper than the Lockheed or ASD proposals, though still costly. [24]

The initial decision of the type of F-X was crucial, because under McNamara's TPP program there would be only one aircraft selected based on strictly "paper" criteria. Once

there was a decision on the type of F-X, it would generate the requirement profile, and when the program started it would be like the F-111, practically impossible to cancel, no matter how badly it fell short of the requirements or how much it was over budget.[25]

"BLUE BIRD"

The debate raged through 1966, and at times it appeared the F-X would be stillborn because of various objections in OSD and the seeming inability of the Air Force to decide on its requirements.[26] Then, in September 1966, General James Ferguson became commander of Air Force Systems Command (AFSC). Ferguson had a fighter background in both World War II and Korea, and he dramatically changed the Systems Command's position on the F-X. He dropped the "baby TFX" proposal and began to push for the F-X to be a "turn and burn" fighter. By the spring of 1967, the Air Force committed to a twin-engine, single-seat F-X air-to-air fighter with fixed wings and weighing about 40,000 pounds, called "Blue Bird." It was to be highly maneuverable – far more maneuverable than any previous or current jet fighter -- and powered by new, advanced jet engines that would give it a speed in excess of Mach 2. It would be equipped with sophisticated fire control radar and armed with both radar-guided and heat-seeking missiles, as well as internal cannon.[27] There was some debate about the number of engines – many wanted a single-engine fighter – and the large radar for radar-guided missiles, but in the end, the twin engines and radar stayed.[28] While American intelligence was aware the Soviets were secretly developing new fighters, the Soviets unintentionally helped the proposed "Blue Bird" design by publicly displaying a number of these advanced fighters – two variants of a new swing-wing fighter, the MiG-23 "Flogger," the Su-7 "Fitter" fighter-bomber, the

Su-15 interceptor, the Yak-36 vertical takeoff fighter, and the MiG-25 "Foxbat"-- at the Moscow Air Show at Domodedovo airport on 9 July 1967. Most were clearly intended for low to medium altitude operations.[29]

However, the Air Force would have to justify the "Blue Bird" and counter Kelly Johnson's "higher, faster" advocates, and Agan and his group needed hard numbers to quantify the advantages of the new "Blue Bird" to the systems analysis-oriented OSD/SA staff who would be making the decisions under TPP.[30] The Air Force knew what the measures of merit were in fighter performance and how to compare them in existing aircraft. In World War II every combatant had test flown captured enemy aircraft to measure their performance in such critical areas as top speed, acceleration, roll rate, and rate of climb at various altitudes. Combat veterans then flew the captured aircraft against their own aircraft to determine where their aircraft had superior performance and where the enemy aircraft had superior performance. The results were extremely useful and provided to pilots as simple "rules of thumb," though the RAF did develop a set of performance graphs for all the RAF and enemy aircraft it tested.[31] However, these graphs required real aircraft to give the data points. What the Air Force needed was the capability to measure the "paper" F-X's air-to-air combat capability with performance graphs to provide the type of numbers McNamara and his staff wanted.[32]

To get these hard data points, Agan brought in Major John Boyd, a former Air Force fighter pilot and newly graduated engineer, to develop a way to measure paper airplanes' performance. Boyd had flown a few missions as an F-86 pilot in the Korean War and had been the head of the Fighter Weapons School Academic Section at Nellis Air Force Base,

Nevada, where he acquired a reputation as a relentless self-aggrandizer and a great fighter pilot "from nose to chin."[33] Nevertheless, when Boyd joined Agan's team, he found his niche in a role combining his engineering and flying experience. Boyd and Dr. Thomas Christie, an engineer at Eglin Air Force Base, developed a concept called "energy maneuverability," a way of measuring "paper fighter" maneuvering capabilities that lent itself well to the type of computer analysis and simulation OSD analysts favored.[34] Agan found Boyd's first effort fell well short of the mark, but the eventual outcome, when combined with an Air Force computer model called "TAC Avenger," became an extremely useful tool.[35] Even though "energy maneuverability" was merely putting old wine in new bottles – one general noted, "it was not a revolutionary theory at the time…just another way of comparing performances of two fighter airplanes," it had the huge advantage of being applicable to "paper" designs, not just real airplanes.[36]

When the energy maneuverability analysis showed that the F-X would be extremely effective against the new Soviet fighters, Enthoven's OSD/SA group initially accepted the findings and the energy maneuverability measures. Then later, after some thought, Enthoven announced he had changed his mind, perhaps because the program was not initiated in his office. This caused a huge row between Enthoven and the Secretary of the Air Force, Eugene Zuckert, who had been following the "Blue Bird" closely.[37] In the end, the Air Force and Zuckert convinced McNamara to overrule Enthoven based on the energy maneuverability performance analysis combined with the huge cost of an aircraft such as the one "Kelly" Johnson was proposing, and OSD approved the "Blue Bird" proposal in December 1967. The Air Force awarded "Blue Bird" study contracts to

McDonnell-Douglas and General Dynamics, though several other companies took part in the competition using their own funds.[38]

This case was an example of why Enthoven was the type of McNamara staffer who frustrated the Air Force. Not only had his OSD/SA office thwarted and delayed many Air Force programs, but many Air Force generals also considered Enthoven a "stupe." One general said it was "the crime of the time" that the Air Force had to try and explain its air combat programs to a person who was "a mathematician only," and another Air Force general who had to deal with Enthoven on a regular basis remembers, "the problem was he didn't understand air combat [something Enthoven would not have denied] and the only way he could was if I could describe it [the situation] in numbers."[39]

This case also highlighted one of the continuing criticisms of OSD/SA both by the Air Force and, increasingly, by Congress. Both felt that OSD/SA was more interested in debating analysis issues than in choosing weapons systems, and that the uniformed services were wasting huge amounts of time answering seemingly endless questions from SA. Even SA analysts were aware of the problem.[40]

"RED BIRD"

Meanwhile Boyd, despite his participation in the F-X/"Blue Bird" proposal, was unhappy with the resulting size and complexity. During the Korean War, American Air Force F-86s had about a 10:1 kill ratio against Soviet-built MiG-15s flown by excellent Russian pilots, but after the war, many F-86 pilots criticized the F-86 for being too heavy because of "unnecessary" equipment. The F-86 weighed about 8,000 pounds to the MiG-15's 7,000, and since both aircraft's engines developed the same thrust this gave the

Soviet fighter a much greater service ceiling and much faster rate of climb than the F-86.[41]

On the other side were a large number of Korean War aces and other experienced pilots who disagreed, notably General James "Jimmy" Doolittle, commander of the American Eighth Air Force whose fighters destroyed the *Luftwaffe* in 1944. They felt that the high-technology avionics, while heavy and hard to maintain, allowed the Air Force F-86s to have the high kill ratio despite the Soviet fighter's lighter weight.[42] Indeed, Soviet MiG-15 pilots who later examined downed F-86s were extremely envious of the very F-86 systems Boyd and others criticized.[43] Throughout the 1960s, the great debate raged in the lower levels of the American fighter community about whether or not sophisticated American systems were worth the weight penalty. Boyd, who had never flown a fighter with any type of avionics or radar, came down solidly on the side of sacrificing the weight of avionics for performance. [44]

While working on the F-X, Boyd met Pierre Sprey, a weapons system analyst on the OASD/SA staff, whose background was similar to Enthoven's but much less distinguished. By his own account, Sprey was a dilettante with an engineering degree but no military experience. After graduation from Yale, Sprey became a research analyst at the Grumman Aircraft Corporation for space and commercial transportation projects. He came to OSD/SA in 1966, where he declared himself an expert on military fighter aircraft, despite his lack of experience. Sprey admitted being a gadfly, a nuisance, and an automatic opponent of any program he was not a part of.[45] He was opposed to many Navy

and Air Force tactical air systems, especially the Navy's Grumman F-14, because of its size and complexity.[46]

Somehow, Sprey concluded that numbers were critically important in air combat, and he and Boyd – both glib, iconoclastic, ambitious, self-aggrandizing, and excluded from the decision-making process -- found a common cause in opposing larger, complex fighters.[47] Boyd had read theories of combat that proposed to be based on "maneuver" warfare rather than "attrition" warfare, and he decided that large, complex, and expensive fighters with advanced avionics and weapons were less effective in air-to-air combat than small, simple, more maneuverable ones that could be bought in large numbers.[48] The two were to give themselves the grand name of "Reformers," but time would show they were actually "Critics." One scholar, Timothy Lefler, defines "critics" as members of a group that have support neither for their proposals nor an interest in succeeding by conciliation and cooperation. Lefler continues that to become a "reformer" one must bridge the gap between criticism and successful reform by recognizing the obstacles to change, and then gaining the support of state authority and the cooperation of the active participants.[49] The next decade would show Boyd, Sprey and the rest of a group they gathered around themselves were never interested in bridging the gap and becoming reformers; they preferred to remain critics.

Boyd and Sprey said the increasing cost of high-technology American fighters like the "Blue Bird" would make it impossible for the United States to maintain near numerical parity with the Soviet Union, which they felt was necessary. It logically followed America needed smaller, less expensive fighters to get the numbers they felt the

Air Force needed. Buried in this proposition was the fact that Boyd and Sprey were going beyond proposing a new aircraft. They were proposing the United States try to match the Soviets in numbers, which was an entirely new way of thinking about American defense and a change in basic American military doctrine that had been in place since the beginning of the Cold War.

PLAYING WITH NUMBERS

From the end of World War II, American defense planners had accepted as a given that they could never match the Soviets in numbers of conventional weapons and manpower. At first SAC's nuclear weapons and bomber force offset the Soviets' conventional supremacy. During the Kennedy/Johnson/McNamara conventional buildup, it was clear that because of costs and manpower America could not match the Soviets' vastly greater numbers of conventional weapons, so American conventional weapons doctrine focused on "force multipliers" provided by fewer but more sophisticated and effective conventional weapons that could kill at a 3-4:1 ratio.[50]

Sprey and Boyd disagreed with this doctrine and the high-tech systems it required.[51] The two began to work on an alternate concept to the "Blue Bird," called the "Red Bird," a clear weather, air-to-air combat only fighter with a top speed of Mach 1.6 instead of the "Blue Bird's" Mach 2.5+. Boyd and Sprey viewed any speed higher than Mach 1.6 as unnecessary because at that time, for aerodynamic reasons, all dogfights took place at subsonic speed and there was a significant technical and financial price for flying at Mach 2+.[52] They claimed the reduced top speed was the only area where the Red Bird's performance was lower than the Blue Bird's, and that by limiting the Red Bird to Mach

1.6 the fighter would be much less expensive, lighter, and have better performance. Sprey and Boyd also decided to remove the radar and the associated radar-guided missiles, which they considered unreliable, further reducing the Red Bird's weight. They estimated the Red Bird would weigh about 23,000 pounds and would provide air-to-air performance equal to the Blue Bird for a far lower unit cost. Additionally, they felt these changes would make the Red Bird more reliable.[53] This seemed to be classic example of "out of the box" thinking, but what Boyd and Sprey were actually doing was not meeting a requirement but changing it. Boyd briefed some members of the Air Staff on the Red Bird concept, while Sprey briefed General Ferguson at Air Force Systems Command, but there were no changes in the Blue Bird.[54]

The reason the Air Force ignored Red Bird was that the service saw it as a small, simple fighter with short range and limited load-carrying capability, and the Air Force had previous bad experiences with such aircraft. Range was the major issue. Small fighters carried a small amount of fuel, so they had limited endurance. This meant their patrol time was limited and they were not able to escort long-range bombers. Additionally, small aircraft had to keep their weight down so they could only carry limited armament, radar, electronic countermeasures, and other systems the Air Force deemed necessary for modern air combat, especially based on their experiences over North Vietnam. The Air Force had looked at two small fighters, the F-104 in the 1950s and the Northrop F-5 in the 1960s, but combat tests in Vietnam confirmed that both the F-104 and the F-5 had too short a range and too light a payload to be useful.[55]

INTERSERVICE COOPERATION…SORT OF

For the entire time the Navy's F-111B program had been in existence the Navy had lobbied hard to cancel it, and when McNamara left his post as Secretary of Defense in November 1967, it helped both services immeasurably in the development of their separate new fighters. It quickly became obvious that McNamara's desire for multi-service fighters was dead, killed by the failures of the F-111. McNamara's successor, Clark Clifford, had no emotional attachment to the F-111B and, with the approval of Congress, cancelled the program in mid-1968.[56]

Even during the F-111B development, the Navy had been quietly working with Grumman, the primary contractor for the F-111B, on a replacement, so the service was ready with a Request for Proposal (RFP) for a "VF-X" designed solely for the Navy. The Air Force leaders were determined to make their F-X a pure Air Force program, and initially they allied with the Navy aviation community who wanted the VF-X and did not want to compromise its design by sharing an Air Force program. Nevertheless, while each service wanted its own fighter airframe both were willing to cooperate on a new, high performance engine. In December 1967, they agreed to jointly finance development of a high-performance, fuel-efficient afterburning turbofan engine that would produce 10 percent more thrust than the F-111s TF30 but weigh 25 percent less.[57]

The Navy was in a hurry to develop the new fighter because the service had already retired the predecessor of the F-4, the Chance Vought F-8 Crusader, and needed the VF-X fighter sooner than the Air Force needed the F-X.[58] The Navy RFP went out the same

month that the F-111B was cancelled, and in early January 1969, the Navy unsurprisingly chose Grumman to build the VF-X, and designated the new aircraft the F-14 "Tomcat." To get the F-14 to the fleet quickly, the Navy told Grumman to use "off-the-shelf" avionics and a number of systems already developed for the F-111B, including the very long-range and expensive Phoenix missile. The Navy also accepted the F-111B's low-powered TF30 engine for the F-14 to keep program costs down and because Grumman had already designed the TF30's high-speed inlets.[59]

The decision to put the TF30 engine in the F-14 allowed the Navy to gradually cut the number of advanced engines it committed to buy in under its agreement with the Air Force until finally, on 22 June 1971, the Navy dropped out of the joint engine program altogether, much to the Air Force's chagrin.[60] The result was the Air Force had to bear the cost of developing the F-X's new engine by itself, which considerably raised the cost of the F-X program. It also soured the Air Force on future work with the Navy on a number of systems.[61]

From the beginning, it was clear the TF30 engine would not provide the power the F-14 needed, but the Navy planned to "game" the TPP process and replace the engine later. Once the F-14 design was accepted, under TPP the Navy could install new engines and new avionics in the F-14 in the out years as add-ons that would not be included in the initial cost of the program, making the initial cost of the F-14 program seem reasonable.[62] It would not work out that way -- this Navy engine decision was a mistake that haunted the F-14 for its entire career.[63]

When McNamara left, much of OSD's power and philosophy went with him, but the idea of a single fighter for both services was still in play, and some members of Congress wanted the Air Force to buy the F-14 as it had bought the F-4. Superficially, it seemed like a good fit because the F-14, like the F-X, was a long-range interceptor and air-to-air fighter.[64] The Navy did little to discourage the idea because the service did not believe Congress would approve more than one new fighter program, and the Navy was determined it would be the F-14, not the Air Force's "paper" airplane. To add to the Air Force's problems, the F-14 program was consistently ahead of the F-X because the Navy was accepting off-the-shelf avionics and the TF30 engine from the F-111B.[65]

The Air Force did not consider the F-14 suitable for its requirements. With no need to rush the F-X into service, the Air Force wanted the fighter to have advanced avionics and a new, high-tech engine, and the Air Force had no requirement for the expensive Phoenix system.[66] But part of the problem with convincing Congress that the Air Force needed the F-X as a separate system was a sudden break in what had seemed to be a solid internal Air Force agreement to make the F-X a pure air superiority fighter. A few Air Force generals began saying the F-X should be a dual role fighter-bomber, despite the "twelve-star" letter. Both the former commander of TAC, General Walter Sweeny, and TAC's current commander, General Gabriel Disosway, were on record as expressing a preference for a multi-role aircraft. As late as February 1968 the Air Force Chief of Staff, General John McConnell, said the F-X would have a "substantial air-to ground capability."[67]

To the consternation of the F-X's supporters, the Air Force was not "speaking with one voice," and in a military organization, this was a critical mistake. On a controversial subject, especially when it involves competition with other services, it is vital that all the senior service leaders express the same views, because any dissenting views can be used by opponents to undermine the service's position. The Navy was unified on the F-14 program and pointedly noted the Air Force could not even define the F-X's mission. [68]

By March 1968, the Air Force was beginning to realize the Navy was planning a double cross by "playing the commonality game," and two Air Force generals wrote McConnell that "the time has come for the Air Force to state its position firmly [against] the joint aircraft."[69] McConnell realized the problem and took action to make sure the service understood the F-X was a single-mission, air-to-air fighter. He sent the head of the F-X program, General Roger K. Rhodarmer, to brief all the four-star generals in the Air Force to make sure they knew what the "party line" was, so that the Air Force could speak with one voice. Rhodarmer remembers McConnell told him: "If you find anybody [in the Air Force] whose [sic] articulating [sic] against this, blow the whistle on him. You tell me and I'll take care of him." [70]

From that time on, there was no more discussion of the F-X as a multi-role aircraft. In May 1968, General McConnell announced to Congress that, while there had been controversy over the role of the F-X, the Air Force decided it would be a pure air superiority fighter. He said, "We have finally decided…that this aircraft will be an air superiority fighter" and will be used for ground attack "over my dead body."[71] Congress

accepted the program, and the Air Force informally adopted the slogan "not a pound for air-to-ground" for the F-X.[72]

There was still some concern about the cost and complexity of the F-X. That fall Sprey convinced his boss in OSD/SA, Alain Enthoven, to ask General Dynamics to consider another TPP "paper airplane," a pure air-to-air fighter called the F-XX, about half the size and weight of the F-4 but with roughly the same performance and a cost of only about $2.2 million. At the same time, the Air Force had its own Studies and Analysis group, AF/SA, and its head, General Glen Kent, brief the Air Staff on possible modifications to the F-X program to make it lighter and less complex while still keeping it the basic F-X.[73] But OSD/SA and AF/SA theory collided with a real world requirement as the Soviets began to field the MiG-25 "Foxbat" fighter, whose Mach 2+ speed and 60,000-foot altitude capabilities put it out of the performance envelope of the Red Bird and a downgraded F-X, so the idea of a less capable F-X disappeared.[74]

F-X TO "EAGLE"

By September 1968, the Air Force and OSD agreed that the F-X would be a single-seat, fixed-wing, twin-engine air superiority fighter, that a competitive fly-off was not a suitable means for selecting a contractor for the F-X, and that the F-14 would not fit the requirement.[75] OSD approved a Development Concept Paper (DCP), allowing the Air Force to proceed with the air-to-air F-X based on the "Blue Bird." On 30 September 1968, the Air Force asked for a final proposal for the F-X. Four companies responded. A preliminary cost estimate for the total program of 729 aircraft was a little over $5 billion.[76]

In November 1968, just before the presidential election, the Air Force accelerated the F-X programs, partially to counter an attempt by OSD to delay the program for nine months to look at the "Red Bird," partially because intelligence reports said the Soviets were building their new MiG-23s and MiG-25s at the rate of a hundred a month, and partially to get the F-X program far enough along so that any new administration could not force the service go back to the idea of one fighter for both services.[77]

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1. Arthur Agan, Gen. USAF, Oral History Interview by Jacob Neufeld, October 1973, K239.0512-857, AFHRA, 13.

2. Ibid., 16.

3. Before coming to DoD, McNamara was associated with Ford's "Edsel," which was one of the most spectacular failures in the history of the United States automobile industry and whose name was synonymous with failure. Paul M. Rogers, Lt. Gen, USAF, Oral History Interview with Jacob Neufeld, 17-18 June 1974, AFHRA, 38-40.

4. Robert J. Art, *The TFX Decision; McNamara and the Military* (Boston: Little Brown, 1968), 12.

5. Agan, 1-2.

6. Memo, Robert McNamara, SECDEF, to Eugene Zuckert, SAF, subj: Close Support and SAW [Special Air Warfare] Aircraft, 7 January 1965. Air Force History Office, Washington, DC.

7. Agan, 2. America's most notable failure in this area was the World War II P-39 Aircobra, designed as a fighter-bomber armed with a large 37mm cannon to allow it to be an anti-tank aircraft and support ground forces. The P-39 was slaughtered by Japanese Zeros and generally considered the worst American fighter of World War II. As soon as they could be replaced by other aircraft, they were sent by Lend Lease to the Soviet Union. William Green, *Famous Fighters of the Second World War* (London: Macdonald and Jane's. 1975), 39-40.

8. Agan, 21.

9. Albert P. Clark, Gen, USAF, interview by Jacob Neufeld, 2 May 1973, Interview #858, May l973, AFHRA. 5-6. In fact, as soon as Disosway took over TAC he forwarded a TAC Qualitative Operational Requirement for an "aircraft capable of outperforming the enemy in the air." Letter, HQ TAC to HQ/USAF Deputy Director for Requirements/Operations, subj: Qualitative Operational Requirement for a STOL Fighter Aircraft Weapons System (TACQOR 65-14-E), 6 October 1965.

10. Jacob Neufeld, *The F-15 Eagle: Origins and Development, 1964-1972* (Office of Air Force History, 1974), v, *passim.*

11. It is common practice to begin planning for a replacement aircraft immediately after the previous one is ordered. Richard P. Hallion, "A Troubling Past: Air Force Fighter Acquisition Since 1945," *Air Power Journal* (Winter 1990), 26; Agan, 17, *passim.*

12. Rogers, 38-40.

13. William T. Y'Blood, *Down in the Weeds: in Korea* (Washington DC: Air Force History and Museums Program, 2001), 1.

14. Agan, 12-13; Arden B. Dahl, "The Warthog: The Best Deal the Air Force Never Wanted," (Washington, DC: Research Study, National Defense University, 2004), 4. For an excellent short analysis of these events from the Army point of view, see J. Kristopher Keener, *The Helicopter Innovation in the United States Army* (Cambridge, MA: MIT Security Studies Working Paper, 2001).

15. SLUFF – Short Little Ugly Fat Fucker.

16. Neufeld, *F-15,* 9-11; F. Michael Rogers, Gen. USAF, Oral History Interview by Jacob Neufeld, 17-18 June 1974. K.239.0152-862, AFHRA, 14.

17. Richard Head, Maj. Gen. USAF, "The A-7 Decisions: A Case Study of Weapons Procurement," in *American Defense Policy, Fifth Edition,* eds. John F. Reichart and Steven Sturm (Baltimore, MD: Johns Hopkins Press, 1982), 623.

18. Low altitude is generally considered from sea level to 10,000 feet, medium altitude from 10,000-25,000 feet, and high altitude above that.

19. Rogers, 5, 28.

20. Neufeld, *F-15,* 17-18, *passim;* Mark A. Lorell, *The Cutting Edge: A Half Century of Fighter Aircraft R&D* (Santa Monica, CA: Rand, Project Air Force, 1998), 104.

21. Wing loading is the pounds per square foot the wing of an aircraft supports in flight. Generally speaking, the lower the wing loading, the more maneuverable the aircraft.

22. Agan, 23; Rogers, 25;

23. Agan, 16.

24. Neufeld, *F-15,* 23; Agan, 4-5; Rogers, 29-30.

25. This was a common Air Force concern with TPP. Drue L. DeBerry, "Flexible Response: Evolution or Revolution," in *Winged Sword, Winged Shield: A History of the United States Air Force. Volume Two, 1950-1997,* Bernard Nalty, ed. (Washington, DC: Air Force History and Museums Program, 1997), 189, *passim.* Enthoven viewed it differently. Alain Enthoven and K. W. Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969* (Santa Monica, CA: Rand, 2005), 26-28, *passim.*

26. Rogers, 15.

27. "Advanced Tactical Fighter (F-X)," AFRDQ/ANSER, Rev 1, quoted in Neufeld, *F-15,* 84, footnote 11.

28. Rogers, 35.

29. Neufeld, *F-15,* 21; Donald C. Winston, "New MiGs Imperil US Superiority," *Aviation Week and Space Technology,* 3 June 1968, 22. Ibid., "Soviet May Be Shifting Design Emphasis," *Aviation Week and Space Technology,* 8 August 1968, 33.

30. Roger K. Rhodarmer, Maj. Gen. USAF, Oral History Interview by Jacob Neufeld, 29 March 1973, K.239.0512.2029, AFHRA, 35.

31. There are least dozens of these studies, perhaps hundreds, and they are of special interest to the author. Consistently the best are the test reports of Captain Eric Brown RN. For the novice his most interesting book is probably *Duels in the Sky: World War II Naval Aircraft in Combat* (Annapolis, MD: Naval Institute: 1988).

32. Agan, 6.

33. Boyd's self-aggrandizing characteristics are clear in his oral history. One example is his claim to have written a textbook on philosophy used at the Air Force Academy and a textbook in engineering used at the University of California, Berkeley. There is no evidence these books ever existed. John Boyd, Col. USAF, Corona Ace interview. #K239.0512-1066, 14 August 1976. AFHRA. 314, 326, *passim.* As for his skills as a fighter pilot, he claimed to never have been beaten and that he would allow anyone to get on his tail but that he would be behind him in 40 seconds. Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown and Company, 2002), 10-11. This is, quite simply, nonsense. General Wilbur Creech, Boyd's commander at Nellis, remembers, "We got along fine but I had to go head to head with him and wax his ass in air-to-air combat so he could at least get his swollen head through the door….I ended up with gun-camera film of my gunsight pipper on his head in the cockpit…." Creech, e-mail, March 18, 2000, provided to author by Keith Ferris. A strong supporter of Boyd, Marine fighter pilot Brigadier General Hal Vincent, also said Boyd exaggerated, noting "two good pilots in the same plane would end up neutral….there were others who could beat [Boyd] in a high speed fight." Hal Vincent e-mail 27 March 2000, provided to author by Keith Ferris.

34. Neufeld, *F-15,* 18-21; Creech e-mail; Agan 7.

35. Rogers, 17; Agan, 17.

36. Agan 18; Rhodarmer, 24-25, *passim*; Boyd agrees with this in his Oral History, 45.

37. Agan, 10.

38. Rhodarmer, 34-35, *passim.* McDonnell had merged with the Douglas aircraft company to become McDonnell-Douglas in mid-1967.

39. Rogers, 21-22 [underlining in original]; Agan, 14, *passim.*

40. Richard Sanders, *The Politics of Defense Analysis* (New York: Dunellen, 1973), 154, *passim*.

41. "Safety Gadgets -- They Kill Fighter Pilots," *Colliers,* 21 March 1953, 16-18.

42. James "Jimmy" Doolittle, Lt. Gen. USAFR, "Safety Gadgets -- They Help Our Fighter Pilots," *Collier's,* 30 March 1953, 24-26, 48.

43. Yefrim Gordon, *The MiG-15* (Osceola, WI: Motorbooks International, 1992), 123-135.

44. "Safety Gadgets - They Kill Fighter Pilots," 16; Boyd Oral History, 76, *passim.*

45. Pierre Sprey, Oral History Interview by Jacob Neufeld, 12 June 1971, K.239.0152-969, AFHRA, 9, *passim.*

46. Rhodarmer, 29; also see Sprey, Oral History, 11.

47. Sprey, Oral History, 5; Boyd, Oral History, 45, *passim.*

48. Boyd, Oral History, 12, *passim.*

49. Timothy T. Lefler, "The Challenge of Military Reform," in *The Defense Reform Debate: Issues and Analysis,* ed. Asa Clark, Peter W. Chiarelli, Jeffery S. McKirtick, and James W. Reed (Baltimore, MD: Johns Hopkins Press, 1984), 24-26

50. This doctrine was expressed by both military and political leaders. See, for example, Futrell, 7, 12, *passim*.

51. Sprey, Oral History, 7, *passim*; Jerauld Gentry, Major USAF, "Evolution of the F-16 Multinational Fighter," (Student Research Paper #163: Industrial College of the Armed Forces, 1976), 14.

52. Neufeld, *F-15,* 13, *passim.* The reason there was a very high cost for flying above Mach 1.6 was that jet engine compressor blades cannot operate with supersonic air. Below Mach 1.6 a well designed simple, non-moving inlet will reduce the airflow to subsonic as it moves from the intake to the engine, but flying at Mach numbers above 1.6 requires a special inlet design, sometimes called the diffuser, for the engine to slow the entering air to subsonic speed before it reaches the compressor section of the engine. Such a diffuser inlet had to have a series of movable compression ramps and doors to adjust its external and internal shape to provide the optimum airflow to the engine at various aircraft speeds and angles of attack, as well as have doors and ducting to allow excess air to bypass the inlet. The result is that diffuser inlets need elaborate, heavy, computer controlled mechanical systems to operate successfully. Philip Jarrett, ed., *The Modern War Machine: Military Aviation Since 1945* (London: Putnam, 2000), 76-78.

53. Sprey, Oral History, 18; Neufeld, *F-15,* 64-66.

54. Gentry, 15.

55. An accurate summary is found in "Lightweight Fighters: No Panacea," US Congress, Senate Armed Services Committee on Manpower and Personnel Subcommittee, *Impact of Technology on Military Manpower, Requirements, Readiness, and Operations.* 96th Cong., 2d sess., 4-5 December 1980, 2281-282, put into the record by Senator Howard Cannon (R-NV) but clearly written by the Air Force. Also see Rogers, 50-56. Though the Air Force had been interested in the F-5 as a "swing" aircraft, in SEA the Air Force had found that, while the F-5's handling characteristics were good and its simple systems easy to maintain, it had very short range and a limited ordinance load (four small bombs). Additionally, its engines were extremely delicate and prone to what is known as foreign object damage (FOD) from any material that was sucked into them. Many were sold to American allies in the developing world and to NATO allies looking for an inexpensive, simple fighter. Jarrett, 213; also see Lorell, 101, 114.

56. Lorell, 104.

57. Turbofan engines are much more fuel-efficient that normal turbojets. For a full explanation as well as a log of the TF30 problems, see Lorell, Appendix B, 110-111.The entire Appendix is a good explanation of jet engine technology.

58. The Air Force had upgraded its F-4s with cannon, but the Navy did not, preferring to wait for the new fighter. Calvin Hargis, 21 March 1973, Oral History interview #86 by Jacob Neufeld, AFHRA, 15-16.

59. Jon Lake, Grumman *F-14 Tomcat: Shipborne Superfighter* (London: AIRtime Publishing, 1998), 24-27, *passim.*

60. Congress, House, Committee on Armed Services, *Military Posture and HR 12604,* 93rd Congress, 2nd sess., 19 February 1972, 9195.

61. Neufeld, *F-15,*74.

62. Drewes, 53.

63. Lovell, 174.

64. Neufeld, *F-15,* 27.

65. Rhodarmer, 5; "F-14 vs. F-15: Will it Come to a Shootout?" *Armed Forces Journal,* 28 February 1970, 20-21.

66. Ibid., 17-18; Neufeld, *F-15,* 38.

67. Congress, Senate, Committee on Appropriations, *Department of Defense Appropriation,* 90th Cong. 2nd sess., 26 February 1968, 706.

68. There is some question about Disoway's feelings about a pure air-to-air fighter; See Clark, 5, and Rogers, 24. Disoway's successor at TAC, Gen. William Momyer, definitely wanted a fighter-bomber. Rogers, 24.

69. Ltr, Gens Disoway and Ferguson to Gen. McConnell, 9 March 1968. AFHRA.

70. Rhodarmer, 21-22. For a more in depth look at this problem, see Rogers, 44-46.

71. Congress, Senate, Armed Services Preparedness Investigating Subcommittee, *US Tactical Air Power Program.* 90th Cong, 2nd sess, 12 May 1968, 92-93, 110.

72. Author's personal observation of the sign in the office of the F-15 Systems Project Office (SPO), commander, Wright Patterson AFB, OH, as escort officer during visit of Israeli Air Force commander Major Gen. Bennie Peled, September 1976.

73. Neufeld, *F-15,* 35.

74. Ibid., 54 (with chart).

75. Memorandum from Air Force Secretary Harold Brown to Air Force Chief of Staff John McConnell, subj: F-X Source Selection Plans, 25 September 1968, AFHRA. The aircraft was single seat rather than two seat because this saved 5,000-6,000 pounds and $500,000 per aircraft, and twin engine for faster throttle response and earlier availability. Development Concept Paper (DCP) No. 19, "New Air Force Tactical Counter Air Fighter (F-X), DDR&E, 28 September 1968, Air Force History Office, Washington, DC.

76. Neufeld, *F-15,* 31 (with chart), *passim.*

77. Memo, John S. Foster, to DDR&E, to Harold Brown, SECDEF, "Development Concept Paper," 30 October 1968, Air Force History Office, Washington, DC; "Status of

Acquisitions of Selected Major Aircraft Systems, App V, Pt IX, *Department of the Air Force Aircraft* (Washington, DC: Air Force History Office, 1970), 1-18.

CHAPER FIVE: ONE WAR ENDS, ANOTHER BEGINS…

THE 1968-1972 BREAK IN THE AIR WAR OVER NORTH VIETNAM

In the combat zone, the April 1968 bombing halt marked the end of air operations into areas of North Vietnam defended by MiGs. As the months and then years passed, the days of the Rolling Thunder "heavies" going into Route Package Six faded into memories, and Air Force fighter crews in Thailand switched to flying daily bombing missions against the Ho Chi Minh trail in Laos where. In spite of significant AAA, Air Force fighters suffered relatively few losses, but it quickly became clear to the fighter crews that they had no chance of stemming the flow of supplies into South Vietnam, most of which traveled at night when the American air forces had limited capability to attack them. Soon the bombing lost any sense of importance or urgency, and a part of the combat culture faded as the targets were seen as less and less important. Without the sense of urgency that important missions brought, the combat culture began to change from "get the job done" to "don't lose airplanes," and slowly the idea that "no target is worth the loss of an aircraft or aircrew" took over, along with "nanny rules." Combat commanders began to be judged on their loss rates, so they placed restrictions on how low aircraft could fly when they released bombs, despite the fact that the higher the release altitude, the less accurate the bombing. Soon some commanders began to pay

attention to such minutia as the strict haircut and mustache length regulations disregarded during the "Big War" of Rolling Thunder. [1]

From mid-1968 to the end of 1971, an Air Force fighter tour to one of the fighter bases in Thailand became a year-long, relatively pleasant experience, one that usually ended with a chest full of medals, memories of R&R (rest and relaxation) visits to Bangkok and large parties at the base officers' clubs, spiced with a limited amount of danger. One Air Force historian noted, "There was something intoxicating about the gracious culture of Thailand. Even for the men who lost friends, Thailand would provide fond memories."[2] There was still a "get the job done" attitude and a combat culture, but the edge was gone.

The end of the serious air war also affected the Air Force leadership. A number of "combat culture" fighter wing commanders had been promoted to one-star generals during Rolling Thunder, but as the war wound down they were considered anachronistic "war lords" by the senior Air Force leadership and most were not promoted again.[3] Notable among these were Robin Olds, a World War II ace and leading MiG killer in Vietnam as the commander of the 8th Tactical Fighter Wing; Robert "Boots" Blesse, author of the tactics manual "No Guts, No Glory" and thirteen-victory Korean War ace; and Robert Scott, a wing commander in Thailand, World War II ace and author of *God is My Co-Pilot.* With the bombing halt, it seemed that the SEA combat culture would never penetrate the higher ranks of the Air Force, and many young Air Force officers felt the senior Air Force leadership breathed a huge sigh of relief with the end of Rolling Thunder and returned to business as usual.[4]

THE EARTHQUAKE BEFORE THE TSUNAMI:

THE AULT REPORT AND TOP GUN

Unlike the Air Force, the United States Navy viewed the last few months of Rolling Thunder as a crisis. The last four aircraft shot down by MiGs over North Vietnam were Navy F-4s, while the F-4s did not shoot down any MiGs. This 0:4 loss ratio, combined with the fact no Navy pilot had shot down more than one MiG while the Air Force had several multiple MiG killers – even though the Air Force's main opponent was the advanced MiG-21 while the Navy's was the Korean War vintage MiG-17 -- showed the Navy fighter force that "something was desperately wrong."[5]

Despite the bombing halt, this perceived crisis pushed the Navy aviation community towards an innovative solution, a solution made possible by the structure of the Navy fighter force. The Navy had two types of aircraft in air-to-air combat over North Vietnam, the F-4 and the older F-8 "Crusader," a large, single-seat, single-engine fighter with a small radar and an armament of short-range, heat-seeking missiles and cannon. Because of this seemingly limited armament, F-8 pilots trained for close in dogfights where they could use their guns and short-range missiles, and the F-8 pilots became some of the most proficient dogfighters in the world. Their doctrine called for the use of the reliable AIM-9 heat-seeking missile, and the F-8 pilots proved extraordinarily effective over North Vietnam, with a kill ratio of 6:1.[6] Navy F-4 crews, on the other hand, were trained to fight at long range using their AIM-7 Sparrow radar-guided missiles and not to dogfight. In combat the AIM-7 was difficult to fire and had a high failure rate even when fired properly, and the F-4 crews, without cannon and untrained in tight, turning

dogfights, did poorly against the MiGs. Throughout Rolling Thunder the F-8 pilots, never noted for their modesty, mocked the two-seat, two-engine F-4, but on a more serious note they felt that the losses the F-4 was suffering were not so much the fault of the aircraft but a result of poor training for F-4 crews.[7]

The F-8 pilots felt the premature closing of the Navy's Fleet Air Gunnery Unit (FAGU) caused many of the problems. Since the 1920s, the Navy had paid a great deal of attention to air-to-air gunnery, and it had paid great dividends in World War II. The attention was formalized in the FAGU, whose primary duty was to train pilots in air combat and gunnery. These pilots would return to their squadrons and impart what they learned at FAGU, but with the advent of more and more missile-armed aircraft, the FAGU seemed to be out of date and closed in 1960.[8]

Nevertheless, the F-8 pilots' opinions of F-4 training had little initial effect on the Navy, which sought a technical solution to the F-4/AIM-7 problems. Just after Rolling Thunder ended, the Navy commissioned one of its Captains, Frank Ault, to do an exhaustive study on the AIM-7 in a carrier environment. Ault and his team pursued a technical solution but several F-8 pilots, sensing the importance of Ault's report, joined his team. While most of Ault's group labored over the technical problems with the AIM-7 and the special problems with using it in the difficult carrier environment, the F-8 pilots pursued their own agenda – the rebirth of a high quality air-to-air training operation for fleet F-4 pilots.

The final report, "Air-to-Air Missile System Capability Review," better known as the "Ault Report," noted in the introduction "almost 600 air-to-air missiles have been fired

by Navy and Air Force pilots in about 360 engagements in Southeast Asia between 17 June 1965 and 19 September 1968. Only about one in ten had any probability of achieving a kill. This is well below expected or desired levels." The 480-page report then went into stifling detail describing the AIM-7 technical shortcomings and problems. In the end, it contained 242 recommendations, virtually all of them concerning the care and maintenance of AIM-7s on carriers.[9]

The F-8 pilots only had an input into a few pages late in the report, but their recommendations received the most attention and were to change forever the way the United States military trained. The F-8 pilots noted the Navy had not only failed to verify the performance of the F-4's missiles in a dogfight environment, but had also not translated the new missiles' capabilities into proper tactics and training. They said the Navy had developed a combat philosophy that put more emphasis on the machine than on the man, which had proved to be a mistake. The recommendation to solve this problem – officially Ault's recommendation – was to establish a Navy Fighter Weapons School where Navy fighter crews could get additional training in air-to-air combat. The weapons school would have an "Adversary Squadron" to fly against the fleet F-4 pilots to give them realistic training.[10]

This clear, simple recommendation was something that the Navy aviation community could act on. Using the Ault Report as a lever, by October 1969 the small group of Navy aviators who had pushed "train the man" idea into the Ault report completed their extraordinary burst of "bubble up" innovation with the establishment of the Navy Fighter Weapons School at Miramar Naval Air Station in California, which quickly became

known as “Top Gun.” But despite the acceptance of the idea and the catchy name, Top Gun was left as an experimental command and for the next several years received little attention, priority, or funding.[11]

In retrospect, Top Gun’s low profile proved to be something of a blessing. The lack of visibility allowed the commander to be truly the commander, and he could select his own instructors and design his own training program. His pilots were all combat veterans, most MiG killers, and they all began a rigorous program of learning to fly the F-4 to its limits. Once they had learned how to fly the F-4 to its maximum capabilities, the Top Gun instructors then moved on to flying what would become their main “Adversary” aircraft, the Douglas A-4 "Skyhawk," a small, highly maneuverable attack aircraft whose performance simulated the MiG-17, the Navy’s main opponent over North Vietnam. These A-4 versus F-4 engagements were called Dissimilar Aircraft Combat Training (DACT), and they emphasized the pilots trying to use their own aircraft’s performance characteristics to maximize their advantages and minimize their disadvantages. [12]

THE CRITICAL IMPORTANCE OF DACT

In the history of American military training, the importance of a formal course using DACT cannot be overstated, though its significance was unappreciated at the time. Fighters from different nations have different characteristics -- speed, maneuverability, range -- because each nation’s national defense strategy has a different mission for its fighter force. In World War II, for example, the Japanese had a combination of an offensive air doctrine and the “samurai” combat mentality that required their fighters to carry a great deal of fuel to fly long distances over the Pacific and engage in close-in,

"hand-to-hand" maneuvering combat. As a result, their aircraft, notably the Zero fighter, carried a great deal of fuel and were very lightly constructed to keep their weight low for high maneuverability.[13] American fighters were intended for long-range operations (though not as long range as the Japanese) but carried their fuel in protected fuel tanks, so they were large, heavy, and less maneuverable than the Japanese aircraft but still had excellent overall performance. Soviet, German and British fighters were intended for short-range interception and tactical operations in Europe and so carried much less fuel than their American counterparts, making them smaller with shorter range while still having good performance, armament, and structural strength. All of these differences could be used to one's advantage or exploited by the enemy.[14]

The differences in various nations' fighter design continued into the jet age. Soviet fighters in the 1960s were designed to fit into the Soviets' air doctrine of short-range "point defense" interceptors intended to operate under tight radar control over Soviet territory. American fighters, on the other hand, reflected America's offensive air doctrine and were intended to operate independently, far from their bases, without supporting radar coverage. American fighters had to be larger to carry independent systems, such as radar, more fuel, and the larger engines necessary to push the added weight around the sky. The result was that Soviet fighters had roughly the same speed as American fighters but were smaller, lighter, in most ways more maneuverable, but carried fewer missiles and had much shorter range. [15] Over Vietnam, their maneuverability and small size were critical. The cannon-armed MiG-17 could easily out-turn any American fighter, a huge advantage in a close-range dogfight. North Vietnamese MiG-21s were usually guided by

ground control radar to begin their attacks from behind American aircraft. The range of MiG-21's heat-seeking missiles was about one and a half miles, about the maximum distance the small MiG fighter could be seen visually by the untrained eye, and often the North Vietnamese were able to fire missiles before the American aircrews saw them.[16] Top Gun's use of the small A-4 was intended to solve the this problem by getting the crews used to looking at small aircraft.

Top Gun innovation went beyond the "book knowledge" of the strengths and weaknesses of the F-4 and Soviet fighters and forced its students to put the principles into practice in daily combat with small and very maneuverable A-4s. This appears to have been the first time in history a military force trained regularly against equipment that simulated the equipment they would be facing in combat. It was the birth of "realistic training," which was to become the great American military innovation of the post-Vietnam era.

The Top Gun training program had none of the restrictions the Air Force had on air-to-air combat and, in developing the training syllabus, the Top Gun instructor cadre sought information from all quarters. At one point, they invited John Boyd, now an Air Force Lieutenant Colonel, to brief the Top Gun instructors about his "energy maneuverability" charts. While energy maneuverability was by now a common buzzword in the air-to-air community, Boyd's briefing did not go well. Boyd, who had not flown for over five years, insisted it was impossible for an F-4 to win a dogfight with the highly maneuverable MiG-17. The Top Gun instructors disagreed (at least two had shot down MiG-17s in dogfights), but Boyd was adamant in saying it was impossible. The Top Gun

instructors left the briefing unimpressed by Boyd and his plethora of charts and graphs, and the unit's commander, Commander Ron "Mugs" McKeown, said later: "never trust anyone who would rather kick your ass with a slide rule than with a jet."[17]

As Top Gun developed, the instructors realized that a thorough analysis of each practice engagement was the key to learning. Because many engagements, especially large ones, were confusing even to Top Gun's experienced instructors, the Top Gun commander persuaded the Navy to ask Cubic Defense Systems to develop a system for recording air combat training. Completed in May 1971 and known as the Air Combat Maneuvering Range (ACMR), this system allowed for real time tracking and recording of air combat engagements by means of small pods, each the size of a heat-seeking missile, attached to the aircraft. The pod relayed the aircraft's speed, altitude, heading, and other parameters to a central computer for display on a large screen, and when a simulated missile was fired, it calculated the parameters and recorded either a hit or a miss. It also allowed for views from various angles, including from each cockpit. When the crews returned after a mission, they could replay an entire dogfight and accurately analyze and learn from each one, much as professional athletic teams use videotape to review games.[18] The ACMR proved a quantum leap in the learning and teaching of air combat skills.

THE AIR FORCE RESPONSE – DUMB IT DOWN

Unlike the Navy, with the end of Rolling Thunder Air Force training reverted to its "fly safe" culture, and the emphasis on training remained on avoiding accidents. Training for air-to-air combat was considered too dangerous for peacetime operations, and the Air

Force cut the number of air-to-air training missions throughout the entire TAF. When it did conduct air-to-air combat training, almost all of it was matching F-4 against F-4, usually from the same unit. The result was Air Force F-4 pilots had no experience looking for smaller aircraft or dogfighting against aircraft more maneuverable than the F-4.[19] There were a few attempts to do DACT beginning in 1968, notably with delta-winged F-106s whose performance simulated the MiG-21, but the program was limited, essentially confined to instructors in the Air Force's elite Fighter Weapons School, and involved a complicated set of rules.[20] There was no attempt to expand the program to regular USAF units, though Air Force F-106s did train with Top Gun and other Navy units.[21]

WHY THE DIFFERENT APPROACHES?

Several factors appear explain why the Navy started a program of realistic air combat training and the Air Force did not:

ATTITUDES TOWARDS FLYING SAFETY. The Air Force and Navy had different views of flying safety. Flying safety in training was not the issue for the Navy it was in the Air Force, because flying from aircraft carriers was inherently dangerous, far more dangerous than anything the Air Force did on a routine basis. For the Navy, the idea of restricting combat training for "safety reasons" for pilots who routinely had to land on a carrier at night in bad weather was a misplaced priority.[22]

FLYING PERSONNEL. The Navy had F-8 pilots who knew the value of a proper air combat training program, and they knew both how to fly air-to-air combat and how to teach it. The F-8 community was able to lead the Navy down a path that the Air Force

could not take because it had no community that knew how to fly or, more important, to teach air–to-air combat.

SERVICE PERSONNEL POLICIES. While the Air Force only sent pilots to Vietnam for one tour, the Navy did not have a similar policy, and many Navy crews flew four or five combat tours while others flew none. While this led to morale problems, the policy allowed the Navy to keep its training program, which did not have "universal pilots" but chose the best students to be fighter/attack pilots, basically the same as it was before Vietnam.[23]

On the other hand, the Air Force policy of "no non-voluntary second tours" meant that the service's personnel system had to replace almost 1000 fighter pilots a year as they finished their SEA combat tours. The service quickly ran through its fighter pilots, and as the war continued, this need for replacement fighter pilots meant increasing numbers of pilots without fighter experience had to be trained in the F-4. The Replacement Training Units (RTU) that trained fighter pilots to go to SEA were gradually filled with "universal pilots" with little or no fighter background. Despite the Air Force theory that "universal pilots" could fly any aircraft, it proved difficult to take pilots, especially older pilots, without fighter experience and make them effective F-4 pilots in the six months the RTUs had to train them.[24] Nevertheless, even though it was soon clear that the F-4 RTUs could not reliably turn the pilots of large, multi-engine aircraft into F-4 pilots in the six months allotted, TAC steadfastly refused to extend the length of the RTU. The need for replacement pilots meant that everyone in each RTU class had to finish on time so they could replace a pilot who was completing a combat

tour, so the RTUs settled on a very basic course that concentrated on training for ground attack in a low to medium-threat environment – Laos and South Vietnam -- and virtually ignored training for air-to-air combat.[25] Along with the limitations on training in the name of "flying safety," the pushing of unqualified "universal pilots" into fighter cockpits was another symbol of the Air Force's lack of commitment to preparing for combat, and became more and more of an issue with experienced F-4 pilots and F-4 combat unit commanders who had to utilize these pilots in SEA.[26]

LEADERSHIP. Probably the most important reason for the Air Force's limited fighter training program was the unwillingness of the man responsible for Air Force fighter training, Tactical Air Command commander General William "Spike" Momyer, to try to change the program. This was surprising since Momyer was considered to be very outspoken – he had acquired his nickname "Spike" because "he could pick a fight with anybody" -- and had seen the Air Force's poor performance over North Vietnam first hand while he was Seventh Air Force commander during the heaviest combat of Rolling Thunder.[27] When he took over TAC in August 1968, one would have expected Momyer would have pushed for radical improvements in the training program. He did not.

The question of why Momyer refused to improve tactical fighter training is one of the great questions of the Air Force's Vietnam War.[28] Momyer does not seem to have been highly knowledgeable about what was required for successful air-to-air combat, and he fought hard to take cannon out of all Air Force fighters.[29] As Commander of Seventh Air Force, there is no record of Momyer asking TAC for improvements in training, and later he proclaimed the Air Force fighter force was successful during the war, using the

disingenuous argument that "our Army and Navy were immune to attacks from the North Vietnamese Air Force" (which had no bomb carrying aircraft) and concluding "through pilot skill, improvision [sic], and training the air battle in the skies over Vietnam was fought and won." Momyer also said he thought that the Air Force kill ratio in Vietnam from 1963-1968 was a "very acceptable" 2:1, and that the reason for the lower kill ratio was that "political and technological factors tended to depress [the] kill ratio in Vietnam, with political constraints perhaps being the most significant factor."[30] Thus, according to Momyer's thinking, realistic training such as DACT for TAC crews would not have helped the kill ratio but would have increased accidents, so Momyer made no changes. In fact, he actually cut back on air-to-air training.[31]

It is also possible that Momyer associated realistic training with the freewheeling "combat culture" he had seen – and send to disapprove of – in the SEA combat zone as commander of Seventh Air Force. As one Air Force historian notes, while in Saigon Momyer banned smoking in staff meetings and "expected clean uniforms…and flower beds [around the headquarters]."[32]

Momyer's strongly held position and unwillingness to admit his ideas were wrong effectively put the quietus on attempts to improve tactical fighter training, and during most of Momyer's time as TAC commander the Air Force had the worst training it has ever had for fighter pilots. Even after the heavy losses his poorly trained TAC crews suffered in 1972 during Operation Linebacker, Momyer never acknowledged lack of training as a cause of Air Force losses and the changes that were made during his tenure were forced on him.

There are at several possible reasons why Momyer was unwilling to press for more and better training. One is that he truly believed that political restrictions were responsible for the low kill ratio. Another is that the requirements and time constraints for TAC to turn a large number of universal pilots into fighter pilots simply made it impossible to provide an adequate air-to-air training program, and Momyer's statements were rationalizations of this reality. However, this argument still begs the question of why did he not fight for better training.

A less charitable interpretation is that Momyer was the ultimate victim of "careerism," a derogatory term in the military that means the desire to have high rank or a powerful position simply to have it rather than to use it with a clear sense of purpose.[33] This theory suggests that Momyer wanted to be the commander of TAC after his tour as Seventh Air Force Commander, and thus did not criticize TAC's training. Once at TAC, given his tenuous relationship with Ryan, Momyer was not willing to take the risk of being fired for losing aircraft in training accidents, so he stopped all high-risk training. This would also explain why Momyer did not push for an increase in the time for RTU training from six months to a longer time that would have allowed the universal pilots to become qualified.

COUNTER CURRENTS IN THE AIR FORCE

Nevertheless, even during Momyer's tenure, under the surface there were currents pulling the Air Force towards changes in its training program. Many in the Air Force were very impressed in June 1967 when the small Israeli Air Force (IAF) smashed the air forces of Arab states, destroying more than 400 aircraft on the ground and in the air with

a 12:1 air-to-air kill ratio. With this air superiority, the ground forces of the Israel Defense Forces (IDF) routed the Egyptian, Syrian, and Jordanian armies in the Sinai, Golan Heights, and West Bank. In the international political realignment after the 1967 War, the United States replaced France as Israel's main supplier of aircraft and other weapons, and a new relationship sprang up between the American military and the Israel Defense Forces (IDF). The Israeli Air Force had acquired an Iraqi MiG-21 through a series of clandestine maneuvers in 1966, and to strengthen the new U.S.-Israel relationship the IAF sent the MiG to the United States. There a group of American Air Force and Navy pilots flew the MiG in a series of comparative tests against US Air Force and Navy fighters under a program called "Have Donut." Later in 1968, the IAF sent two Syrian MiG-17s that had defected to Israel to the United States where they were exploited under a similar program, "Have Drill." The Air Force and Navy test pilots produced a series of written reports and movies describing the MiGs' performance and characteristics and discussed how different the two MiG types – which formed the backbone of the North Vietnamese Air Force – were from American aircraft, especially the F-4.[34]

In return for the MiGs and other captured Soviet equipment, in 1968 the US government agreed to sell Israel F-4 Phantoms, and the IAF sent a class of pilots (several of them MiG killers) to check out in the F-4 at George Air Force Base in California during late 1968 and early 1969.[35] At George, the Israelis showed air-to-air flying skills that were well beyond their American instructors, even though all of the Americans had at least one combat tour in the F-4. [36]

THE INITIAL MOVES

In 1970, the Air Force began its first tentative "bubble up" moves towards improving training. An instructor at the Fighter Weapons School, Major Roger Wells, began to develop an academic course on Soviet fighter tactics and was able to get access to previously classified information that described the Soviet fighter force, its training, and its employment in some detail. In early 1971, Wells gave his first "Threat" presentations to the students at the Fighter Weapons School, and then took his "Threat Briefing" to TAF fighter bases all over the world, where it received rave reviews.[37]

Encouraged by the response, aware of the Navy's Top Gun program and the availability of the Have Donut and Have Drill MiGs, Wells and other weapons school instructors began to consider the possibility of obtaining a full squadron of Soviet fighters to fly against the Weapons School pilots and instructors. There were many problems, mainly the lack of available MiGs, but the idea generated considerable internal discussion, much of it at the bar in the Nellis Officers' Club among a group of FWS instructors who epitomized the Vietnam combat culture. [38]

The Fighter Weapons School was part of a larger organization known as the Air Force Fighter Weapons Center (FWC), and Wells and the others convinced the FWC's commanding general, Major General William Chairsell, to try and sell the idea of a MiG squadron to TAC commander Momyer while the two were on a golfing outing. Chairsell raised the idea, but briefing the Soviet threat was one thing, and flying – where there was safety involved – was another. One of Momyer's deputies stopped the idea at TAC headquarters because it was "too radical and dangerous."[39] The Air Force's first attempt

at serious “bubble up” innovation in tactical flying training had failed, but a seed had been planted and the precedent of taking ideas about radical changes in training to TAC headquarters had been established.[40]

The idea of realistic training and a more rigorous selection of fighter pilots received another boost at the beginning of 1972 when, as part of the arrangement that had brought the MiGs from Israel to the US, two Israeli F-4 pilots, Asher Snir and Eytan Ben-Eliyahu, came to Nellis as students in the Fighter Weapons School Instructor’s Course. Both were experienced F-4 pilots but hardly the normal students. Snir already had twelve air-to-air victories and was considered one of the IAF’s best and bravest pilots. Ben-Eliyahu was younger but also was a MiG killer and an IAF “up and comer” (he would later become commander of the Israeli Air Force). They were outstanding pilots, so proficient that only a few Fighter Weapons School instructors were considered good enough to fly with them, but what most impressed the FWS instructors was the Israelis’ attitude. One of their instructors remembered, “they were very professional in their approach and flying, even though early on several instructors tried to provoke them into unauthorized dogfights. [The Israelis] flew every mission like the survival of the state was at risk and flew their aircraft into parts of the [performance] envelope our Air Force leadership of the time would not have liked, but proved they could do it safely.”[41]

The Israelis were more than happy to share their combat experiences, as well as their low opinions of U.S Air Force flying training.[42] They had long discussions with their instructors about how to prepare for combat and harped on three themes: "know your

enemy"; "fly in training the way you will fly in combat"; and "wash out of fighters those pilots who do not have the proper mentality or skills."[43]

Asher Snir's instructor at Nellis was Richard M. "Moody" Suter, the commander of the Weapons School's Air-to-Air Flight, a warm, likeable *bon vivant* and *raconteur*, large, fair complexioned, and pear shaped.[44] While he was no poster child for Air Force fitness programs, Suter was a unique combination of flying skills, personality and extraordinary creativity, an "idea a minute" man. He also had a solid combat reputation with 232 combat missions, and was known as an outstanding pilot. Suter, Snir and Ben-Eliyahu and many of the Nellis instructors became friends before the Israelis finished their course in April 1972, and the skill of the Israelis, not only in their flying but also in their philosophy, left a lasting impression on their Air Force counterparts.[45] It was clear to Wells, Suter and the rest that the Israeli Air Force and Navy's Top Gun, with its dazzling new ACMR, had far better training programs than the Air Force. They also saw that the IAF and Navy training programs had two things in common – a low priority for flying safety and a rigorous selection program for fighter pilots.[46]

The discussion with the Israelis also supported another theory held by Suter and others in the Weapons School, that good air-to-air combat skills vastly improved air-to-ground bombing skills. The theory was that air-to-air combat involved maneuvering the aircraft at the "edge of the envelope" and thus made the pilots much more skillful in all aspects of flying. A good air-to-air pilot would be able to maneuver his aircraft well when it was heavily loaded with bombs and would be able to put the aircraft in the proper position to deliver bombs accurately. But air-to-air took a great deal of training and, some

thought, natural skill. Suter said on more than one occasion, "Bombing is for technicians, air-to-air is for artists. Artists are born, but they don't become artists overnight."[47]

Nevertheless, theories were one thing, changing TAC's training another. The experience with the attempt to form a MiG squadron and the general service chauvinism made it clear to Suter, Wells, and the others they could not suggest that the Navy might be doing something better than the Air Force. Moreover, as long as General Momyer, the "500 pound gorilla" of the TAF, decreed that the problems encountered over Vietnam were the result of political limitations, TAC's emphasis on safety in training would continue.[48] To change the Air Force's attitude towards flying safety and the "universal pilot" would take some type of a crisis and, as 1972 began and the Vietnam War continued to wind down, that seemed unlikely.

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1. These conclusions are based on author's journal while stationed at Udorn Royal Thai Air Force Base October 1970-Dec 1971 (when things changed) and with other F-4 crewmembers stationed in Thailand during this period. Bob Hipps, Lt. Col. USAF, e-mail to author, 17 June 2005; William "Will" Rudd, Col. USAF e-mail to author, 13 May 2005; John Vickery, Col. USAF, e-mails to author 5, 21, 22 June 2005.

2. Wayne Thompson, *To Hanoi and Back: The USAF and North Vietnam, 1966-1973* (Washington, DC: Air Force History and Museums Program), 12.

3. Mike Worden, *The Rise of the Fighter Generals: The Problem of Air Leadership, 1945-1982* (Maxwell AFB, AL: Air University Press, 1997), 49.

4. Marshall Michel, *Clashes: Air Combat Over North Vietnam 1965-1973* (Naval Institute Press, 1996), 45-48.

5. Richard K. Wilcox, *Scream of Eagles: The Creation of Top Gun and the U.S. Air Victory in Vietnam* (New York: J. Wiley, 1990), 8, 16, *passim;* Jeffery P. Simpson, Lt. Cmdr. USN, "Origins of Top Gun," *The Hook*, (Winter 1983), 21.

6. Eighteen kills, three losses. Barrett Tillman, *MiG Master: The Story of the F-8 Crusader* (Annapolis, MD: Naval Institute Press 1990), 34, *passim.*

7. Wilcox, 16-18, *passim.*

8. Ibid., 10; for a history of Navy air gunnery, see J. B. Lundstrom, *The First Team: Pacific Naval Air Combat from Pearl Harbor to Midway* (Annapolis, MD: Naval Institute Press, 2005), Appendix Two, 358.

9. “Air-to-Air Missile System Capability Review,” NAVAIRSYSCOM: Naval Historical Center, Washington, DC, 17 February 1979, 324-326.

10. Wilcox, 42-44.

11. Ibid., 48.

12. Ibid., 52-58; Simpson, 22-23.

13. This trade off had unfortunate consequences for the Japanese. While Japanese fighters were vastly superior in range and maneuverability to their American and British counterparts, their light structure, which included unprotected fuel tanks, made them highly vulnerable to any type of damage. William Green, *Famous Fighters of the Second World War* (Garden City, N.Y.: Doubleday, 1975), 46-49.

14. For an excellent account of how these differences play out in combat, see Eric Brown, Capt. RN, *Duels in the Sky: World War II Naval Aircraft in Combat.* (Annapolis, MD: Naval Institute, 1988). The work also includes non-naval aircraft.

15. Yefrim Gordon, *MiG-15* (Osceola, WI: Motorbooks International, 1992), 7, 134.

16. *Red Baron Reports Volume Three* (Nellis AFB, NV: Tactical Fighter Weapons Center, 1975), 3, *passim.*

17. Wilcox, 145-146.

18. C.R “Dick” Anderegg, Col. USAF, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C: Air Force History and Museums Program, 2001), 108-109.

19. *Red Baron, Volume Three,* 2-3.

20. Maurice B. Johnson, Capt., USAF, “Dissimilar Aircraft Engagements,” *Fighter Weapons Newsletter,* March 1968, 26-29; Donald D. Carson, Capt. USAF, “Dissimilar Aerial Combat Tactics – New Techniques in Battle Training,” *Air Force Magazine,* March 1973, 57-61.

21. Eddie Cobleigh, Capt. USAF, "Top Gun, Navy Style," *USAF Fighter Weapons Review,* Winter 1972, 5-8.

22. Wilcox, 177-178.

23. Michel, 52.

24. Wilbur Creech, Gen. USAF. Oral History Interview by Hugh Ahmann, 19 June 92, K239.0512, AFHRA, 161-162.

25. Anderegg, 23, *passim.*

26. End of Tour Report, Col. Charles Gabriel, Commander, 432nr TRW, 14 September 1972, 8-9, AFHRA.

27. Creech, Oral History, 74. Seventh Air Force in Saigon was responsible for all Air Force operations during the war with the exception of B-52 raids. http://www.globalsecurity.org/military/agency/usaf/7af.htm. (accessed February 2006).

28. Momyer has refused several interview requests from this author over the last ten years.

29. Creech, Oral History, 41. Momyer was also not a fan of pure air-fighters. Thompson, 15.

30. William Momyer, Gen. USAF, *Air Power in Three Wars: WWII, Korea, Vietnam* (Washington, DC: Air Force History and Museums Program, 1978), 176-178. Factually, Momyer's arguments were disingenuous. Air Force pilots in the Korean War faced many of the same political restrictions Air Force pilots had over North Vietnam and flew aircraft that were no better than equal to the MiGs they were facing, yet the Air Force pilots were still able to shoot down about six Soviet pilots for every American pilot lost, and their kill ratio against Chinese and Korean pilots was 25-30:1. There are many references for this; one good short one is William T. Y'Blood, *MiG Alley: The Fight for Air Superiority* (Washington, DC: Air Force History and Museums Program, 2000).

31. Bruce K. Holloway, Gen. USAF. "Air Superiority in Tactical Air Warfare," *Air University Review* 19, 3 (March-April1968): 8-9.

32. Thompson, 14.

33. Frank Waller, F., Maj. USAF, "Are Officers Incompetent? The Military Reform's Case Against the Officer's Corps," *Air University Review*, September-October 1985, http://www.airpower.maxwell.af.mil/airchronicles/aureview/1985/sep-oct/waller.html (accessed August 2005).

34. Wilcox, 17.

35. Schlomo Aloni, *Israeli F-4 Phantom II Aces* (Oxford, UK: Osprey Aircraft of the Aces Number 60, 2004), 7-8.

36. Author Interview with Robert Wagner, Col. USAF, 15 May 2005. Wagner was one of the IAF's instructors at George.

37. Anderegg, 72-73. Author received the briefing and can confirm the response.

38. Vickery e-mail, 6 June 2005; Anderegg, 74.

39. John Corder, Maj. Gen. USAF, phone interview with author, 23 March 2005.

40. Ibid.; Vickery e-mail 6 June 2005.

41. E-mail with Will Rudd, Col. USAF and former FWS instructor, 13 May 2005; Vickery e-mail, 19 June 2005.

42. Snir, when later asked what he had learned in the Fighter Weapons School Instructor Course, paused for several seconds, then said, "I learned how to take an American course. It is quite different from ours – not demanding." Author's conversation with Asher Snir, September 1977.

43. Vickery e-mail, 19 June 2005.

44. The Weapons School at this time had a commander, an operations officer (in effect the deputy commander) and two mission-oriented flights, the Air-to-Ground flight and the Air-to-Air flight.

45. This was not to be Suter's last contact with foreigners. In 1976-1977, he was the Air Force debriefer and eventual friend of Soviet MiG-25 Foxbat pilot Lieutenant Viktor Ivanovich Belenko, the defector who flew a MiG-25 to Japan in 1976. Author's notes of various conversations with Moody Suter while author was training to be air attaché to Israel, 1976.

46. Vickery e-mail 5 June 2005; Richard M. ("Moody") Suter, "Corona Ace" interview by Lt. Cols. Gordon Nelson and John Dick, 26 January 1977, AFHRA; Everts e-mail 5 February 2005.

47.Suter Oral History, 13, passim.

48. See, for example, George A. Devorshak, Major, USAF, "An Analysis of Fighter Weapons Training and Directives," Research Study, Air University, 1971.

CHAPTER SIX: BUDGET BATTLES

LAIRD TAKES OVER

In November 1968, Richard Nixon was elected president, and on 15 January 1969, just a few days before Nixon's inauguration, outgoing Secretary Defense Clark Clifford presented the FY1970 Defense Budget to Congress. Clifford's budget was similar to the FY1969 budget but with an increase of almost $3 billion to $77.7 billion. The F-14 program was allotted $414 million and, as the Navy had requested, the budget called for several varieties of F-14; the F-14A with the original, small TF30 engine, an F-14B with the Air Force's F-X engine under development, and finally an F-14C with the F-X engine and advanced avionics. The first funds were allotted for the F-X, $45 million in FY1970 and $175 million in FY1971 for the aircraft and its high technology radar and engine.[1]

In January 1969, Nixon named Representative Melvin Laird as Secretary of Defense. Laird had served on the Defense Subcommittee of the House Appropriations Committee and had often been at odds with Secretary of Defense McNamara, both on Vietnam policy and on the management of the DoD. In his first report to Congress in early 1969, Laird painted a bleak picture, noting that not only had modernization of the military been deferred because of the Vietnam War but also that the thirty-four main DoD weapons systems programs were plagued by defects and cost overruns totaling more than $16.2 billion. Laird attacked McNamara's TPP, saying it had done little to slow the trend

towards increased costs, reoccurring risks, and delays in aircraft procurement programs. To Laird, TPP seemed to exacerbate these problems, causing large cost overruns for systems that were delivered late and were actually less effective than the ones they replaced. The leading example of TPP failure was the F-111, with its huge upward cost spirals and poor performance in combat.[2] In addition to TPP, Laird said that the over centralization of decision-making in the Office of the Secretary of Defense led to "a kind of paralysis" and that much of the problem was in Enthoven's Office of Systems Analysis,[3] and OSD/SA was a popular whipping boy. It was, as noted, especially unpopular with military officers, who felt that the OSD analysts had no business in military decisions and were usurping the military's authority over the weapons system acquisition process. It had become equally unpopular with Congress, which thought OSD/SA was trying to obstruct congressional prerogatives on military matters and concentrate power in the Secretary of Defense's office. Finally, "systems analysis" in general had become a pejorative term because in the popular mind it was identified with "body counts" and other numerical systems that tried to explain how the United States was "winning" in Vietnam.[4]

Enthoven vigorously defended the office and viewed its actions as simply restoring the Secretary of Defense to his rightful position granted by statutory authority, but in fact OSD/SA's power had already dropped significantly after McNamara left in 1967.[5] Nevertheless, it was still seen as too powerful, so Laird quickly moved to emasculate the office.[6] He eliminated the most important part of OSD/SA's charter, its ability to initiate planning, and from this point on OSD/SA could only evaluate and review service

proposals.[7] It would not be involved in the decision process as it had been under McNamara. In fact, the System Analysis office was fortunate to survive in any form. In both 1968 and 1969 the Chairman of the House Armed Services Committee, Mendel Rivers (D-SC), tried to abolish the office because "the Secretary should not have a civilian-led staff of analysts advising him on matters of strategy and force requirements."[8]

Laird had been an effective and popular congressman, and he moved quickly to improve DoD's relations with the legislative branch, which had been soured by McNamara. By and large, he succeeded. During his tenure, Laird cooperated closely with the members and was always available to testify before Senate and House committees. Once the budget was before Congress, Laird was flexible, acceding to additional cuts when they could be absorbed without serious harm to national security.[9]

At the same time, he moved to improve the fractious relationship between the Secretary of Defense's office and the uniformed services. McNamara had been heavy handed with the services, and his requirement that the services make budget requests for "mission areas" that cut across service lines instead of letting each service determine its own budget was particularly unpopular. Laird decentralized policymaking and operations and revised the PPBS to allow a return of service budget ceilings and service programming of forces within these ceilings. This gave the services a more influential role in the development of budgets and force levels, and quickly won Laird the good will of the uniformed military.

At the same time, Laird recognized congressional determination, with wide public support, to cut defense costs. Laird's overall approach was to have the services agree to a

substantial cut in personnel and reallocate these funds to new weapon systems like the Trident nuclear ballistic missile submarine, cruise missiles, and the F-14 and F-X. The services accepted the plan, and total military personnel declined from about 3.5 million in FY 1969 to 2.3 million by the time Laird left office in January 1973.[10] His credibility with the services also allowed him to prune the service budgetary requests before they went to Congress. In general, while some critics say that these relationships were unimportant, it appears that Laird's respect for and rapport with the uniformed military services and Congress provided the administration with a reservoir of support it could later draw on for some of its more controversial actions.[11]

DAVID PACKARD AND THE ACQUISITION PROCESS

Laird was determined to get a better handle on cost growth by revising many of McNamara's programs. Laird noted that during the McNamara years there was "a widespread belief…that 'better management' would solve the problem. 'Better management' had a tendency to be translated into 'more management' with an accompanying increase in rigidity, delay, and the suppression of initiative."[12] Laird began by choosing David Packard as the Deputy Secretary of Defense with instructions to decentralize the acquisition process. Packard proved to be a wise choice, and many today consider Laird and Packard the best team ever to occupy the top positions at the Pentagon. One historian of DoD noted, "Laird was a gifted leader, commanding the respect, even affection, of all hands as he articulated a master vision… Packard, a well known and respected leader of high-technology American industry, provided the high

quality management and administrative skills that assured [DoD] functions were carried out effectively."[13]

Laird and Packard believed that TPP technical studies, reliance on prime contractors, and "planning" failed to avoid costly and time-consuming problems with weapons systems, and that TPP's technical oversight failed because the programs were too complex to manage from contracts and plans alone. Laird gave Packard the charter to -- once again -- overhaul the weapons procurement process to avoid huge cost overruns. [14] Packard looked closely at the military's thirty-four largest programs that Laird had cited to Congress for ways to cut costs. He realized that the Navy had misused the TPP system by buying the TF30 engine for the F-14A while planning to upengine the aircraft later, and decided to use the F-14 program to send a message to the services that the days of "gaming" TPP were over. When the F-14 program began to experience cost overruns, Packard cut the procurement number of F-14s in half, and he later refused to give the Navy any additional funds to put a more powerful engine in the F-14. The fighter was to remain underpowered for the next twenty years.[15]

Packard was especially interested in the Air Force's high visibility F-X program and concerned about the aircraft's performance and cost. He was an advocate of prototyping, feeling that, while prototyping was more expensive to contractors, its long-term advantages outweighed its initial high cost. Having real systems instead of paper systems to work with brought military users back into the selection process, and in general, prototyping would allow more flexibility and certainty in the process. Having contractors

build and test a real piece of hardware not only gave assurance the design would demonstrably perform, but also meant better estimation of follow-on costs.

The Air Force explained to Packard it had considered some form of a prototype flyoff of competing versions of the F-X, but found that the process was more complicated than it seemed – there had, for example, been twenty-two different types of prototyping programs in the past – and ultimately determined that prototyping was impractical for the F-X because the planning for the program was so far advanced. Packard agreed, but insisted on prototyping for the F-X's engine and radar, and also insisted on prototyping for all future major programs.[16]

Packard and Laird believed the F-X cost overruns were caused by the TPP's general lack of program supervision after the signing of the contract, and to try to avoid more overruns with the F-X Packard insisted on a new "milestone" process to carefully monitor the development and production costs.[17] A series of markers – "milestones" – were set up at critical development points in the program, and at each milestone a specific, formal decision to continue, delay, or cancel the program would be made by an elaborate set of review boards at both the OSD level (the Defense Systems Acquisition Review Council) and service level (the Air Force Systems Acquisition Review Council). Under this review system, a delay in one part of the program would hold up the whole program, and if the delays became excessive, they would invite a decision to cancel the program rather than dragging it on, as happened under TPP. Laird also streamlined management -- now a military Systems Project Office (SPO) would have full development responsibility. The military SPO Director was responsible for controlling

costs and had specific, regular reporting requirements to the Commander of the Air Force Systems Command, DoD, and Congress, reports that were to highlight significant changes to the program's cost, schedule, or requirements.[18]

The Air Force wanted to get the F-X selection process completed and the aircraft into production as quickly as possible, and many in the service initially criticized OSD for forcing delays in the fielding of the F-15. [19] But as the program developed, it was found that the slower pace and milestone system worked quite well because the system allowed both the Air Force and OSD to look carefully at the project as it moved along and allowed the technology for the F-15 to develop more fully.[20]

REINFORCING THE CRITICS

In May 1969, Lieutenant Colonel John Boyd and Pierre Sprey were joined in the Pentagon by another advocate of a lightweight fighter, Colonel Everest Riccioni, assigned to the Tactical Fighter Requirements Division of Air Force Headquarters. Riccioni, like Boyd, had not flown in Vietnam and he was, like Boyd, an engineer. He had flown fighters for a brief period (he taught at the Air Force Academy for longer than he flew) and claimed to have written a manual on jet aircraft tactics while flying F-100s in Germany.[21] When Boyd and Sprey learned that Riccioni was not only concerned about the size and expense of the F-15 but also about several of its new systems, they welcomed him to the group. Riccioni grandly designated the group "the Fighter Mafia" and himself as the "the Godfather."[22] The three began to brainstorm ways to make the Air Force and the Department of Defense accept their theories. They gave the "Red Bird" a new name, the "VF-XX /F-XX," but it remained a small, single-engine fighter that would

have a loaded weight of 25,000 pounds, no radar or sophisticated avionics, and armed with only cannon and heat-seeking missiles.[23]

In mid-1969, Sprey mounted a formal challenge to the F-14/F-X. In the name of the OSD/SA staff, he drafted a "Draft Presidential Memorandum [DPM] on Tactical Air," suggesting both the Air Force and the Navy adopt the VF-XX/F-XX concept, claiming it would allow the services to double the size of their future fighter force.[24] The DPM circulated around the Pentagon for coordination and, coming after Laird had seemingly gutted OSD/SA, dismayed both the Air Force and the Navy because it threatened both the F-14 and F-X programs. The Navy was especially unhappy because Laird's reduction in the number of F-14s left the Navy short of the number of new fighters required for its carriers, but it wanted more F-14s, not a less capable lightweight fighter. The Navy took the lead in the counterattack, and in an informal but devastating response circulated around the Pentagon, George Spangenberg, the Director of the Naval Air Systems Command's (NAVAIRSYSCOM) Evaluation Division, and Fred Gloeckler of the Systems Evaluation Division, wrote a scathing analysis of Sprey's work. The Navy engineers said the lightweight claimed for the VF-XX was "unachievable" and the proposed thrust-to-weight ratio and wing loading could only be achieved by a larger airplane. They added it was "obvious" that Sprey was not an aeronautical engineer and that:

> [Sprey's] basic concepts have been considered in detail by the Services during the formative stages of the F-14 and F-15, have been reviewed by DDR&E [Deputy Director of Research and Evaluation], and rejected in all decisions to date...the reconsideration of the concept [VF-XX/F-XX] as a viable alternative should have been turned down before submission to the services...

> In common with past papers by the same author, this study contains many fallacious assumptions, half-truths, distortions, and erroneous extrapolations. Unsubstantiated opinions are presented as facts. Any rebuttals give the appearance of arguments against the rudimentary virtues of simplicity, high performance, and low cost. [25]

This response, while delivered with feeling, was factual and analytical and effectively blunted Sprey's attempt to forward the DPM. It also showed that Sprey was out of his class when confronted with knowledgeable aeronautical engineers, but it was a valuable lesson for Sprey, Boyd, Riccioni, and other Critics – do not make arguments in front of experts. Their arguments would only achieve traction when they could present them to non-engineers unaware of the complexity and trade-offs of aircraft design. This meant they would have to move out of the Pentagon and fight on a different field.

THE NIXON DOCTRINE

Nixon presented his administration's grand strategy, the "Nixon Doctrine," in July 1969 on Guam and formally offered it to Congress on 3 November 1969. The "Nixon Doctrine" stressed pursuit of peace by a partnership with American allies supported by military aid and credit-assisted sales of military equipment abroad. The aim was to prepare America's allies to take up a greater share of the defense burden, especially manpower needs, in case of war. American military forces, Nixon said, would be "smaller, more mobile, and more efficient general purpose forces." Additionally, instead of the previous administration's "two-and-a-half war" concept (readiness to fight simultaneous wars on two major fronts and one minor front) the Nixon Doctrine cut back to a "one-and-a-half war" strategy.[26]

The Nixon administration also attempted to show how the new strategy would lower the defense budget. On 25 February 1970, a proud Laird took his FY1971 Defense Budget to Congress. The new Nixon Doctrine, he said, allowed record cuts in the defense budget in a short period. Laird noted that, as a percentage of GNP, the FY1968 defense budget was 9.5 percent, but the Nixon/Laird budget planned to drop the defense budget's percentage of GNP to 7 percent in FY1971. Laird also pointed out that, as a percentage of the federal budget, in FY1970 defense was 37.7 percent, but would be cut to 34.6 percent in FY1971. In constant dollars, defense would go from $72.3 billion in FY1970 to $65.9 billion in FY1971.[27] Laird noted in passing that the Department of Defense was looking for a new "International Fighter" for NATO and its other allies, who would be taking more responsibility for their own defense under the Nixon Doctrine.[28]

This last was to have a profound effect on America's tactical air forces. Implicit in the Nixon Doctrine was the assumption that America's allies would receive modern weapons, which in early 1970, even in NATO, was not the reality. America's NATO allies had a hodge podge of older aircraft, most of them with limited range and weapons capability. For the Nixon Doctrine to be credible, NATO needed a modern fighter force.

THE F-15 AND THE A-X

In December 1969, the Air Force selected McDonnell-Douglas to build the F-X. It was designated the F-15 "Eagle," and on 19 December 1969, OSD authorized the Air Force to purchase twenty aircraft for test and evaluation.[29] The total program costs were projected to be $6 billion in September 1968, but had climbed to $7.3 billion by February 1970, which Laird blamed entirely on bad estimates at the initial planning stage. It was,

he said, an example of the overoptimistic original cost estimates endemic under TPP where the emphasis was on winning a contract with papers for analysis rather than real systems. Notwithstanding this, Laird said F-15 development was proceeding on schedule and the program would receive $370 million in FY 1971. Its first flight was scheduled for October 1972, and the aircraft would be in operational service by November 1974.[30]

The contract award was not without some dispute. While the competitors agreed the award was fair, McDonnell-Douglas had come under a great deal of scrutiny for its minority hiring and employment practices, which some saw as discriminatory. Under strong pressure from the Air Force, the company revised its hiring and promotion practices.[31]

As Laird had promised, the two other key high-technology components of the F-15, the radar and the engine, were selected by prototype competition. The Hughes AN/APG-63, a pulse-Doppler radar with a "look down, shoot down capability," won the radar competition and, in a close contest, the Air Force selected the Pratt &Whitney F100 engine to power the F-15 over the lighter and structurally superior General Electric F401, because the F401 was considered higher risk.[32]

Because the new engine would be so technologically advanced and so critical to the F-15's performance, the contract for the F100 imposed a series of tight guarantees on Pratt & Whitney to make sure the engine performed up to specifications. One of the milestones the engine would have to meet was a satisfactory Military Qualification Test (MQT), which included a 150-hour endurance test. Additionally, the Air Force had negotiated a "correction of deficiencies" clause under which Pratt had to correct, at its

own expense, "any subsequently discovered deficiency stemming from its design, workmanship, or material."[33] The prototype competition and the tough, performance-driven engine contract seemed to be an ironclad guarantee that the bad old days of TPP were over. The F-15 program was cleared to take off – or so it seemed.

While the F-15 program was on its way, the Critics also won a victory for simple, cheap tactical aircraft. Laird announced the Air Force would go ahead with development of the "A-X," a simple, subsonic, heavily armored, long-range attack aircraft that could carry a large ordinance for close air support. High speed was not a requirement but low cost was, so the aircraft was to use two proven, economical jet engines and have an extremely limited avionics suite. The A-X would be the first aircraft built under Packard's prototyping program, and two contractors would build aircraft for a competitive flyoff.[34]

Though one Air Force general was to say "there was absolutely no requirement for the A-X" and another said it was a "dumb idea," the Air Force accepted the A-X because it fulfilled a number of parochial Air Force goals.[35] The A-X acquisition had the same rationale as the acquisition of the A-7, the desire to keep the close air support mission for the Air Force and away from the Army. The Army was developing a sophisticated attack helicopter, the AH-65A Cheyenne, for close air support when the Air Force issued the A-X requirement.[36] The A-X was much cheaper than the Cheyenne and the proposal scuttled the AH-65A program, preserving the close air support mission for the Air Force.

The A-X program guidelines called for two contractors to conduct a competitive flyoff with their prototypes, which showed that the Air Force was "on board" with

Packard's guidelines, and also showed that the Air Force was willing to take seriously the calls for simpler and cheaper aircraft.[37] Additionally, the A-X provided the tactical air forces with a modern ground-attack fighter, continuing the TAF's expansion and modernization, and also reduced pressure to convert the F-15 to a bomb carrier. It helped the Air Force expunge the last of the Navy aircraft, the A-7, from its inventory and allowed the Critics to claim a victory validating their acquisition schemes and the "simple/cheap" criteria. Still, many of the Critics were skeptical that the Air Force was serious about CAS as a mission and predicted the Air Force would quickly cancel the A-X program once the Army dropped the Cheyenne. It was not.[38]

PACKARD'S FIRST BLUE RIBBON PANEL – THE FITZHUGH COMMISSION[39]

In late 1969, Laird had asked Packard to establish a "Blue Ribbon" panel to examine the DoD's weapons system acquisition process, to recommend changes in management, and to improve the PPBS.[40] The members of the board were eclectic and seemingly a bit odd to be looking at the Department of Defense. The Chairman, Gilbert W. Fitzhugh, was the Chairman of the Board of the Metropolitan Life Insurance Company, so the group became the Fitzhugh Commission. The Commission included several attorneys, as well as Dr. Martha E. Peterson, President of Barnard College, and Hobart D. Lewis, President of Readers Digest Association, Inc.[41]

In July 1970, the Fitzhugh Commission issued its *Report to the President and the Secretary of Defense on the Department of Defense.* The board made more than one hundred recommendations, but few were surprising. It recommended exploring

development of subsystems independent of full weapons systems, more use of competitive prototypes, and less reliance on paper studies. The panel also recommended a general rule against concurrent development and production, and a prohibition on total package procurement – TPP.[42]

Packard had anticipated the report and immediately sent the services a memorandum on how to improve their programs. Willing – indeed eager -- to comply, the Air Force began a cost-cutting exercise for the F-15 program. The three-month review left the program intact but eliminated a number of items planned for the aircraft, including a long-range identification system called TISEO (Target Identification System Electro-Optical).[43]

THE DEPARTURE OF THE CRITICS

Even with the selection of the A-X, the Critics' Holy Grail remained the F-XX/VF-XX. Unable to win the internal battle in the Pentagon, Sprey went public with his ideas. In March 1970, an official from the DoD made a presentation on both the F-14 and F-15 programs at a meeting of the American Institute of Aeronautics and Astronautics in St. Louis. Sprey countered with a presentation of his weapons acquisition theories and his idea of the F-XX fighter, which he now claimed weighed less than 25,000 pounds.[44] While provocative, the presentation had no apparent impact on the Department of Defense or the Air Force. In September 1970, in a blatant appeal to parochial service prejudices, Riccioni wrote a memorandum to the Air Force leadership saying that some in the Navy were working on a lightweight fighter of their own, the VF-XX, to augment the F-14 after Laird had cut the buy. The letter was clearly trying to raise the specter of the

Air Force having to buy another Navy fighter. Riccioni also developed a briefing that proposed possible designs for three new lightweight fighters and presented the briefing to anyone on the Air Staff who would listen. Again, these efforts yielded no results.[45]

One of the main reasons for both Sprey's and Riccioni's failures was their lack of credibility. Sprey, as has been noted, had no credentials other than his time at OSD/SA – hardly a plus in the post-McNamara era. Riccioni was considered a joke, especially in the critical area of the Air Force Directorate of Operations, XO, where the real "fighter mafia" – young Air Force fighter pilots with years of flying experience and combat tours in Vietnam – were assigned. Riccioni's attempts to sell himself as a "fighter pilot," though he had never been in combat and had come to the Pentagon rather than go to Vietnam, brought hoots of derision from Air Force combat veterans, especially when Riccioni walked down the halls of the Pentagon with an arrow under his arm because he was a "warrior."[46] He generated his own problems in other ways. After several drinks at a Pentagon Christmas party in December 1970, Riccioni cornered the Air Force Deputy Chief of Staff, General John C. Meyer, a 26-victory fighter ace in World War II, and lectured him about what was wrong with the F-15 and why the Air Force needed the F-XX. Meyer was not amused. He apparently did not take kindly to being lectured to by a "fighter pilot" who had never flown a combat mission and who was unwilling to volunteer to fly in Vietnam, though the war had been going on for five years and the Air Force was short of fighter pilots. Shortly afterwards Riccioni's tour in the Pentagon was completed and, given the choice between flying combat in Vietnam and a desk job in Korea, Riccioni chose Korea.[47] At about the same time Sprey left OSD, but instead of

continuing to work on tactical air systems, he founded a company called Enviro Control, which developed mechanisms for water pollution instrumentation, as well as providing water pollution demonstrations and studies.[48]

But Sprey stayed in the Washington area and he and Boyd continued to use all their bureaucratic infighting skills to push the lightweight fighter and kill the F-15. They formed an alliance with anti-military members of Congress who wanted to cut the defense budget and, in May 1971, the anti-Vietnam War, anti-military congressional "Congress Through Peace and Law" organization issued a report that recommended dropping both the F-14 and F-15 in favor of a very low-cost fighter that looked suspiciously like the F-XX.[49]

A few months earlier, in March 1971, Laird presented the administration's FY1972 Defense Budget to Congress. In his opening statement, he noted that the "period of defense domination in [federal] resource allocation is over" and that defense spending "no longer consumes the large percentage of the federal budget it did in the 1950s." Laird said the administration believed America needed to drop its defense budget and manpower to pre-Vietnam levels and that a restructured military required 7 percent GNP or less. The administration's FY1972 budget declined in real terms by about 5 percent from FY1971 and was approximately 24 percent below the FY1968 budget. In constant dollars, it was about equal to the pre-Vietnam FY1964 budget.[50] Nevertheless, the budget kept Laird's basic commitment to the services, allowing them to buy new equipment at the expense of the force structure in the immediate future. For the Air Force, the new budget allowed it to pursue its modernization programs in exchange for reducing the

number of tactical fighter wings from twenty-four to twenty-one from 1973 to 1977. The F-15 program would receive $348 million in FY1971 and $415 million in FY1972; procurement would begin in 1973, and in FY 1976 the F-15 would be in service.[51]

AN IDEA WHOSE TIME HAD COME – THE LIGHT WEIGHT FIGHTER

Ironically, as the Critics left the Pentagon, a combination of DoD acquisition philosophy and financial considerations aligned in favor of a low-cost, high-performance fighter, called the Light Weight Fighter. It was a radical change, but the attractions of the LWF were becoming clear. A low-cost fighter would help cut the defense budget, and a new fighter offered Laird and Packard an opportunity to try out some of their theories about weapons acquisition. In February 1971, Laird agreed to a study, known as the "Simon Study" from its leader, OSD staffer Allan Simon, to examine the potential of a lightweight fighter with the aim of using it as a model for Packard's prototyping program. Just before he departed for Korea, Riccioni received $149,000 for a study project on the LWF and gave the money to contractors from General Dynamics and Northrop, the two companies that had lost the F-14 and F-15 competitions, to design a 25,000-pound fighter whose performance would be superior to the F-4.[52] The word of the financial incentive quickly spread. Lured by the promise of a large contract, several companies – Lockheed, Northrop, and Ling-Temco-Vought (LTV) -- offered the Air Force "unsolicited" proposals for a lightweight fighter. Boyd and Riccioni visited Boeing when the contractor did not submit a proposal and urged – or pressured -- to submit a proposal, which Boeing did.[53]

With the formation of Simon's group, the Air Force saw the LWF was a serious project and realized it had to become an active participant. There were, in fact, many in the Air Force who liked the idea of a small, simple fighter and in August 1971, the Air Force set up a Prototype Program Office for the LWF. When Packard announced to Congress in September 1971 that, because of the Simon Study, the Department of Defense would go ahead with an experimental program to develop a LWF, the Air Force was ready.[54]

The LWF program was not only intended to build a new fighter but also to do it on a "design to cost" basis of no more than $3 million a copy, based on a buy of 300 aircraft.[55] Using the Simon Study as an outline, DoD prepared requests for proposals and other information for the companies interested in competing for the LWF contract. Based on the contractors' preliminary studies, the DoD would select two companies and give them $100 million dollars to build a prototype of their aircraft. The aircraft was to be designed for both the Air Force and Navy, and then there would be a fly-off between the prototypes to decide the winner in a "winner take all" competition. The actual "requirements proposal" Packard and Laird approved for the aircraft companies was very broad to allow the companies' wide latitude in developing the new fighter. This freedom, Packard and Laird believed, would produce innovative proposals for the new aircraft.[56] Packard and Laird also said the purpose of the LWF project was only to allow contractors to demonstrate technology, but the ultimate aim of the program was clear. Packard acknowledged this when he wrote an interested senator "[the LWF] could, if objectives

were met, provide the Air Force with the option of complementing the F-15 force with inexpensive fighters."[57]

Despite the movement of the program, neither the Air Force nor the Navy committed to buying the winner. The Air Force leadership remained apprehensive that the LWF would cut into the number of F-15s it wanted to buy, and the service refused to write the mandatory "Required Operational Commitment" (ROC) for the fighter.[58]

AIR FORCE SHIFTS ITS POSITION

As the LWF program moved inexorably forward, it seemed the Critics had won a major battle, but they had actually won without a fight. Despite its public foot dragging, it seems that internally the Air Force had slowly begun to change its mind about the requirement for a LWF for force structure reasons – a less expensive fighter meant the service could buy a larger number -- and as a means of preserving the air-to-air role of the F-15. The Air Force's primary long-range strike aircraft, the F-4, was aging and the F-15 was coming under increasing pressure to be assigned a bomb-carrying interdiction role. The service began to see the LWF as an F-4 replacement and quietly decided internally that, if the prototype tests showed the winner had adequate performance, it could be enlarged and otherwise modified to become a "swing role" fighter for both ground attack and air-to-air combat. Additionally, and importantly, the Air Force was interested in having an inexpensive, high-performance multi-role fighter for the National Guard and Air Force Reserve forces that were equipped with obsolete, low-capability aircraft. Equipping them with modern fighters would provide a quantum improvement in American TACAIR capabilities. [59]

Force structure was really the key, especially in this time of limited budgets. At a certain point, the size of the fighter force mattered, because the Air Force had to have the proper number of aircraft in the proper places to meet the Soviet threat. The service needed to expand to meet its commitments, and the Air Force calculated it needed about twenty-six active fighter wings to provide flexible forces for deployment to world trouble spots.[60] Because the LWF would be considerably less expensive than the F-15, the Air Force would be able to grow a much larger modern fighter force. While at this time twenty-six active fighter wings seemed wildly optimistic, the new idea was a combination of high cost F-15s and low cost LWFs and A-10s that became known as the "high-lo mix" and became a buzzword in the TAF.[61] While McDonnell-Douglas made strenuous efforts to lower the F-15's price and give it a ground-attack capability, even at a lower cost the multi-role "stripped" F-15 was "high end" compared to the projected cost of a LWF.[62]

The main Air Force concerns were about the LWF's performance, but these were somewhat assuaged when Laird made one of the requirements for the LWF roughly the same "fuel fraction," that is the same proportional fuel load, as the F-15, and this gave the LWF roughly the same range.[63] While the Critics, notably Sprey, considered long range a useless requirement, range was a key issue for the Air Force, and the high fuel fraction of the LWF changed the service's view of the aircraft in spite of the considerable drawbacks of its small size.[64]

There was also a political dimension to the LWF program, because it would support the Nixon Doctrine. In the mid-1960s, unhappy with the cheap but ineffective F-104s and

F-5s, several NATO countries had committed to a new "European fighter" called the Multi-Role Combat Aircraft (MRCA), eventually named the "Tornado." The MRCA became an F-111 clone -- expensive, multi-role, and swing-wing – and, like the F-111, had many problems. By the early 1970s, half the countries had dropped out of the program because of high cost and marginal performance.[65] The air-to-air F-15 was too expensive and too limited for the NATO allies who needed a fighter-bomber, not a pure air-to-air fighter, so a less expensive, dual-mission LWF would be a perfect solution for these allies. Having NATO fly the same fighters as the U.S. Air Force would also have huge benefits for both sides. Foreign sales would reduce the unit cost of the aircraft, and it would also mean the USAF and its NATO air forces would be using the same aircraft with common spare parts, weapons and other items, thus solving many existing logistical problems.[66]

The Air Force gradually saw that the LWF could be a win-win situation. If the LWF proved successful, buying it would not only be politically popular, but the service would also be getting a very capable aircraft. The key was that the Air Force had quietly changed the mission of the LWF. It would not be the low-tech, cheap, air-to-air aircraft the Critics envisioned, but a high-tech, if small, multi-role fighter-bomber.[67]

On 13 April 1972, DoD selected General Dynamics and Northrop to develop prototypes of their LWF for a prototype fly off. The General Dynamics entry, the YF-16, was a single-engine fighter with the same Pratt and Whitney F100 engine as the F-15, while the Northrop entry, the twin-engine YF-17, had two General Electric F101 engines,

a modification of the F401 engine that had lost out to the F100 in the F-15 engine competition.[68]

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1. Clark Clifford, "Statement of Secretary of Defense Clark M. Clifford. The Fiscal Year 1970-1974 Defense Program and 1970 Defense Budget," January 15, 1969, 88-89.

2. Andrew A. Jordan and W. J. Taylor, *American National Security: Policy and Process* (Baltimore: Johns Hopkins University Press, 1984), 79.

3. Ibid., 7.

4. Richard Sanders, *The Politics of Defense Analysis (*New York: Dunellen, 1973), 124, 319-324, *passim;* Lawrence J. Korb, "The Budget Process in the Department of Defense 1947-1977: The Strengths and Weaknesses of Three Systems," *Public Administration Review* 37, 4 (July-August 77): 340; Lawrence Lynn and Richard Smith, "Can the Secretary of Defense make a Difference?" *International Security* (Summer 1982): 49.

5. Alain Enthoven and K. Wayne Smith, *How Much is Enough?* (Santa Monica, CA: Rand Corporation, 2005), 23, *passim.*

6. Robert Sanders, *The Politics of Defense Analysis* (New York: Dunellen, 1973), 34.

7. Enthoven, 211.

8. Ibid., 212.

9. Korb, 342.

10. *Congressional Quarterly Almanac, 93rd Congress, 1st Session, 1973, Volume XXIX,* 213-214.

11. Some thought this brought no benefits and was generally a bad idea. Enthoven, 21.

12. Congress, Senate, Subcommittee on Department of Defense Appropriations, *Statement of Secretary of Defense Melvin R. Laird on the 1971 Defense Program and Budget,* 25 February 1970, 55; Calvin Hargis, Oral History interview #86 by Jacob Neufeld, 21 March 1973, AFHRA, 18

13. Stephen J Cimbala, *The Reagan Defense Program: An Interim Assessment* (Wilmington, Del: Scholarly Resources, 1986), 44.

14. Ibid., 49.

15. Robert W. Drewes, *The Air Force and the Great Engine War* (Washington, DC: National Defense University Press, 1987), 23, 34-35; Jon Lake, Grumman *F-14 Tomcat: Shipborne Superfighter* (London: AIRtime Publishing, 1998), 53-54.

16. Paul M. Rogers, Lt. Gen. USAF, Oral History Interview with Jacob Neufeld, 17-19 June 74, AFHRA, 8-10, *passim.* Hargis, 15-16.

17. Hargis, 11. Some Air Force officers felt that, in fact, it was the Air Force that was responsible for this method of program development. Neufeld, 35-36.

18. An excellent and concise description of this is found in Philip Lacombe, "Acquiring Systems, Step by Step," *Air Force Magazine,* August 1983, 53-55. Also see U.S. Congress, Senate, Subcommittee on Department of Defense Appropriations, *Statement of Secretary of Defense Melvin R. Laird on the 1971 Defense Program and Budget,* 25 February 1970, 24, 135-136.

19. Roger K. Rhodarmer, Maj. Gen. USAF, Oral History Interview by Jacob Neufeld, 29 March 1973, K.239.0512.2029, AFHRA, 12-13;

20. Rogers, 40-42; 47-48.

21. There is no evidence that such a manual existed.

22. Grant Hammond, *The Mind of War: John Boyd and American Security* (Washington, D.C: Smithsonian Press, 2001), 85.

23. Jacob Neufeld, *The F-15 Eagle: Origins and Development 1964-1972* (Washington, DC: Office of Air Force History, 1974), 32; Jeruald Gentry, Maj. USAF, "Evolution of the F-16 Multinational Fighter" (Student Research Paper #163: Industrial College of the Armed Forces, 1976), 25.

24. Pierre Sprey, Oral History Interview by Jacob Neufeld, 12 June 1971, K.239.0152-969, AFHRA, 40.

25. Congress, Senate, Armed Services Committee on Manpower and Personnel Subcommittee, *Impact of Technology on Military Manpower, Requirements, Readiness, and Operations.* 96th Cong., 2nd sess., 4-5 December 1980, 5 December, 275; Gentry, 21. This memo was circulated in the Pentagon and copies presented informally to the services in late 1969.

26. Congress, Senate, Subcommittee on Department of Defense Appropriations, *Statement of Secretary of Defense Melvin R. Laird on the FY 1972-1976 Defense Program and the 1972 Defense Budget,* 92nd Congress, 2nd sess., 24 Feb, 1971, 10-11. For a complete explanation, see President Richard Nixon, Report to Congress, *US Foreign Policy for the 1970s: A New Strategy for Peace,* 11 February 1970 (Washington, DC: GPO, 1970).

27. Laird, Chart 26.

28. Ibid., 24, 60, 137; Gentry, 6-8.

29. Neufeld, *F-15,* 37.

30. Laird, 24 February 1971, 79-80.

31. Memo, Undersecretary of the Air Force John McLucas to Roger Kelley, Assistant Secretary of Defense, Manpower and Reserve Affairs, "Equal Opportunity Compliance: F-15 Contract," 24Jan 1970; "The F-15 and Fair Employment," *Saint Louis Post Dispatch,* 6 February 1970, 10; "McDonnell Hiring Plan Approved," *The Washington Post,* 11 February 1970, D10.

32. Pulse Doppler radar is able to detect targets below the horizon by using the "Doppler effect," rather than simple pulses used by regular radars that cannot look below the horizon because the pulse bounces off the ground. Peter Jarrett, *The Modern War*

Machine: Military Aviation Since 1945 (London: Putnam Aeronautical Books, 2000), 134. For the engine, see Drewes, 19.

33. Drewes, 31-32.

34. Arden B Dahl, "The Warthog: The Best Deal the Air Force Never Wanted." (Research Study: National Defense University, 2004), 26.

35. Rogers, 58-59; Wilbur Creech, Gen. USAF, Oral History Interview by Hugh Ahmann, 19 June 92, K239.0512, AFHRA, 248-250.

36. Rogers, 58-59. For an in-depth look at the issue, see Benjamin Franklin Cooling, ed., *Case Studies in the Development of Close Air Support* (Washington, D.C: Office of Air Force History, 2000).

37. The prototyping process is a complex one. While it seems logical, it should be noted that three of the best fighters of World War II – the British Supermarine Spitfire, the North American P-51 Mustang, and the Japanese A6M Zero, were not the result of the prototyping process, even though it was the norm at the time. Also, America's best post-war fighter, the F-86, was not the product of a prototype flyoff. William Green, *Famous Fighters of the Second World War* (London: Macdonald and Jane's, 1975). For the F-86, see Jarrett, 49.

38. The Fairchild-Republic A-10 was chosen the winner of the competition in January 1973. Once in the field in 1975, the A-10 was criticized by its pilots for its lack of avionics, which were eventually updated at considerably more cost than had the avionics been included at the time of its development. Creech, Oral History, 248-250; Robert C. Seamans, Secretary of the Air Force, "Tac Air: A Look at the Late 70s." *Air Force Magazine*, January 1973, 35.

39. The Commission is called in some documents the Packard Blue Ribbon Commission, but this name is more commonly and accurately given to a Commission Packard actually chaired under President Ronald Reagan in 1986.

40. Congress, Senate, Subcommittee on Department of Defense Appropriations. *Statement of Secretary of Defense Melvin R. Laird on the 1971 Defense Program and Budget*, 25 February 1970, 17-18.

41. Fitzhugh Commission (Blue Ribbon Defense Panel), "Report to the President and the Secretary of Defense on the Department of Defense, 1 July 1970" (Washington, DC: GPO, 1970), iii.

42. Ibid., 78-80.

43. Rogers, 21.

44. Sprey, Oral History, 39.

45. Everest Riccioni, Col. USAF, interview by Jerauld Gentry, Maj. USAF, quoted in "Evolution of the F-16 Multinational Fighter," 31, 37.

46. Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown and Company, 2002), 29.

47. Ibid., 31.

48. Congress, Senate, Armed Services Committee on Manpower and Personnel Subcommittee, *Impact of Technology on Military Manpower, Requirements, Readiness, and Operations,* 96th Cong., 2nd sess., 4-5 December 1980, 273.

49. Members of Congress for Peace Through Law Military Spending Committee, *The Economics of Defense: A Bipartisan Review of Military Spending* (New York, NY: Praeger, 1971).

50. Laird, 24 Feb, 1971, 150-151.

51. Ibid., 81.

52. Corum, 94. Riccioni was later to work for Northrop.

53. Ibid., 99; Hillikar, "Father of the F-16," *Code One,* General Dynamics Magazine, April 1991, 14.

54. Gentry, 47, 51. Richard M. "Moody Suter," Col. USAF, "Corona Ace" interview by Lt. Cols. Gordon Nelson and John Dick, 26 January 1977, AFHRA, 24.

55. The $3 million was not made contractual. Gentry, 56.

56. Charles R. Janson and Kenneth C. Rogers, *Origin of the F-16 Multinational Program (1970-1977), Volume 1* (Kirtland Air Force Base NM: Air Force Systems Command Headquarters, 17 October 1983), 13.

57. Letter, David Packard, Deputy Secretary of Defense, to Stuart Symington, US Senate, 10 September 1971, AFHRA; Gentry, 59.

58. Gentry, 44.

59. Seamans, 37.

60. Ibid., 34;

61. Gen. Alton Slay Testimony, Congress, Senate Armed Services Committee, *FY1977 Military Procurement,* 95th Congress, 2nd sess., January 17 1976, 4886.

62. Lorell, 213; author's conversations with McDonnell-Douglas representatives, Tel Aviv, Israel, 1977-1978. The representatives were trying to keep the IAF from buying F-16s.

63. While they had the same fuel fraction, external stores – extra fuel tanks and missiles – cut into the F-16's range more than the F-15's. Simply put, the F-15 was bigger and thus external stores were proportionally smaller, thus adding less overall drag, while in a smaller fighter the same external stores were a larger proportion of the drag and thus cut into the range more. Hillikar, 9.

64. Edgar Ulsamer, "YF-16: On Time, On Track, On Budget," *Air Force Magazine,* January 1974, 51-54; "The Lightweight Fighter Halts the Cost Spiral," *Air Force Magazine,* October 1973, 64-68. The *Air Force Magazine* is the unofficial "party organ" of the corporate Air Force.

65. Gentry, 42.

66. John Vogt, Gen. USAF, "Allied Air Power in Europe: The View From the Top," *International Defense Review,* January 1974, 43-44.

67. General Slay Testimony, 4896-97.

68. Gentry, 46.

CHAPTER SEVEN: THE WAR ZONE

TRAUMA I – LINEBACKER, 1972

By late 1971, the Vietnam War seemed to be steadily winding down and the Navy's Top Gun school was beginning to feel some pressure. There had been virtually no MiG encounters since mid-1968, so the program's graduates had no MiG kills. Without combat successes, there was a real question about whether Top Gun would survive post-Vietnam. Then, in the combat zone, slowly, almost imperceptibly, the situation began to change. Early in 1972, North Vietnamese MiGs began to engage Air Force aircraft at night over Laos. Though there were only a few engagements with MiGs, once again the Air Force kill ratio was low, about 2:1.[1] The MiGs also began aggressively pursuing Navy reconnaissance aircraft during the day, and in the first months of 1972 Navy F-4s, mainly flown by Top Gun graduates, shot down four MiGs for no losses of their own. The Top Gun school breathed a sigh of relief – its program seemed to be working, and its future looked secure.[2]

Then, in April 1972, the North Vietnamese launched a massive invasion of South Vietnam. As the North Vietnamese threatened to overwhelm the South Vietnamese army, the USAF poured F-4 squadrons into American bases in Thailand to stem the tide.[3] Once the attack was contained, in the beginning of May 1972, Nixon ordered massive attacks

against targets in the Hanoi area and the mining of Haiphong harbor in an operation called "Linebacker."[4]

The Air Force expected good results. The squadrons sent to the conflict were fully operational and considered well trained by Air Force standards, and the crews were all experienced, most with at least one combat tour. Almost of all of the squadrons flew the latest model F-4, the F-4E, with an internal cannon that made it a vast improvement over the earlier F-4s. Additionally, some of the F-4s had a classified device known as "Combat Tree," which allowed the F-4s to tell which radar blips on their screens were friendly and which were MiGs. "Tree," as it was quickly dubbed, would allow the F-4s to use their long-range AIM-7 radar missiles to fire at MiGs beyond visual range (BVR), before the MiGs could see the F-4s.[5]

The Air Force raids on Hanoi that began in May consisted of large, complex "strike packages" built around a few F-4s carrying laser guided bombs (LGBs) and their critical guidance pods, called Pave Knife. The Air Force had only a few of these Pave Knife pods – four, for most of the operation – and protecting them was given the highest priority. [6] A strike package consisted of F-4 flights dropping chaff to jam North Vietnamese radars in front of the LGB carriers, with "Wild Weasel" anti-SAM hunter-killer teams and several different variants of fighter escorts to protect the LGB aircraft and chaffers from MiGs. [7] Each of the Thai bases was given a component of the complex missions – anti-SAM Wild Weasels and hunter-killer missions came from Korat RTAFB, laser bomb and chaff missions from Ubon RTAFB, and fighter escorts from the two other bases, the main air-to-air base at Udorn RTAFB and another unit at Takhali RTAFB.[8]

But the results the first three months of Linebacker fell far short of Air Force expectations, and the results of the first day of the strikes on Hanoi on 10 May showed the stark contrast between Navy and Air Force training. That day Navy F-4s shot down eight MiGs without loss and produced the first ace of the Vietnam War, Navy Lieutenant Randy Cunningham, who shot down three MiG-17s in the space of a few minutes. The Air Force shot down three MiGs but lost two F-4s, including one flown by a crew that had recently scored three victories.[9]

As Linebacker continued, Air Force losses remained high, especially to MiGs, and the Air Force operations reflected poor training, tactics, discipline, and organization. While the new laser-guided bombs were extremely effective, there were inordinate difficulties and losses while protecting the LGB delivery aircraft, and many of the raids destroyed their targets by simply overwhelming the North Vietnamese defenders. The heavy losses in the initial stages of Linebacker made a deep impression on the Air Force crews. It came as a shock to them how poorly prepared they were, and one pilot, Ron Keys, remembered "I had been having the time of my life [up to this point]…it had never occurred to me I had been poorly trained."[10]

Coordination of the complex strikes was a nightmare because none of the Air Force units had ever trained with other units with different missions, and the crews were not prepared for operations against an integrated air defense system of MiGs, SAMs, and radar-guided AAA. The Air Force was also using formations that made it easy for the MiGs to attack unseen, and the crews were also poorly trained for air-to-air combat -- for many, their first air combat engagement was with a MiG. Despite being heavily

outnumbered, a few North Vietnamese MiGs were able to disrupt many Air Force strikes, and the MiGs ran up a kill ratio of almost 2:1 in their favor through July 1972. One F-4 pilot, a veteran of two previous combat tours, remembered, "For the first three months of Linebacker the MiGs gave us an old fashioned butt kicking, pure and simple."[11]

The Air Force's poor performance caused dismay in the White House. Since the beginning of the Vietnam War the Air Force had been agitating to be "cut loose" to attack all the significant targets in North Vietnam, but now that President Nixon gave the Air Force the opportunity, it stumbled badly. Nixon singled out the Air Force leaders for severe criticism and at one point he told Kissinger:

> I want you to convey directly to the Air Force that I am disgusted with their performance….I do not blame the fine Air Force pilots who do a fantastic job in so many other areas. I do blame the commanders….If there is one more instance of whining about target restrictions we will simply blow the whistle on this whole sorry performance of our Air Force in failing for day after day after day in North Vietnam this past week [12-19 May] to hit enormously important targets when they had an opportunity to do so and were ordered to do so and then wouldn't carry out the order….I want you to convey my utter disgust to [Admiral] Moorer [Chairman of the Joint Chiefs of Staff] which he can in turn pass on to the [Air Force senior commanders]. It is time for these people either to shape up or get out….[12]

Nixon's unhappiness with the Air Force's performance was mirrored by the senior Air Force leadership, especially concerning the losses to MiGs. Had the kill:loss ratios been kept within the Air Force, the leadership might have accepted General Momyer's rationale that the losses were caused by a variety of factors over which the Air Force had no control. However, while Momyer's staff at TAC headquarters could shield him from hearing things he did not want to hear, things were different in Washington. Each week there were separate, all-service meetings for the three groups of general officers who

were in charge of the uniformed military -- the Chiefs of Staff, the Chiefs of Staff for Operations (OPSDEPS), and the Deputy Chiefs of Staff for Operations, (DEPOPSDEPS). The meetings took place in a small, sealed, and unimpressive room known as the "Tank," where the generals sat around a large, rectangular, dining room-size table. Each of the weekly briefings started with an intelligence report, and beginning in May 1972 the top Air Force leadership had to sit and listen while a briefer from the Joint Chiefs of Staff described how many MiGs the Navy shot down and Navy losses compared to Air Force MiGs shot down and Air Force losses.[13] Both services were flying the same F-4s -- in fact, the Air Force F-4s with a cannon and Tree were superior – and one can imagine how embarrassing it was for the Air Force generals to have to sit through these briefings week after week, and how often the Navy admirals mentioned the Top Gun. It was clear the Navy was doing something right, as loath as the Air Force leaders were to admit it. Parochial service considerations would have to be put aside to solve this problem.

WORKING THE PROBLEM

The Air Force Chief of Staff, General John D. "Jack" Ryan, sat through many of these briefings and was especially dismayed by the Air Force's poor air-to-air performance. Major John Corder, a highly decorated Rolling Thunder veteran and a member of the Fighter Tactics Branch of the Air Staff's Tactical Division, was the officer who had to brief Ryan daily on the losses, and Corder remembers that this was "always a tense time."[14] The problems finally came to head when Corder briefed Ryan in June 1972 about an Air Force F-4 pilot who had lost a MiG kill because he had his missile arming switches in the incorrect positions -- not an uncommon problem in the heat of combat in

the F-4. Ryan "threw a fit and asked how this was possible, what was wrong with our air-to-air combat capability?"[15]

One of the officers in the room was Corder's boss, the Chief of the Tactical Division, Lieutenant Colonel William Kirk, a double MiG killer and the former commander of the F-4 squadron at the Fighter Weapons School. Kirk told Ryan that, in his opinion, Air Force fighter pilots were so poorly trained that only 10 percent could pass a written test on the basics of air combat and the F-4's air-to-air systems. Ryan was taken aback and clearly irritated that TAC's poor training meant his fighter pilots were coming up short in combat. Ryan had clashed with Momyer before and there seems to have been no love lost between the two, so Ryan turned to Kirk and Corder and said, "OK, you guys make up that test, take it to the field and give it, then tell me what the results are. And don't tell Momyer what you're doing."[16]

Kirk and Corder, both of whom wanted to return to fighters after their Pentagon tours, quietly disregarded Ryan's last directive. They quickly passed the word to Momyer's staff and asked for someone from the TAC staff to join them on their visit to the bases to give the test. Corder wrote a twenty-five question test and on the front of the test put a caveat: "If there is any question on this test that you don't need to fight a MiG this afternoon, don't answer it." Out of more than two hundred pilots who took the test, only one pilot dropped one question.[17]

Just as Kirk had predicted, results were absolutely miserable. The average score was 40 percent, and only 10 percent of the pilots passed the test. It was clear Air Force F-4 pilots, even those who had flown two combat tours, knew little about the F-4's radar or

missiles, were unable to judge their distance from the small Soviet MiGs when presented with pictures, and several drew gunsight profiles of MiG-21s that looked like F-4s. [18] Moreover, the academics were the easy part. There was no flying to check on the crews' air-to-air flying skills -- or lack thereof.

Before the team returned to the Pentagon to brief General Ryan they stopped at Tactical Command Headquarters to brief General Momyer. It was a tricky time, because they were going to have to tell the man responsible for TAC's training that his program was inadequate. After some discussion the team decided to brief Momyer that the results were "understandably poor" because of the short training time TAC had to make Air Force "universal pilots" combat capable in the F-4 before they went to SEA.[19]

Momyer was not pleased with the briefing or the test results because he had been saying how well his TAC-trained pilots were doing in SEA, but faced with the facts and knowing the team was to report to General Ryan, he had no choice but to listen and then ask for the team's recommendations. Kirk, who had been Suter's and Wells' commander at Nellis and knew about the Navy's Top Gun program, had a ready answer for the question. He recommended that TAC form an "Aggressor squadron" of aircraft that duplicated the MiGs' small size and performance to regularly visit all the fighter wings in TAC and teach air-to-air combat. It was a flying variation of Wells' threat briefing and an Air Force version of Top Gun, though the latter went discreetly unmentioned. [20]

It seemed to the team that Momyer did not like the idea, and Kirk, Corder, and the rest of the team returned to Washington to brief General Ryan. It took the team three days to prepare their findings, develop a briefing and a "package" for Ryan approving an

Aggressor squadron, and to get on his schedule.[21] Meanwhile, back at TAC General Momyer, knowing that the team would report that TAC's training was inadequate and then give Ryan their recommendations, tried to take the initiative. He called Ryan, described what the report found and recommended that TAC form an Aggressor Squadron. When Corder, Kirk and the rest of the team went in to brief Ryan, he listened to their report and then said, "Momyer called me a few days ago and said he wanted to form an Aggressor squadron. Does this package do that?"[22]

Kirk assured him it did. Corder remembers, "Ryan took the package, opened it to the approval page and, without reading it, scrawled a big R across it. I realized this SAC general was going to change the way we trained for air-to-air combat in our air force. I liked his style." Even though Ryan was a former SAC bomber pilot and not particularly well liked or respected by some in the fighter community, he started the Aggressors on their way -- "the most significant item in the development of modern [Air Force] air-to-air capability," one general said later. [23]

The proposal Ryan approved was the forming of an Aggressor squadron using small, supersonic Northrop T-38 Talon trainers turned over to TAC by Air Training Command (ATC) where they were used in the last six months of pilot training. Except for top speed, the T-38 simulated a MiG-21's performance quite adequately, and because the T-38 was a two-seater, it allowed extra training opportunities. Air Training Command was loath to give up the T-38s, even with sharp cuts in pilot training as the Vietnam War wound down, but the large "R" scrawled on the approval package worked wonders in the Pentagon.[24] By late 1972 the Aggressors, based at Nellis and officially designated the

64th Fighter Weapons Squadron, began to get their T-38s, though as one of the original Aggressors noted, "Air Training Command sent us the oldest, most beat up jets I'd ever seen."[25]

The Aggressor pilots were young former F-4 pilots, some of them MiG killers, and one of the requirements was that they had a combat tour, preferably during Linebacker. One of the first Aggressors was Major Roger Wells, and he provided much of the intellectual backbone of the unit.[26] The Aggressors had studied Top Gun and knew they did not want to be a mirror image of the Navy program. Top Gun's mission was simply to give Navy F-4 crews experience flying against small, maneuverable fighters flown by skilled pilots, but the Top Gun instructors flew their A-4s using standard Navy tactics, not Soviet tactics. Because Top Gun took only the top crews from each unit in the fleet, this allowed the instructors a good deal of leeway in how they taught their students because all of the students were highly qualified. Additionally, the prevailing attitude of the instructors at Top Gun seems to have been to win at all costs, while teaching along the way.[27]

While Top Gun only brought in a few selected pilots from across the fleet, the Aggressors would fly with all the pilots in an Air Force fighter unit, not just the best, so the new Aggressors knew their mission had to be considerably broader and would have to be more innovative. The Aggressors decided that when they visited a unit they would bring an intelligence officer to present Wells' Soviet capability and tactics briefings, and then to combine the "book knowledge" with flying missions against T-38s that had many of the same characteristics of the MiG-21. Unlike Top Gun, the Aggressors would fly like

the Soviets, using Soviet tactics and radar control. A typical Aggressor ACM (air combat maneuvering) flying training mission would see the Aggressors, completely under the control of their own ground radar controller, fly Soviet formations into the fight to give the American crews the chance to see the Soviet formations on radar before the actual dogfight began. Once the dogfight began, the maneuvering was free play.[28]

The Aggressors also introduced a cultural change in how Air Force pilots approached ACM training missions. Because the Aggressors flew against less experienced crews whose air-to-air skill level was considerably lower than the Aggressor pilots, the Aggressors won most of the fights, especially in the beginning. The vast disparity in skill levels meant the Aggressors had to be cautious about how they debriefed the missions and much less competitive in their approach. The Aggressors knew the perception the missions were a masculinity test would change the focus to winning rather than learning, so they could not let the training become a "me vs. you" event where pride was on the line. The key to successful air combat training was to remove ego from the training dogfight, so the Aggressor pilots worked hard on being professional, on making the missions learning experiences, and on developing the art of debriefing each engagement.[29] As one Aggressor wag noted, "our mission was to gun somebody and make them like it." To this end, the first thing the Aggressors did with the T-38s was to put gun cameras in them to record their missions, and the idea was to let the film do the talking, so there would be no arguments.[30] This was another major cultural shift – now air combat was not for building up the ego, but for training, and if a student won a fight with an Aggressor, the Aggressors had done their job as instructors.

There were other significant differences with Top Gun. Because Top Gun was self-contained, the Top Gun commander wrote his instructors' effectiveness reports internally, with little input from former students or the students' unit commanders. The Aggressors, on the other hand, were in TAC's chain of command and their commander was a fairly low ranking officer – a lieutenant colonel (O-5). Since the Aggressors went to TAC wings, if a wing commander felt the Aggressors were arrogant or too hard on his wing's pilot when they visited, a phone call from the wing commander to TAC headquarters could have had a serious impact on an Aggressor's career. [31]

STOPPING THE BLEEDING

Back in the combat zone, after three months of general disarray and a kill ratio of less than 1:1 against the MiGs, in August 1972 the Air Force crews finally began to get a grip on the situation. Crews became familiar with their missions, new command and control measures were implemented by Seventh Air Force headquarters (with modest success), but the most important change was that the crews began to have mass debriefings at the end of each day's missions.[32]

When Seventh Air Force ordered the mass debriefings, the idea seemed to be complicated, time-consuming and a poor use of resources. After every large daily strike to the Hanoi area, each of the Thai bases sent one lead crew that had flown that day's mission to Udorn RTAFB after the mission landed. Representatives from the other components involved in the day's strike – command and control, intelligence, tankers and others – also came to Udorn. Once everyone arrived in the late afternoon, there was a mass debriefing where each group discussed what went wrong and right on the mission,

then developed ways to correct the mistakes for the next day. The participants then returned to their bases to put the agreed changes into the next day's strike plan. It quickly became obvious that the mass debriefing was an extraordinarily useful way to exchange information and improve operations, and losses dropped dramatically almost immediately.[33]

LINEBACKER'S IMPACT ON THE AIR FORCE

The units that flew in Linebacker generally returned home after spending only two or three months in the combat zone and fresh units sent in. As more and more units rotated in and out, soon a large percentage of the Air Force's tactical fighter aircrews had been involved in the Linebacker operations. They shared the experiences when they returned, and soon the entire TAF realized it was not well trained. The Fighter Weapons School at Nellis sent several instructors over to fly with the crews during Linebacker and observe the situation. They came to the same conclusion, that the years of neglect of air-to-air training and the large number of unqualified "universal pilots" being sent into combat in the F-4 were finally bearing bitter fruit. But while the results of Linebacker were a sharp rebuke of TAC's training methods, identifying what went wrong and fixing it was a tricky business, because General Momyer was still commander of TAC and responsible for the training.

In October 1972, the annual Tactical Fighter Weapons Symposium took place at Nellis. TAC's general officers were the target audience for the gathering, but it also included many young combat veterans, including the Air Force's first aces, Captains Steve Ritchie and Charles "Chuck" DeBellevue. The focus of the meetings was on tactics

and training, and the combat veterans told the general officers that these were two areas where the Air Force was sorely lacking. After the symposium, Ritchie wrote a letter to TAC Commander Momyer about TAC's air-to-air training. The letter said, among other things:

> I feel our F-4 aircrews assigned to Southeast Asia were not properly trained to engage MiGs in Route Package Six and combat is certainly not the place to train. We must prepare our aircrews for worldwide air combat before the war begins…I am convinced that proper aircrew preparation requires a complete renovation of [TAC] training programs…[34]

But the letter and the results of Linebacker had little impact on Momyer and the TAF in general. The bombing of North Vietnam ended in January 1973 and in August the war ended for the Air Force, and TAC stateside training continued with its emphasis on "canned" missions and filling training squares.[35] The solution to the problems that appeared in the war, the TAC leadership felt, was not training but a technological solution with the new F-15 and better missiles.[36] Except for the Aggressor squadron Ryan had foisted on the command, there was little change. However, while Momyer did not introduce any new training programs, the fear that many had that he would terminate the Aggressors once the war was over did not materialize. Ryan remained as Chief of Staff, and the Aggressors seemed to prosper.[37]

But despite the availability of the Aggressors, TAC under Momyer was still part of the stateside Air Force "fly safe" culture. It seems many TAC wing commanders were hesitant to bring the Aggressors to their bases for intense air-to-air training, fearing (probably correctly) that an accident would negatively impact on their performance reports. They were also afraid the Aggressors would show their pilots were poorly

trained. Some may also have been aware that the Aggressors had been foisted on Momyer and he may not have been a supporter of the program. In the event, it was not until mid-1973 that the Aggressors flew their first deployment to the F-4 wing at Homestead Air Force Base, Florida. Even though all the Homestead squadrons had flown during Linebacker and had several MiG killers, the well-trained Aggressors won most engagements. They found that the F-4s' tactics were "poor" in 51 percent of the engagements, that the F-4 crews were able to see the Aggressors before they attacked only 15 percent of the time, and the F-4 crews' radio communication was poor in 82 percent of the engagements.[38]

While the Aggressors' flying skills were superior to the Homestead crews, it was their briefing and debriefing skills and their unwillingness to "crow" that made a deep impression on the F-4 crews. After each practice engagement, there were long, intense debriefings the Aggressors dissected every aspect of the engagement from the first meeting to the final disengagement, with the help of gun camera film and tape recorders the Aggressors carried in each cockpit. Word spread among the wing commanders and the Aggressors became more and more popular, and soon they were traveling every week to fly at another TAC base.[39]

To make their training authentic, the Aggressors carefully studied what had gone wrong in air combat over North Vietnam, using a three-series set of multi-volume combat reports known as the *Red Baron Reports.* These reports described, in great detail, every air-to-air engagement that took place during the Vietnam War, and included comments of the American aircrews involved on both their specific engagements as well as general

comments about the aircraft and weapons they were using. The reports also included statistics that documented the poor performance of American air-to-air missiles.

The *Red Baron Reports* pointed out the small MiGs usually caught the Air Force aircraft by surprise -- 80 percent of the losses came from an enemy fighter in the 30 degree cone to the rear of the aircraft, the "blind spot" -- because pilots were so overwhelmed by the new, heavy combat environment that they were not looking behind them when the MiGs attacked.[40] Another reason the Air Force aircraft were caught by surprise was that the Air Force was using poor formations, put "in stone" by the Air Force's 1964 tactics manual, written by John Boyd while he was at the Weapons School. The formations were both hard to fly and created "blind spots" for MiGs to exploit, and the problem exacerbated by poor rear visibility from the F-4 cockpit. [41]

The *Red Baron III* report also confirmed what Kirk had told Air Force Chief of Staff Ryan -- Air Force crews knew very little about the MiGs' limitations, strengths, and the formations they flew, and also knew little about their own F-4s. The report pointed out that, in general, Air Force missiles performed poorly not only because they had limited firing envelopes and were unreliable, but also because they were usually fired from positions where they had no chance to function properly, a situation called "firing out of the envelope." This was the same thing the Ault Report had found for the Navy F-4 crews. The *Red Baron III* report also noted that the Navy F-4 pilots had a much higher success rate than the Air Force with AIM-9 heat seeking missiles because the Navy pilots fired the AIM-9 "in the envelope," the small area directly behind a MiG where the missile had the best chance of functioning properly and hitting the target. The Navy F-4

"in the envelope" firings rose dramatically in 1972 compared to their firings in Rolling Thunder, and this was attributed by the pilots to their Top Gun training.[42] The Aggressors used the *Red Baron* reports on their visits to emphasize how the points they were teaching were the results of hard lessons learned in combat, further increasing their credibility.[43]

SERIOUS CULTURE CLASHES

Even before the Vietnam War ended, the clash between the SEA combat culture and the stateside Air Force culture was manifesting itself in the highest ranks. In combat many Air Force officers, including high-ranking ones, had breached discipline before in the heat of battle, but the most serious violation began in late 1971.[44]

In mid-1971, General John D. Lavelle had replaced General Momyer as Commander of the Seventh Air Force in Saigon, which was in charge of the day-to-day Air Force combat operations in SEA. The appointment was something of a surprise because Lavelle and Air Force Chief of Staff John Ryan were not on good terms, but it was seen by some as an indication that the war in SEA was winding down. Generally, Lavelle was a well-respected and well-liked World War II veteran and was intimately familiar with SEA combat operations. He had been Deputy Commander of the Pacific Air Forces (PACAF), which was in overall charge of all service air operations in SEA, before moving to Saigon.[45]

Since the end of Rolling Thunder, the Air Force and Navy had flown authorized daily, unarmed reconnaissance flights with protective fighter-bomber escort over southern North Vietnam to monitor the North Vietnamese military activities near the

Demilitarized Zone (DMZ), and the North Vietnamese generally accepted these flights and let them go unchallenged. Shortly after General Lavelle arrived in Saigon, he noted from the reconnaissance flights that there was an increasing buildup of North Vietnamese supplies in southern North Vietnam as well as an increase in the defenses, including surface-to-air missiles. Lavelle ordered aircraft from the base that flew the reconnaissance flights, the 432nd Tactical Reconnaissance Wing at Udorn RTAFB in Thailand, to increase the number of surveillance missions. When it became clear that the North Vietnamese were involved in a major build up that seemed to be the prelude to an invasion of South Vietnam, Lavelle passed the news to Washington.

Beginning in September 1971, President Nixon ordered PACAF to tell Lavelle to carry out a series of strikes on the supply areas and on airfields in the area. The problem arose when Lavelle continued the strikes without specific authorization, and the word was passed – how is the question of some debate – to the reconnaissance crews and their escorts to say they were fired on, whether or not this was true. The Air Force could then say the strikes were responses to North Vietnamese attacks on the legitimate reconnaissance flights. The bombing missions became “protective reaction strikes" to make it appear they were following the Rules of Engagement. However, when an Air Force anti-war photo interpreter learned of the deceptions and wrote his congressman, Lavelle was caught. Air Force Chief of Staff Ryan professed to be “shocked, shocked” by the revelation, and relieved Lavelle of his command just a few days before the North Vietnamese invaded South Vietnam, using the supplies Lavelle had ordered attacked.

Whether Ryan authorized, or hinted at authorizing, the attacks or not became a matter of heated debate, but in the end it was determined that Lavelle operated without the required authorization. Several other high-ranking officers in the combat theater, including Major General Alton Slay, Lavelle's Deputy Commander for Operations at Seventh Air Force, Colonel Charles Gabriel, the 432nd Commander, and Colonel Jerome O'Malley, the 432nd Wing's Vice Commander, were implicated but never charged.[46] Ryan soon relieved Slay and it seemed his career was over. It was not.

The Lavelle case was very controversial in and out of the Air Force. Many Air Force officers felt that General Ryan, the former SAC bomber pilot and Seventh Air Force Commander unpopular with some of the combat culture fighter pilots, had implied to Lavelle that President Nixon had approved such strikes. This would have seemed plausible to Lavelle, because Nixon and Kissinger had earlier approved the secret bombing of Cambodia and were known to be looking for other aggressive military options in the war. After Lavelle's cashiering, many felt that Ryan blamed Lavelle alone for the actions even though Ryan himself had been complicit. Not only did many Air Force combat culture officers feel Lavelle was railroaded, but many years of frustration and feeling that the Air Force had its "hands tied behind its back" also led many to feel that the bombing raids were justified. It showed a huge disconnect between the SEA combat culture and the stateside Air Force culture. [47]

On the operational level, after Linebacker the combat culture vs. safety culture gap widened as Air Force fighter crews realized they had gone into combat unprepared because of their leaders' emphasis on flying safety over realistic training. Once peacetime

settled in, in the crews were dismayed to find a return to flying safety rules and restrictions and the same lack of realistic training that had caused the losses over North Vietnam. Even with the Aggressor program, by the mid-1970s it seemed to many young officers that the "fly safe" and "zero defects" culture, with its concomitant lack of integrity, was still an ingrained part of Air Force culture. [48]

This belief in the failure of Air Force leadership began to appear in theses and other papers written at the Air Force senior service schools, where outstanding officers matriculate for academic and leadership studies before moving to more responsible positions. While students had written papers on Air Force ethics from the founding of the schools, more were written on the subject from 1972-1976 than had been written in all the previous years combined.[49] In one 1974 survey taken of captains at Squadron Officers School (SOS), 52 percent said ethics was a serious problem in the Air Force, and 61 percent indicated they had already had to sacrifice their integrity at times to satisfy their job requirements. Interestingly, they blamed this lack of ethics not on their immediate superiors but rather on the most senior Air Force leadership.[50] A 1976 study at the next highest Air Force service school, Air Command and Staff College, noted that a majority of officers – 58 percent -- believed that there was an ethical problem in the Air Force caused by "pressure from above," but that "the more senior the officer, the less likely he was to perceive an ethical problem."[51] The young officers also noted that the problem went to the Air Force's combat capability. The Air Force was not training for combat, but no one was willing to admit it, and Air Force commanders were faking their training weapons scores rather than admitting they were not training their crews up to standard.

Worse, nothing appeared to be changing, as shown in 1977 when the famous Air Force aerobatic team, the Thunderbirds, had a minor but damaging mid-air collision. Instead of reporting the accident as required, the commander attempted to cover it up. The incident and the cover up were "handled internally," and the commander was not relieved.[52]

The result was, as one officer noted, "[Air Force fighter crews] left the Vietnam conflict not only distrustful of the national leadership but of the Air Force leadership as well. The supreme lesson of combat was that the only people one could trust were peers….There was a common disregard, even disrespect, for authority above the squadron level."[53] Part of the explanation for this was almost certainly the *zeitgeist.* The young aircrews had been in college in the 1960s and certainly internalized some of the counterculture questioning of authority. Additionally, most were not volunteers for the war. They came into the service at the time of the draft, and the bulk of the junior Air Force aircrews had joined the Air Force to avoid the Army. After being involved in the war and seeing the price paid for the ROE and other restrictions, it is not surprising they were cynical about their leadership.

Other authors have suggested an additional reason for the young aircrews' discontent. Older World War II generals were often poorly educated – the SAC commander after LeMay, General Thomas "Tommy" Powers, had only a high school degree and no further education. [54] At the beginning of the 1960s, about 45 percent of Air Force officers had college degrees, but by 1974, about 85 percent of the officers had college degrees, and in the lower officer ranks, it was 100 percent.[55] This meant that during the Vietnam War many of the middle and upper-level leaders did not have college degrees, while virtually

all the young aircrews they were commanding were college graduates. Many felt this further contributed to the cultural divide.[56]

Not surprisingly, many of the young Vietnam aircrew voted with their feet and left the Air Force after their commitment expired, generally about seven or eight years after commissioning.[57] Most left because they had another life they wanted to pursue, or because they wanted to fly for the airlines, but many left because they were repelled by the stateside Air Force culture. Initially, the Air Force paid little attention to the exodus, because it had an excess of aircrews after the war and a voluntary reduction in their numbers was actually helpful to the Air Force personnel system. [58]

POSTWAR CHALLENGES AND THE PROBLEM OF PEACETIME INNOVATION

The young aircrew that stayed soon had their records go before the majors' promotion board that usually comes after about nine years in the service.[59] Major is perhaps the most important commissioned rank in the military. Promotion to major guaranteed an officer a career of twenty years in the military, even if they were never promoted again, thus ensuring retirement benefits, but few pilots stayed only for the retirement benefits. There were far too many lucrative opportunities in airlines for those who were interested in money and stability. The pilots who stayed in did so for a variety of reasons -- they loved the flying, they enjoyed the people they flew with -- but once they were promoted to major, they had "bought into" the Air Force. For many, the commitment to the Air Force was a commitment to change things, to bring some form of realistic training so the Air Force could "train the way it planned to fight." One Air Force historian, a veteran of this

period, wrote later, "These fighter crews came out of their combat experience with positive goals. One of the goals was to find a better way to teach the next generation the fighter business." [60]

The leaders of this group were combat veteran fighter pilots, most of whom had been captains during the war and became majors in the early 1970s. They became known as the "iron majors," a group that was willing to put their careers on the line as they pushed hard for changes in the tactical air forces. [61] In many ways, these iron majors had some of what was called in 1905 the "Cardinal Vices of the American Soldier: "personal independence, a rebellious spirit, a willingness to criticize higher authority, and excessive wants" – in this case, realistic training. However, it was soon to become clear that these vices were the vices of their virtues.[62]

THE SHIFT IN AIR FORCE LEADERSHIP

In retrospect, it was ironic that so many fighter pilots left the Air Force in the mid-1970s. By then the combination of the Kennedy/McNamara changes from the emphasis on SAC to TAC in the early 1960s and the dynamics of the Vietnam War, with its preponderance of tactical forces, were beginning to significantly change the Air Force leadership. In 1960, the list of Air Force senior leaders – chiefs of the Air Staff directorates and major commanders -- showed eleven Air Staff leaders were "bomber generals" with only two "fighter generals, " and of the major commanders, fifteen were "bomber generals" and two "fighter generals." While the first group of fighter leaders from Rolling Thunder had not been promoted very far, the post-Rolling Thunder fighter leaders, especially the Linebacker veterans, had advanced much farther. By 1975, the Air

Staff directorates had eight bomber generals and four fighter generals at their head, while ten fighter generals but only five bomber generals were major commanders.[63]

However, the shift in the numbers did not automatically bring cultural change. Most of the senior generals, no matter what their background, had advanced as part of the "flying safety is paramount" and "zero defects" culture. While most of the young generals were products of the SEA combat culture, it normally took about six years for a general to reach a rank that allowed him to influence policy, and during that time these combat culture generals would be distracted by the administrative routines of peacetime and the pressing post-Vietnam challenges -- the all-volunteer force, budget cuts, soaring fuel costs, inflation that was eating into the Air Force's planned modernization programs -- as well as a general national ambivalence about the military. These distractions would challenge their ability to remember that wartime demands different skills than peacetime, and the iron majors were afraid that the leaders who had been their comrades-in-arms as combat commanders would gradually be co-opted by the "fly safe, zero defects" culture and forget about the Air Force's shortcomings in Vietnam. The iron majors knew that unless the TAF quickly established concrete, realistic training programs, the winds of change that began with the Aggressors would drop off to zephyrs, and then disappear. [64]

One of their main reasons for the iron majors' concern was that they knew conventional means of postwar peacetime innovation would not work for the Air Force. The most successful example of peacetime innovation had been the German military between World War I and World War II when they developed *blitzkrieg* tactics, the *Luftwaffe*, and submarine warfare.[65] The Germans had used their General Staff College to

develop new ideas about war fighting, but all Air Force officers, regardless of specialty, attended the Air Force service schools – Air War College, Command and Staff College and Squadron Officers School. The faculty included all types of Air Force officers as well as civilians, and since the schools were so general, they offered little to the fighter pilot who was interested in changing the way the Air Force trained its aircrews for combat operations. The common joke was that there was very little "war" in the Air War College curriculum, so Air Force professional education would not help bring about change.[66] It was true that before the Air Force became independent, while the Air Force was the Army Air Corps and later the Army Air Force, the schools at Maxwell had been the birthplace of a great deal of doctrine, but some of the doctrines were the belief in unescorted daylight bombing and the refusal to develop the long-range fighter, so this was not encouraging.[67]

But the biggest problem was that the Air Force culture had never been interested in innovative ways to develop human skills – "training the man," as the Navy's Ault Report called it. In the Air Force, innovation was always technological innovation, new and better systems, a trait known as "the Icarus Syndrome," defined as "when identifying with the air weapon and a commitment to technological superiority…becomes an end itself and aircraft or systems, rather than mission, become the primary focus."[68] The most prominent "intellectual" representative for this approach was the Air Force historian I.B. (Irving Brinton) Holley, author of such works as *Ideas and Weapons: Exploitation of the Aerial Weapon by the United States during World War I* (Washington, D.C: Air Force History and Museums Program, 1953) and *A Study in the Relationship of Technological*

Advance, Military Doctrine, and the Development of Weapons (Washington, D.C: Office of Air Force History, 1983). The influential Holley relentlessly pushed the importance of Air Force doctrine tied to technology and the need for the Air Force to adapt its doctrine to the improving technology of air and space warfare, while virtually ignoring training.[69] An outside observer noted, "The Air Force's approach [to innovation] was essentially linear. If it was faster, traveled farther, was more complex (and more expensive), it was…bound to be better….the Air Force resembled a swift greyhound pursuing the rabbit of technology with blinders on to keep it from distractions."[70]

The iron majors' fear was that "politics" and the ROE would take the blame the Air Force failures in SEA, and the Air Force would continue to innovate the same way it always had, with its emphasis on management, control, and technology. Left to its own devices, almost certainly the Air Force leadership would not opt for realistic training programs that might decrease flying safety, but rather for the devil it knew -- technology. Using its corporate "fly safe" and "zero defects" philosophy, the Air Force would try to solve the problems that arose in Vietnam with new systems, such as the F-15, then use flying using safety as a tool to keep from losing the valuable new assets in accidents, much as SAC had done when the B-52 came into the inventory. Viewed in this context, and considering the massive modernization programs that were already under way, it is remarkable that in the later 1970s the Air Force became the leader in realistic combat training and led the way to training programs that would change the American military for the foreseeable future.

BACKSLIDING

One of the results of the frustrations with the lack of realistic training was that the young aircrews took things into their own hands. They dropped the rules they developed and imposed on themselves in combat and began to return to the "flying club" attitude of pre-SEA TAF. Flying discipline waned, and while in the United States the possibility of being caught kept a lid on many extracurricular activities, for TAF units in Europe and the Pacific flying safety rules went out the window. In Europe, many of the flying activities took place over the North Sea or over NATO training areas in Germany where there were virtually no rules. Air Force aircrews "blew off" Air Force regulations and engaged in large, low-level dogfights over the North Sea where fighters from many NATO countries met and fought for the fun of it, and on low-level ground-attack training missions the Air Force aircrews went to the German training areas were they flew as low as they could, completely disregarding the Air Force's 500 foot above ground level minimum altitude. The aircrews knew this was the kind of flying they would need in combat, but there was limited learning because there was no structure to teach them how to dogfight or fly at very low level. Still, it was the best the crews could do, even if such flying violated the safety rules. One pilot who later became a four-star general remembered, "[The restrictive rules] led crews to lie and then do the real job the best way they could. Thus, integrity meant lying…"[71]

The loss of discipline in the air was repeated by antics on the ground. Officers' clubs, especially in units where there were no general officers on the base, became rowdier and

rowdier. The Air Force was steadily reverting to the competing flying safety vs. fighter pilot culture conflict of the pre-Vietnam days.[72]

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1. *Red Baron Reports Volume Two, Part One,* (Nellis AFB, NV: Tactical Fighter Weapons Center, 1974), 12, 34-36, 40-48, *passim.*

2. Richard K. Wilcox, *Scream of Eagles: The Creation of Top Gun and the U.S. Air Victory in Vietnam* (New York: J. Wiley, 1990), 206.

3. Marshall Michel, *Clashes: Air Combat Over North Vietnam, 1965-1972* (Annapolis, MD: Naval Institute Press, 1997), 79-83; Wayne Thompson, *To Hanoi and Back: The USAF and North Vietnam, 1966-1973* (Washington, DC: Air Force History and Museums Program) 223-224, *passim.*

4. The operation would later be called Linebacker I.

5. Michel, *Clashes,* 143-144.

6. Thompson, 231.

7. Chaff is small, specially cut lengths of aluminum foil, very much resembling Christmas tinsel that creates a cloud that radar beams cannot penetrate. Thompson, 243.

8. *Red Baron Volume Two, Part One,* 16.

9. For a full account of this day, see Alfred Price and Jeffery Ethell, *One Day in a Very Long War* (New York: Random House, 1989).

10. Ron Keys, Capt. USAF, quoted in C.R "Dick" Anderegg, Col. USAF, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C: Air Force History and Museums Program, 2001), 26.

11. Russ Everts, Col. USAF, e-mail to author, 5 February 2005.

12. Message, Nixon/Haig to Kissinger, 19 May 1972, National Archives, Nixon National Security Council Papers, 1972; author's interviews with Alexander Haig, Washington, DC, 13, 20, 24 April 1999.

13. John Corder, Maj. Gen. USAF, phone interview with author, March 23, 28, 2005. Description of the "Tank" from author's personal observations while giving numerous briefings there while serving on the Joint Chiefs of Staff, 1983-1986.

14. Corder interview, 23 March.

15. Ibid. The account of the founding of the Aggressors was developed by the author from interviews with and e-mails from several of the participants; interviews with John Corder and William Kirk, Gen. USAF, 6, 7, 9 November 2005; Colonel John Vickery, e-mails 5 June, 22 June 2005. Also James A. Knight, Lt. Gen., USAF. Oral History Interview, 30 Nov-1 Dec 1983, K239.0152-1561, AFHRA, 45, 208, as well as the accounts in Anderegg's *Sierra Hotel,* 75-78.

16. Ibid. Ryan was commander of PACAF and Momyer's boss when Momyer was commander of Seventh Air Force in Saigon. Thompson, 213-215.

17. Ibid.

18. Ibid.

19. Ibid.

20. Ibid.

21. A staff "package" is a folder of background materials pertaining to a particular desired action, with a cover sheet prepared by the staff for the principal's signature that signifies he approves the recommended action. Normally the staff briefs the principal on the issue and their recommendation. The principal listens to the briefing, reads the package, then signs (or does not sign) the cover sheet. Author's personal observations while serving on the Joint Staff, 1983-1986, and Air Staff, 1988-1989.

22. Corder interview.

23. The negative view of General Ryan comes from Broughton, *Going Downtown*, iii, 76, *passim.* James A. Knight, Lt. Gen., USAF. Oral History Interview, 30 Nov-1 Dec 1983, K239.0152-1561, AFHRA, 45, 208, as well as the accounts in Anderegg's *Sierra Hotel*, 75-78.

24. The Air Force wanted a MiG-21 simulator rather than a MiG-17 simulator because the Air Force's main opponent was the MiG-21 due to North Vietnamese basing patterns. Of the Air Force's 137 kills, 105 were MiG-21s; of the Navy's 57 kills, 41 were MiG-17s. *Red Baron Three, Volume One*, 4-6, *passim.*

25. Jack Manclark, Col. USAF, interview with author, the Pentagon, Washington, DC, 14 April 2005.

26. Ibid.

27. Richard K. Wilcox, *Scream of Eagles: The Creation of Top Gun and the U.S. Air Victory in Vietnam* (New York: J. Wiley, 1990), 7, 14-15, *passim*.

28. Manclark interview; Anderegg, 79; author's personal experience flying F-15s on numerous missions with the Aggressors, 1980-1983.

29. This it not a trivial task – in fact, many consider it more difficult than the actual flying. Ed Clements, Capt. USAF, "Aggressively Speaking," *USAF Fighter Weapons Review*, Summer 1974, 4-5.

30. Mike Press, Capt. USAF, "Meet the Aggressors," *USAF Fighter Weapons Review*, Fall 1973, 33; Press, "Aggressively Speaking," *USAF Fighter Weapons Review*, Fall 1974, 2-3.

31. Manclark interview. Wing commanders were senior full colonels (O-6) personally chosen by the TAC commander. The insights into the tightrope the Aggressors had to walk come from Manclark's interview with the author.

32. Michel, 165-167.

33. Ibid., 168.

34. Capt Steve Ritchie letter to General William W. Momyer, "Air Superiority," TAC Commander, 30 October 1972, AFHRA.

35. Anderegg, 47-49; Tom Clancy and General Chuck Horner, USAF, *Every Man a Tiger* (New York: Putnam, 1999), 133-136.

36. Robert C Seamans, Secretary of the Air Force, "Tac Air: A Look at the Late 70s," *Air Force Magazine*, January 1973, 33-34.

37. Donald Carson, Capt. USAF, "Teaching Tactics in TAC's MiGs," *Air Force Magazine,* March 1974, 44-47.

38. Mike Press, Capt. USAF, "Aggressively Speaking," *USAF Fighter Weapons Review,* Fall 1974, 2.

39. Anderegg, 82-83.

40. *Red Baron III, Vol. 1, Summary,* 1-2, *passim.*

41. John Boyd, Capt. USAF, *Aerial Attack* (Nellis AFB, NV: Tactical Fighter Weapons Center), 113-114, passim. Copy available at Air University Library, Maxwell AFB, AL.

42. *Red Baron III, Vol. 1, Summary,* 4, *passim.*

43. Press, "Aggressively Speaking," 1-2.

44. Broughton, *Going Downtown,* 33, *passim.*

45. Thompson, 198-199.

46.Congress, House of Representatives, Committee on the Armed Services Investigating Subcommittee, *Report on the Unauthorized Bombing of Military Targets in North Vietnam,* 92nd Congress, 2nd sess., Dec 15 1972, 813-814. All of these officers will appear again later in the narrative in different contexts.

47. For an excellent, balanced account of the Lavelle affair see Thompson, 199-210. The "off the record" comments were made to the author by the 1972 commander of the 432nd, General Charles Gabriel, 19 June 76, TAC Headquarters, Langley AFB and the 432nd deputy wing commander, General Gerald O'Malley, the Pentagon, Washington, DC, in August 1976. Both Gabriel and O'Malley are now deceased. The feeling was also widespread in the 432nd Wing where the bombing missions originated and where the author was serving in 1972 when Lavelle was relieved.

48. "IG Uncovers False Reports," *Air Force Times,* 22 December 1971, 15; Clancy and Horner, 141-142.

49. Thomas C. Padgett, Maj. USAF, "A Study of Attitudes Concerning Unethical Behavior in the Air Force," (Research Study, Air Command and Staff College: Maxwell Air Force Base, AL May 1976), 24.

50. Peter Henderson, Maj. USAF, "What the Captain Really Means…" *Air University Review,* January-February 1976, 1-2.

51. Padgett, 24.

52. Ibid., 25.

53. Anderegg, 47-49.

54. http://www.af.mil/library/biographies/bio.asp?bioID=6801 (accessed August 2005).

55. In 1966, the Air Force began to require a college degree prior to commissioning. Anderegg, 41-42.

56. Ibid., 42.

57. Air Force officers after commissioning accrue further commitments for additional specialized training. For example, during the Vietnam War a pilot had a five-year commitment after he finished pilot training and training on his first aircraft. This

generally meant that it was a minimum of six and a half years before he could leave the service. From author's journal as a serving Air Force officer 1966-1972.

58. This was a major concern for the Air Force in the late 1970s. Robert Dixon, Gen. USAF, Oral History Interview, K239.0512-1591, 21 September 1988, 245; Ed Gates, "USAF: Institution or Occupation," *Air Force Magazine*, August 1977, 60-63; General David Jones, "The Air Force Is a Way of Life," *Air Force Magazine*, May 1977, 12-15.

59.The exact number of years in service that an officer needs to be considered for major has varied, but nine years in service is a good average for 1960s-70s, when this author was a captain and promoted to major.

60. Anderegg, 48-49.

61. The term "iron majors" has been given a number of meanings. Richard G. Davis, in *The 31 Initiatives: a Study in Air Force-Army Cooperation*, Air Staff Historical Study (Washington, D.C.: Office of Air Force History, United States Air Force, 1987), 41, describes the "Iron Major" syndrome as "the staff officer who became such an ardent advocate of his own service program that he would neither compromise on the details of a project nor consider alternatives to it." This author's definition would be "an officer who will not compromise on the aims of his program but is flexible in how they are achieved," and would fit with the description in Robert Kaplan, "Supremacy by Stealth," *The Atlantic Monthly*, July-August 2003, 46.

62. Quoted in Samuel Huntington, *The Soldier and the State* (Cambridge, MA: Belknap Press of Harvard University Press, 1957), 269.

63. Mike Worden, *The Rise of the Fighter Generals: The Problem of Air Leadership, 1945-1982* (Maxwell AFB, AL: Air University Press, 1997), 242-252.

64. Vickery e-mail to author 18 July 2005; Everts e-mail to author 29 July 2005.

65. For an excellent account, see Williamson Murray and Alan R. Millett, *Military Innovation in the Interwar Period* (Cambridge: Cambridge University Press, 1996).

66.Vickery e-mail; Everts e-mail.

67. Murray and Millett, 124-127.

68. Carl Builder, *The Icarus Syndrome* (London: Transaction Publishers, 1994), 6-7, *passim*.

69. Dr Alan L. Gropman, "An Airman's Quintet," *Aerospace Power Journal*, Summer 1987, 23.

70. Fredric A. Bergerson, *The Army Gets An Air Force: Tactics of Insurgent Bureaucratic Politics* (Baltimore: Johns Hopkins University Press, 1980), 64.

71. Horner and Clancy, 117.

72. Anderegg, 47-50; author's interview with General John "Johnny" Jumper, Chief of Staff USAF, MIT, March 17, 2005; author's personal observations, 1973-1975.

CHAPTER EIGHT: POST VIETNEM BATTLES

NIXON'S NEW DEFENSE TEAM

At the end of January 1973, just after Nixon's second inauguration, Secretary of Defense Laird resigned. He had reluctantly left Congress to serve as Secretary of Defense, and from the beginning had made it clear he intended to serve no more than four years. Laird left an impressive legacy. During his tenure, he never lost a vote in Congress and maintained all the essential weapons systems development programs the military wanted, while at the same time allowing Congress to make substantial reductions in the defense budget.

Laird was as good as his word, but left with a flurry of activity. On 27 January 1973, two days before Laird left office, American and Vietnamese negotiators signed a Vietnam settlement in Paris, and that same day Laird suspended the draft.

The FY 1973 defense bill Laird proposed before he left was a record, over $74 billion, and perhaps because legislators were simply happy to be out of Vietnam and trying to fully understand the implications for future budgets, it suffered relatively small reductions. However, there was some criticism of the new, high-tech weapons systems. A GAO study said that the Navy's underpowered F-14A would be inferior to the aircraft it was replacing, the F-4J, which led Senator William Proxmire (D-WI) to say the program

had been managed by "a group of kamikaze pilots determined to commit procurement suicide."[1]

While there appeared to be a sharp contrast between Laird's cooperative approach and McNamara's active management, some analysts feel that their accomplishments were quite similar – selective but important influences on weapons systems they felt were overpriced, but little influence on budgetary allocations, budget totals, or force levels and capabilities. It was beginning to seem, as one noted, "the system was not the solution."[2]

Secretary of Health, Education and Welfare, Elliot Richardson briefly replaced Laird. Richardson was concerned about a possible drop in the defense budget with the end of the war and cautioned against precipitate cuts when he presented the FY1974 defense budget in early 1973, even though it was, at $82.6 billion, the largest in history. The debate over the budget was dominated by the provision of $700 million to South Vietnam, but in the end, spurred by concerns raised by the October 1973 Middle East War, Congress only cut it by $4.4 billion.[3] Still, there would not be the "peace dividend" Nixon had hoped for because of inflation, the expense of the new all-volunteer force, and cost overruns on several major new weapons systems programs, despite Laird's and Packard's efforts.[4] The head of the GAO, Comptroller General Elmer Staats, found that in forty-five systems cost overruns were up by 20 percent, caused by greater complexity to give greater capability, inflation, as well as management problems, notably the pressure to continue to push weapons into production without proper cost/effectiveness assessments. In the Air Force programs, the F-111 and F-15 accounted for much of the cost overrun, and the F-15 program ballooned from $34 million to $47 million.[5] On a

separate front, Richardson took a step to further reduce the power of OSD/SA by redesignating it the Office of Program Analysis and Evaluation (PA&E), no longer headed by an assistant secretary.[6]

Richardson spent only three and a half months as Secretary of Defense before becoming Attorney General as part of the turmoil caused by Watergate. In early May 1973 Nixon nominated the young -- forty-four -- James Schlesinger to replace him. Schlesinger was a formidable intellect and personality who knew the military well because he had worked at Rand and as assistant director of the Bureau of the Budget. Schlesinger also had strong views on defense funding, and even before becoming Secretary of Defense Schlesinger made it clear he was in favor of increasing the defense budget. In a speech in San Francisco in September 1972, he warned that it was “time to call a halt to the self-defeating game of cutting defense outlays, this process that seems to have become addicting, of chopping away year after year."[7]

Soon after he took office, Schlesinger complained about "the post-war follies" of defense budget cutting, pointing out that the DoD budget, in real terms, had been reduced by one-third since FY 1968. Purchases of equipment, consumables, and research and development were down 45 percent from the Vietnam War peak and about $10 billion in constant dollars below the prewar level. The defense budget was about 6 percent of the gross national product, about 17 percent of total federal government expenditures, both the lowest percentages since before the Korean War, and military manpower was at the lowest point since before the Korean War.[8]

Six months after Schlesinger was appointed, the October 1973 Middle East War exploded, reinforcing Schlesinger's and other "hawks'" notion that the Soviets were as aggressive as ever, with expansionist aims backed up by very good, modern weapons. The Soviets and Americans had reached approximate nuclear parity, and Schlesinger believed this reduced the chance of a nuclear confrontation, but now conventional forces had become a large part of deterrence. At the same time, he also believed that American conventional force strength was declining *vis-à-vis* the Soviets. In one example, in 1965 the United States had 3,800 fighter/attack aircraft to the Soviets 2,800, but by 1975 the United States had 2,300 fighter/attack aircraft and the Soviets 3,600, a shift of 2,300 in favor of the Soviets.[9]

Armed with these statistics and alarmed by the improvements in Soviet weapon technology shown in the 1973 Middle East War, Schlesinger pushed hard for larger DoD budgets. However, he had a difficult road, made more difficult by a structural problem -- steep oil price increases that pushed the cost of training, exercises, and other fuel consuming military actions steadily upward. During 1974, the military services cut training fuel use by 15 percent, but fuel costs still increased from $1.3 billion in 1973 to $3.5 billion. Double-digit inflation at this time also had a major impact on the defense budgets.[10]

Schlesinger, like Laird, got along well with the military leadership. He consulted with them regularly, shared many of their views, and wanted to give them more resources. Air Force General Robert Dixon, who took over TAC in September 1973, considered Schlesinger a "great" Secretary of Defense and tried to help him by publicly citing the

Soviets' tactical air force build up, saying "the Soviets are producing a fighter squadron a week, a fighter wing a month."[11] But Schlesinger's views came into direct conflict with moderate and liberal senators and representatives who saw the Pentagon budget and military spending as a hazard to domestic programs, as well as those in the administration, notably Henry Kissinger, who wanted to cut military spending.

CONTINUING WITH THE LIGHT WEIGHT FIGHTER

One of the issues that Schlesinger had to deal with was the Light Weight Fighter. In early 1973, Secretary of the Air Force Robert C. Seamans sought to calm Air Force fears about the LWF being a replacement for the F-15 by saying he agreed with the Air Force doctrine that gave first priority to air–to-air superiority and that the F-15 was the solution, marking full political acceptance of the air-to-air role for the F-15.[12] Seamans balanced this judgment by noting the LWF program was intended to investigate the feasibility of a fighter with advanced technology and design concepts to "provide information that would be invaluable to the Air Force in helping to determine future Air Force tactical requirements."[13]

Despite internal interest in the LWF, publicly the Air Force was still hesitant. Air Force General Otto Glaser told Congress, "We have no intention of the Air Force going into production of this airplane, of asking for force structure for this airplane," and the previous Air Force Chief of Staff, General Jack Ryan had said "The lightweight fighter is not a weapons system…it is more of a technology effort so you can try these things out so see if they do give you increased performance."[14] The current Air Force Chief of Staff, General George S. Brown, strongly defended the F-15 as a multi-role fighter-bomber,

noting, "we've always had in mind its [the F-15's] attack capability….it's going to be the best aircraft we've had in the attack role." He continued, "many people are jumping to the conclusion either the YF-16 orYF-17 will go into production." While he agreed with the "principle" of a low cost LWF, Brown said that at this point in its career the F-15 was low cost because its development and support costs were paid. Buying more F-15s meant paying only the procurement and operations and maintenance (O&M) costs. Unless a large number of the LWF were bought, Brown said, the development and support costs of the LWF might not make it cost effective. In the end, he noted, "the [LWF] program is a prototype program with the question of production to be answered after flight testing" – hardly a ringing endorsement.[15]

Actually, the LWF and F-15 were not Brown's or Seamans' main concerns. Both were extremely worried that Congress had not approved the production of the Airborne Warning and Control System (AWACS), a modified Boeing 707 with a large, sophisticated pulse Doppler radar mounted in a saucer on the top of the aircraft. The AWACS would solve one of the main problems that appeared in the Vietnam War, the ability to locate enemy aircraft at low altitude, and was considered vital to NATO's defense plans. However, the AWACS was expensive and was slow in developing because of systems and software integration problems, problems that were more nagging than serious but still put a strain on the critical program. [16]

In March 1974, to decide an Air Force position on the LWF and future fighter acquisition, General Brown established the Tactical Fighter Modernization Group to develop a tactical fighter "road map" for the 1980s, and a few months later the group

recommended acquiring the winner of the LWF competition.[17] At about the same time, in what was to be a pivotal development, four NATO nations – Belgium, Denmark, the Netherlands, and Norway – formed a Multinational Steering Group (MSG) to look at aircraft to replace their F-104s and F-5s, and began to meet with American representatives in June 1974 for briefings on the LWF program.[18] The MSG members were enthusiastic about the program but had to make a decision on their own program by January 1975, two months before the Air Force had planned to choose the winner of the fly-off. The US was aware that the LWF was in competition with European fighters, notably the French Mirage F.1, and that the MSG was under great pressure to "buy European." Because the contract would be huge -- over 2,000 aircraft -- the Air Force agreed to advance the decision date for choosing the winner between the YF-16 and YF-17 to January 1975.[19]

In the last half of 1974, the YF-16/YF-17 fly-off began. Schlesinger had directed that the winner be a multi-service aircraft and told the Navy specifically that it could not have its own new LWF, much to the service's chagrin.[20] The fly-off showed the twin-engine YF-17 had a 25 percent greater load carrying capability than the YF-16, but the YF-16 had greater range, was superior in air-to-air combat, and was projected to have lower development, production, and operational support and life-cycle costs. Its single engine used less fuel and, though it was not noted in the final report, almost certainly one of the considerations was that the YF-16 used the same F100 engine as the F-15.[21]

On 13 January 1975, Secretary of the Air Force John McLucas declared the General Dynamics YF-16 the winner of the competition. While the YF-16 was a small fighter

-- about 15,000 pounds empty, as opposed to the F-15's 26,000 pounds -- it hardly met the Critics' definition of "simple" and "low tech." To keep the weight down and meet the performance goals, the F-16 used a very advanced digital "fly by wire" system, composed of electronic circuits to send inputs from the pilot to the motors that move the various flight controls on the aircraft. This electronic flight control system was coupled with a digital computer and replaced heavy conventional mechanical flight controls -- there were no direct hydraulic or mechanical linkages between the pilot and the flight controls. This flight control system allowed the F-16 to operate in a condition called "relaxed static stability" where longitudinal stability is reduced, allowing the aircraft's center of gravity to move to a point close to the aerodynamic center of the aircraft. This reduced the tail load and associated trim drag, and thus the aircraft had much greater performance than a similar aircraft with mechanical controls. It also means that if the computer failed, the F-16 was essentially uncontrollable.[22] As mentioned, the F-16 used the same F100 engine as the F-15 to achieve the required range and other performance goals, which would cause problems to be described later.

Schlesinger cheered the selection of the F-16 as "a happy circumstance that the airplane with the best performance is also the lowest cost."[23] Nevertheless, the Air Force still had leverage with DoD because it had not committed to buying the F-16, even after the competition. Schlesinger knew that, despite the support of the Critics and Congress, to get full-scale production of the F-16 he had to have the support of the uniformed Air Force hierarchy. The Air Force still seemed to favor more F-15s, so Schlesinger met with General David Jones, the new Air Force Chief of Staff, to discuss the issue. Schlesinger

pitched the merits of complementing the F-15 with the F-16, an aircraft that was considerably cheaper and therefore available in larger quantity. In a major concession, Schlesinger also told Jones that if the Air Force would buy the F-16 instead of the F-15, DoD would not take the money that was saved away from the Air Force, but allow the Air Force to use the money to buy more aircraft. He also committed to keeping the F-16 program costs within it budget. If the F-16 program exceeded its budget, Schlesinger said, the program would be cancelled and the Air Force could buy more F-15s. Jones had the guarantee he wanted – an increase in force structure, and he remembered "the Secretary...asked me what it would take to get the Air Force to support the F-16...I told him four more [tactical fighter] wings [about 290 aircraft]…He leaned over and shook my hand."[24]

THE MORPHING OF THE F-16

After it was selected as the winner of the competition, the F-16 was turned over to the Air Force Configuration Control Committee (CCC) for modifications to bring it up to Air Force combat standards before it went into full-scale production. The leader of the Committee was long-time fighter pilot General Alton Slay, who was now a four-star general, having recovered from his disagreements with Ryan and his association with the Lavelle affair. Slay quickly moved to make the F-16 into the multi-role combat aircraft the Air Force wanted. Because the Air Force was paying the bills, Slay and his committee had the enthusiastic help of General Dynamics, who willingly dropped the Critics' concept of a simple, austere lightweight air-to-air fighter. The Configuration Control Committee added roughly two tons of new electronic equipment and other modifications

to the F-16, including more pylons for bombs and electronic countermeasures pods, and then increased the F-16's length so it could carry more fuel and enlarged the wing so it could carry bombs and keep the same performance.[25] The F-16's bombing system was about five times more accurate than the F-4's in dropping conventional bombs, which, as one wag noted, was "a good thing since it carried one-third the number of bombs."[26] More important for the F-16's combat capability, the Configuration Control Committee ordered it equipped with a small but highly capable pulse Doppler radar, something the Critics had adamantly opposed.

Critic James Fallows later noted correctly that these changes "represented nothing less than the rejection of the entire philosophy under which the plane had been designed."[27] The Critics had been outflanked by the Air Force's ability to make the F-16 a dual-role aircraft, while the F-15 remained the Air Force's primary air-to-air fighter. General Jones was very pleased, saying, "the F-16 turned out to be a much better aircraft than the air-to-air advocates wanted."[28] There was, as the Critics had claimed, a price to be paid for the changes. The cost of the F-16 improvements required to make it a dual-role fighter were initially underestimated and these additional costs, plus a production "stretch out" in the first ten years, caused the actual costs of the F-16 to rise 29 percent over initial estimates for the ten-year period.[29]

In June 1975, the F-16 program received a huge boost when the four members of the European Multinational Steering Group (EMSG) also agreed to buy the aircraft.[30] This decision provided NATO a modern fighter-bomber vastly superior to any Soviet aircraft and one that had commonality with USAF aircraft, and at the same time allowed for a

certain amount of economies of scale in production, though much of this was offset by coproduction agreements with the EMSG. The F-16 soon became the fighter of choice for other American allies, notably Israel.[31]

However, even though it lost the competition, the YF-17 did not die. The Navy did not want either aircraft and pushed to develop its own new fighter, but the House Armed Services and Appropriations Committee had denied the service's request for $34 million for the project. Nevertheless, the Navy was determined not to buy the F-16 because it was single engine and because it was an Air Force aircraft (the rank order of importance is a question of debate), and selected the YF-17. In a convoluted arrangement, McDonnell-Douglas, the maker of the F-4 and F-15, bought the YF-17 design from Northrop and converted it to a larger, multi-role fighter, much as the Air Force had done with the F-16, and designated it the F/A-18.[32] This infuriated Schlesinger and Congress, but the GAO said the Navy decision was legal, so in the end no funds were cut.[33]

DEVELOPING A NEW AIR FORCE CULTURE: DIXON TAKES OVER TAC

The most significant date in the development of the Air Force culture change was 30 September 1973, when General Robert Dixon replaced the retiring General Momyer as commander of the Tactical Air Command. Dixon was unusual. He was very well educated (Dartmouth '41), had rushed off to join the Royal Canadian Air Force before the US entered World War II, and during World War II he flew reconnaissance missions rather than fighter missions over Europe before being shot down and captured.[34] He later served in SAC's Directorate of Personnel, then as commander of a fighter wing in the Korean War where he shot down a MiG-15. During the Vietnam War, he had served as

Momyer's deputy commander of the Seventh Air Force where he had seen the Air Force's shortcomings at close range, then became Director of Air Force Personnel.

"Acerbic" is a charitable way to describe Dixon, and he quickly made it clear that things were going to change at TAC headquarters. While General Momyer was quiet and had been satisfied with short briefing sheets and brief morning staff meetings, Dixon was entirely different. Many of his daily staff meetings went on for four or more hours as he relentlessly pushed his staff for details. Dixon later admitted, "I put the TAC staff in a very, very bloody confrontational mode with me and with each other day after day after day."[35] When a senior officer could not answer a question to Dixon's satisfaction, he would berate the officer in front of the staff with a barrage of profanity. There are verified accounts of Dixon removing a brigadier general's rank at one staff meeting and of full colonels being reduced to tears by his insults. One Air Force officer who later became a four-star general noted, "[Dixon] was famous for his indiscriminate hatred."[36] His actions carried over to his visits to the field, and one deputy wing commander – a former Vietnam POW who knew the meaning of abuse – remembered after one of Dixon's visits to his wing "I got so damn mad I went home and typed out my resignation from the Air Force. I simply wasn't going to take that kind of crap anymore."[37]

TRAUMA II – THE 1973 MIDDLE EAST WAR

One week after Dixon took over, a second event took place that would have almost as great an influence on the Air Force as Linebacker. On 6 October 1973, several Arab states launched an attack on Israel, beginning the 1973 Middle East War. The Israeli Air Force had dominated military operations in the Middle East for years, but for first time it

faced a modern Soviet integrated air-defense system (IADS) and the results were devastating.[38] For the first few days of the war, the vaunted IAF – considered by many the best air force in the world – suffered huge losses to the IADS manned by the Egyptians and Syrians. In the first three days, the IAF lost fifty aircraft in about 1,220 sorties.[39] This was an unsustainable loss rate, rivaling the loss rate of the early USAAF bomber offensive over Germany in World War II. Losses were so heavy that, for a few critical days early in the war, the IAF actually stopped making attacks against the leading Arab tank columns, even though the tanks were overrunning Israeli positions and were threatening to penetrate the Jewish state's borders. By the end of the war, Israel lost 53 of its 170 A-4 Skyhawks and 33 of its 177 F-4 Phantoms. Even on the last day of the war, it was still groping for solutions to the SAM problem, losing five Phantoms in a single raid.[40]

The IAF problems had actually begun during the War of Attrition (March 1969 through mid-1970), an Egyptian campaign to use heavy artillery fire to increase casualties among the Israeli forces along the Suez Canal. The Israelis countered with a bombing campaign, led by new American F-4s. The Soviets then supplied the Egyptians with a large number of Soviet air defense weapons, including modern radars and SA-3 missiles, much more modern equipment than the United States had faced in North Vietnam just a few months before. Unlike in North Vietnam, Soviet specialists also operated the equipment and, while IAF raids destroyed some SAM batteries, the IAF suffered heavy losses to the Soviet missiles. The Arab states began to concentrate on

SAMs rather than fighters for air defense. The IAF failed to adjust to the change, and the result was heavy losses in the 1973 War.[41]

For the USAF, the war was an almost unalloyed blessing because it marked the beginning of close ties between the USAF and the IAF. After some fits and starts driven by Secretary of State Henry Kissinger's political machinations, the U.S. began to send aid to the Israelis. Dixon, as commander of TAC, had the resources the Israeli Air Force needed, and he quickly and enthusiastically began to send equipment to the theater. When he was told to send new F-4Es flown by Air Force crews nonstop across the Atlantic to replace Israeli losses, Dixon "leaned forward in the saddle" and prepositioned TAC F-4Es in the Azores, in the middle of the Atlantic Ocean, so they could get to Israel faster. [42]

The Israelis were appreciative. In the first few days of the war an IAF intelligence officer, Oded Erez, brought a seeker head for the new SA-6 missile to Washington for US experts to examine, and once the war was over the American military was allowed to send a large number of Army, Air Force, and Navy personnel in a Weapons Systems Evaluation (WSEG) group to stay in Israel for several months. The Air Force quickly assembled a team of operational experts led by Korean War ace Brigadier General "Boots" Blesse to talk to the IAF. The team was allowed to interview everyone from the top commanders to regular aircrew, and was given access to captured Soviet equipment and much of the raw data in the reports the IAF was preparing.[43] Besides relating their experiences against the latest Soviet systems, the IAF told the Air Force they were practically eliminating the limits that flying safety imposed on their training to make it more realistic. They especially emphasized the need to fly very low – under fifty feet – to

stay below the missile envelope. This information and the access to Soviet equipment, especially their latest missile and air defense radar systems, was a huge windfall for the Air Force and TAC.[44]

Dixon's rapid deployment of the TAC F-4s and the willingness of the IAF to share the captured equipment and their experiences was the beginning of a beautiful friendship between Dixon and Israeli Air Force Commander Major General Binyamin "Bennie" Peled. Peled, who like Dixon had acerbic tendencies, had become commander of the Israeli Air Force in January 1973, replacing the popular Mordechai "Modi" Hod. Hod had been given credit for the IAF's stunning and complete victory in the 1967 Six Day War, but it was also Hod who had underestimated the impact of the Soviet missile systems at the end of the War of Attrition. The 1973 War was the first time the Israeli Air Force had been less than completely dominant over the battlefield; it was a trauma for the Israeli public and brought Peled a great deal of criticism.[45] Thus, Dixon and Peled found themselves in much the same position, having to develop innovative new programs after their service's poor performance in wartime. Both needed to relook at their equipment, their training, and their doctrine. Both air forces were facing the same Soviet systems and the same Soviet tactics, and the Dixon-Peled relationship was to be a fruitful one for both air forces.

DIXON'S OBSESSION WITH REALISTIC TRAINING

The results of the 1973 war preyed on Dixon's mind, and he said in an interview in early 1975 that the October 1973 war was a key influence on reshaping TAC's training. The war made it clear to him that the TAF was facing a formidable Soviet challenge and

would have to make dramatic improvements in their combat capability to meet it. The lessons Dixon took from the war were that tactical forces would have to devote significant resources now to defense suppression, that innovative tactics were the key to success and survival in a high-threat environment, and that the "overriding requirement" was for highly trained aircrews, because without trained crews innovative tactics could not be implemented. Additionally, because of the improved aircraft shelters and defenses around airfields, it would be difficult to destroy large numbers of enemy aircraft on the ground, and this meant TAC had to put ever-increasing emphasis on the air-to-air combat training. Dixon said the "key to air superiority training is DACT, or dissimilar air combat training," so that an enlarged DACT program and the Aggressors were necessary for improving the crews' air-to-air skills.[46]

At the same time, Dixon saw that TAC's air-to-ground training was still modeled on SAC training and did not remotely resemble combat.[47] Air Force fighters flew in two-ship or four-ship formations at medium altitude along standardized routes to small bombing ranges close to their base. Once on the range, they performed a set series of repetitious bombing runs in "box patterns," flying on the same designated heading to the targets. There were no threat simulators, no coordination or combined missions with other units, and the routes to and from the bombing range were "canned," the same every day, so there were no navigation or timing challenges. On these training missions, the only thing the crews had to do was to drop their bombs accurately. This was entirely different from a combat mission, where a major part of the mission is navigating to the target against enemy defenses, then identifying the target, and then bombing, often under

heavy enemy fire. The crews flew their training missions solely to "fill the squares" on their training sheet, and to prepare for the annual Operational Readiness Inspection (ORI), a SAC-type inspection where the crews flew essentially the same mission, only for a grade.

Not only were the routes and targets "canned," but there were also other unrealistic aspects. It was practically impossible for separate units with different but complementary missions to practice missions they would have to fly in combat. In addition, the Air Force restricted low-level flying to a minimum of 500 feet above the ground, which was neither demanding on the pilots' flying abilities nor low enough to be useful in combat. Additionally, the weapons the aircraft carried and dropped were very small "blue bombs" that weighed about 25 pounds and gave off a puff of white smoke (sometimes) when they hit the ground. The lightweight blue bomb's trajectory was nothing like standard bombs, which weighed from 500 and 1,000 lbs, and the blue bombs were very susceptible to the wind. An instructor in a tower on the range scored the bomb impacts, so crews had no responsibility for seeing where their bombs hit, as they would have to do in combat.[48] For virtually all crews, the first time they carried or dropped a live bomb would be in combat.

The use of practice bombs added to the lack of realism in the training because it made the weight and drag of the fighters on training missions all wrong. The weight and extra drag of a full load of real bombs are very important because with a full combat load fighters are much less responsive and harder to fly. Despite this, in training crews flew with light loads and never had to make "heavyweight" takeoffs or "heavyweight" air

refueling with the weight and drag of a full combat load, both of which were much more difficult fully loaded.[49]

THE "IRON MAJORS" BEGIN TO INNOVATE

Dixon's desire to improve training was based on the same impulse that was pushing the iron majors, but at this point the young officers had, as one later put it, "lots of velocity, but no vector."[50] Unintentionally, the iron majors began to form groups that in modern management are called "industry peer networks (IPN)." The characteristics of an IPN are multiple groups of noncompeting peers, selective admission to the group (low-ranking fighter pilot combat veterans), face-to-face meetings, and detailed discussions of issues. IPNs allow "members to learn vicariously from the experiences of peers and address deep rooted common problems," generally myopia (the focus on immediate problems at the expense of the larger issues) and inertia (the tendency to cling to old assumptions and time tested ways of operating).[51]

Management experts also realize that for effective innovation the innovators need "free space for conversation" where ideas can be "bounced off" a large number of people with no stigma. There must then be open lines of communication throughout the organization so the ideas can flow freely. However, such "free spaces for conversation" have to fit into the work patterns of the organization, and a fighter pilot in an operational unit had his workday filled with flying, as well as briefings and debriefings, which generally took longer than the flight itself. Line pilots also had a variety of what were euphemistically called "additional duties," from running the snack bar to writing effectiveness reports. The workday left no time for discussing larger issues. [52]

Unintentionally, the Air Force had a facility and customs that allowed young officers to communicate with each other and exchange ideas in an informal way. In the afternoons after flying ended many, if not most, of the aircrews adjourned to the bar at the Officers' Club for low priced drinks and snacks at "Happy Hour." Here they exchanged stories, compared experiences, and engaged in discussions about what was wrong with the Air Force and how to fix it. Many of the pilots had flown in Linebacker, so the Vietnam War was one of the main topics, as was the 1973 Middle East War and the possibility of a war in Europe. One of the characteristics of this "bar talk" was that rank had no place. Anyone could have an idea, and anyone could say, "That's BS, and here's why…." Senior officers who wanted to push, as opposed to discuss, their ideas or the Air Force party line simply were not included in the conversations. The Officers' Club at Nellis, as the home of the Fighter Weapons School, was a special hotbed of new ideas, since it had not only the instructors but also students who were considered the best fighter crews in the TAF.

One variant of these free spaces for communication happened on weekends when fighter crews were encouraged to take airplanes and fly "cross countries" for navigation training and to practice instrument approach and landing procedures at different bases. Every weekend, beginning about noon on Friday, fighter pilots would take off and fly around the country to different bases, usually landing Friday afternoon at a few select fighter bases known for the quality and quantity of females they attracted at after work "Happy Hours" – Luke AFB in Phoenix, Arizona, Langley AFB in Hampton, Virginia, where TAC headquarters is located, and Nellis were a few of the favorites, but there were

also Navy bases, such as Miramar Naval Air Station in San Diego, the home of Top Gun, and the Naval Air Station at Oceana, Virginia. These cross-countries allowed the fighter pilots to mingle and exchange ideas with pilots from different wings, of different aircraft, and often from different services. For Air Force pilots, it was a chance to ask Navy pilots about their training.[53]

Additionally, there was an organization of Air Force, Navy, and Marine fighter pilots who had flown the difficult missions to Hanoi in both Rolling Thunder and Linebacker, the Red River Valley Fighter Pilots Association. Known simply as "River Rats" or "Rats," the members wore a distinctive, officially sanctioned patch on the shoulder of their flight suit, and the patch was an automatic invitation for other Rats to come over and start a conversation, which quickly led to war stories. Some of the members were returned POWs (virtually all of the POWs during the Vietnam War were aircrew, mostly pilots), which gave them extra status and moral authority. The Rats also had regular meetings and "reunions" at Air Force and Navy bases around the world, and their discussions invariably drifted to what went wrong in the war and how to fix it.[54]

The formation of these IPNs and the availability of these free spaces for conversation stimulated the type of dialogue that led to innovation and creativity, but the most important IPN and free spaces for conversation were in the Air Force Headquarters, know as the Air Staff, in the Pentagon, especially in the offices of the Tactical Fighter Division (XOT) of the Air Force Operations Directorate in the Pentagon (XO), in the basement of the Pentagon next to the purple water fountain. The XO director was a three-star general who was the Deputy Chief of Staff for Operations, the XO, and was extremely powerful,

generally considered the second most powerful man on the Air Staff behind the Air Force Chief of Staff. The Tactical Division of XO was intended to be the home of the Air Force's young fighter pilots with the most fertile tactical minds, known as "action officers" (AOs).[55] The XOT action officers were many of the Air Forces' top fighter pilots chosen for both their intelligence and innovative skills and, of course, included many of the iron majors.[56] While the young aircrew often groused at Pentagon assignments, preferring to stay in the cockpit, most realized that working in XO was highly desirable. The assignment not only allowed them to make real changes in the Air Force, but also the follow-on assignment for the majors from XO was often the much sought-after command of a fighter squadron. Above the AOs in XO were the division chiefs, senior lieutenant colonels who had finished a successful tour as a squadron commander and were being groomed for wing commander positions.[57]

The iron majors of XO had considerable leeway to exercise their imaginations, helped because the XO office spaces where they sat were small and open (no cubicles), which made free discussions easy. While new and creative ideas came from all over the TAF, in the Pentagon the AOs had a charter to innovate and take new ideas out of the "bar talk" category. Any action officer with a good idea could work up a briefing and present it to his immediate superior and up the chain of command where the idea was vetted at all levels. Eventually, if the idea was good enough, it could go all the way up to the Chief of Staff. This was an option that was not available to field officers, and many good ideas for improvement from the field certainly died the death of a thousand cuts as they worked

their way up the chain of command. With its proximity to power and its talented officers, XO was to become the hotbed of innovation in the Air Force in the mid-1970s.[58]

THE FLYING SAFETY ISSUE

The iron majors were not totally enamored with the Air Force impulse to innovate by technology. While they were enthusiastic about the new F-15 and F-16, they had seen high technology up close in combat and knew that while sometimes it worked, often it did not. The main problem they had seen in the war in general, and in Linebacker in particular, was poor training, caused by bringing in "universal pilots" to fighters as well as the incompatibility between the Air Force idea of flying safety and a realistic training program. The combat veterans knew that many aircraft lost over Vietnam and attributed to "combat" were, in fact, accidents, and they believed that most accidents reflected an inability to fly an aircraft properly. The iron majors saw a peacetime pattern – an accident, followed by restrictions on flying the aircraft, then another accident followed by more restrictions. Their conclusion was that, ironically, the emphasis on flying safety actually caused accidents.[59] Flying safety might prevent accidents in peacetime but would increase losses in wartime, when poorly trained pilots would have to fly their aircraft to the limits. It was better to train to the limits under supervision in peacetime, when losses could be analyzed and solutions found, rather than lose aircraft in combat where the cause of the loss would be unknown and perhaps the crew lost. The iron majors believed if crews were trained to fly their airplanes to the limits, they would be prepared for unexpected and demanding situations and could fly their way out – or, better, recognize when they were getting into difficulty early and avoid the problem.[60]

This was not a new issue. In a 1944 letter to the Secretary of Defense concerning high accident rates, Army Air Force Chief General "Hap" Arnold said:

> If our only interest was flying safety in the United States, we would have every man fly a primary trainer on sunny days, and we could cut the accident record to almost zero. If we stopped flying and put the airplanes in hangars we would have no accidents at all. But war is not fought that way. From the outset, the Army Air Forces have taught the men at home the maneuvers that they would execute in combat abroad. In these maneuvers a few are bound to be injured or killed, but the overwhelming proportion of the men are better prepared to defeat the enemy.[61]

The bright spot in the push for realistic training was the maturing and expanding Aggressor program. The Air Force formed a second stateside squadron at Nellis and added two more overseas, one squadron in the Philippines and one squadron in England, for training fighter units based in the Pacific and in Europe. The expansion of the Aggressors was important because the iron majors believed that air-to-air flying skills were the *sine qua non* of the tactical fighter force, but having seen Linebacker and read the reports of the 1973 Arab-Israeli War, the iron majors knew air-to-air training and its associated skills were necessary but not sufficient. Winning the air-to-air battle was only one of the means to an end – putting bombs on the target. The Air Force also needed large-scale, realistic conventional ground-attack training.

CHANGING THE FIGHTER WEAPONS SCHOOL CULTURE

General Dixon continued making changes in the other ways TAC did business, starting with the Fighter Weapons School. The school's mission was twofold – to provide a "graduate school" for selected fighter pilots to take new techniques back to their units and to continually examine USAF tactics and combat procedures with an eye towards improving them. The school had a sign in front of the building that said, "Home of the

World's Greatest Fighter Pilots," and many of the instructors agreed with the sentiment, but the school had many critics. These critics noted almost none of the instructors had any MiG kills, that some had never flown a combat tour in SEA, and that others had only flown a combat tour in the back seat of the F-4. The tactical manuals written at the school were considered "holy writ" to be followed at all costs, and changing them was a long, involved process. The result of this inflexibility was that during the SEA war, when the FWS should have been the primary source of Air Force tactical innovation, the school did little to help the Air Force crews over North Vietnam, unlike the Navy's Top Gun. The inability of the FWS to develop tactical innovations was especially noticeable in its resistance to suggestions to change the clumsy Air Force four-ship fighter formations.[62] These inflexible four-ship formations were identified as being responsible for many of the losses over North Vietnam and were unfavorably compared to the smaller, more flexible, two-ship formations the Navy and IAF flew.[63] During Linebacker, the Weapons School sent a group of instructors to Thailand to fly combat missions with the crews and they returned with the realization that the four-ship formation was obsolete. Still, it took several years before any changes were officially made, in part because two-ship was a "Navy formation."[64]

Additionally, the critics noted that some -- but not all – of the Weapons School instructors put more emphasis on demonstrating their superiority over their students rather than teaching their techniques. These instructors had the attitude that they should teach students enough to be good, but not to be better than their instructor. In short, the

Weapons School was considered by many to be focused on "navel gazing" while disregarding any tactical ideas or suggestions that came from outside.[65]

This changed in July 1974, shortly after Dixon took over TAC. He sent Major Larry Keith, a MiG killer but not a Fighter Weapons School graduate, to take over the Weapons School. Keith saw that many of the instructors were more interested in "harassing and hazing" the students than teaching them, so he fired several instructors and brought in a new group to change the way the Weapons School taught. The sign "Home of the World's Greatest Fighter Pilots" came down, and the FWS refocused on teaching and innovating rather than humiliating and hazing.[66]

THE ISRAELI AIR FORCE VISIT

As part of his attempts to improve TAC's training, Dixon used his friendship with IAF commander Bennie Peled to get an impartial but expert look at TAC's training programs. Dixon asked Peled to send a group of his F-4 pilots to the United States to fly with crews in several American F-4 wings and the Aggressors, and then pass on their impressions to Dixon. In May 1975, a team of five Israeli Air Force pilots and a back seat F-4 navigator, led by Colonel Amos Lapidot, later commander of the Israeli Air Force, visited several Air Force bases to fly with American pilots. The Israelis were not impressed. Their report to Gen. Dixon was, by American standards, scathing, even though one team member said later that "because of considerations of US-Israel relationship, it was somewhat softened – telling the truth does not mean telling all the truth." The biggest problem the Israelis found was TAC's emphasis on flying safety in training. One of the team members remembers, "My main impression was that the USAF

flight safety limitations of the time were sterilizing the pilot's fighting abilities. As a result of the 1973 war, we in the IAF were loosening the safety restrictions on flying training extensively."[67]

The Israelis also were unimpressed with the Air Force pilots' integrity and the "zero defects" culture that sustained it. In one incident that went unmentioned in the report, a TAC pilot flew an air-to-air combat mission with one of the IAF officers in the back seat of his F-4. The TAC pilot overstressed the aircraft during hard maneuvering,[68] but the pilot did not tell the maintenance crew about the overstress and asked the Israeli not to tell anyone because "If they found out I'd overstressed an aircraft flying with you, it would be the end of my career." The story circulated around the group, and while the Israelis understood the officer's actions, they seriously questioned the mentality of a leadership that would fire an officer for telling the truth.[69] The Israelis' letter to Dixon and the general culture in TAC reflected Dixon's belief that he needed to change not only the way TAC operated but also the way TAC thought.

TAC had other problems, notably cuts in flying time because of reductions in the defense budget and the soaring cost of fuel. As the number of flying training hours declined, Dixon felt TAC needed to make the training missions more productive. He believed too much emphasis was being placed on the quantity of "fill the square" sorties flown – which could be measured – rather than on the quality of the training. Dixon later said that TAC training was "what amounted to calisthenics—the same thing every day in a very unreal atmosphere – and betraying the purpose of training and betraying the crews."[70] But using quantitative measures, along with an emphasis on flying safety, was

part of Air Force culture, and what Dixon needed was people to come up with innovative changes to provide the high quality training he wanted and the TAF needed.[71] He was trying to build TAC into an organization that "discourages orthodoxy for its own sake and encourages creative, useful innovators and mavericks… [But] my kind of maverick has to understand the system and bring about change without either wrecking it or himself."[72] At this point, Dixon's search for innovative mavericks was about to intersect with the ideas of Moody Suter and the iron majors.

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50. Vickery, e-mail to author, 6 June 2005.

51. Stoyan Sgourev and Ezra Zuckerman, "Leveraging the Power of Peer Networks" [also titled "Improving Capabilities Through Industry Peer Networks"], *MITSloan Management Review*, 42, 2 (Winter 2005), 33-38.

52. Richard K. Lester and Michael J. Piore, *Innovation: The Missing Dimension* (Cambridge, Mass.: Harvard University Press, 2004), 154.

53. Everts e-mail 5 February 2005; Vickery e-mail 6 June 2005; author's own experiences flying F-4s 1974-1975.

54. Ibid., all three of the above; River Rats web site, http://www.river-rats.org/. (accessed March 2006).

55. "Action officer" is the name given to any young officer in the Pentagon, not just those in XO. Anderegg, 72; author's Pentagon experience 1983-1986.

56. Anderegg, 89. Also see Clancy and Horner, 130-131.

57. Vickery e-mail 6 June 2005; Corder interview.

58. Anderegg, 89-92.

59 "Der Baron" (Richard M. "Moody" Suter, Col. USAF). "…anything else is rubbish," Fighter *Weapons Review,* Summer 1972, 33.

60. Richard M. "Moody" Suter, Col. USAF, "Corona Ace" interview by Lt. Cols. Gordon Nelson and John Dick, 26 January 1977, 17; "Der Baron," (Suter) "…anything else is rubbish," *Fighter Weapons Review*, Summer 1972, 33; Everts e-mail.

61. Quoted by Fredrick C. "Boots" Blesse, Brig. Gen. USAF, in "An Ace Looks at Flying Safety," *United States Air Force Flying Safety Magazine,* January 1981, 16.

62. See, for example, Major Gary Skaret, "Double Attack," *Fighter Weapons Review,* Spring 1971, and the same author's "Double Attack Revisited One More Time," *Fighter Weapons Review,* Summer 1971, 14-16.

63. Anderegg, 34-35; for a fuller discussion and diagrams, see Michel, *Clashes,* 46-58.

64. For the Air Force "party line" see "Der Baron," (Suter) "…anything else is Rubbish," *Fighter Weapons Review,* Fall 1971, 31-33.

65. Anderegg, 50-53.

66. Ibid., 51-52.

67. The other members of the team were Lt. Colonels Yoram Agmon and David Gal, and Majors Elazar Lior, Yiftach Spector. Spector e-mail to author, 15 April 2005.

68. Aircraft are designed with structural limits that allow them to pull a certain maximum number of Gs, one G equaling the weight of the aircraft and four Gs being four times the weight of the aircraft. The F-4 was stressed for 7.3G, like most fighters of the time. In the cockpit is a small "G meter" that registers the maximum number of Gs pulled in a flight. If an aircraft is "over-Gd" in a flight then it is supposed to be written up so maintenance can check to see if there is any structural damage. The cockpit G meter has a large button on it that will "zero out" the meter when it is pushed, eliminaing the evidence that the aircraft was overstressed. The dangers of "punching off" the G meter when an aircraft has been overstressed are obvious, but it was a not uncommon occurrence in peacetime or training situations during this time. Author's experiences flying F-4s, 1970-1975.

69. Spector e-mail.

70. Dixon Oral History, 246.

71. Knight, 204-205.

72. Dixon quoted in Edward Ulsamar, "TAC's Focus is 'Lean and Lethal,'" *Air Force Magazine,* March 1975, 28.

CHAPTER NINE: THE BUBBLE UP INNOVATION TSUNAMI

RED FLAG

Just after the end of the October 1973 war, Moody Suter was transferred from command of the air-to-air flight at the Fighter Weapons School at Nellis to the Pentagon. Suter went to the Directorate of Operations, Tactics Branch, XOOT, and arrived full of ideas he and his compatriots had developed at Nellis for realistic training against a realistic threat. The results of the 1973 war, where a Soviet IADS manned by Third World crews wrought havoc on the IAF and prevented it from intervening in critical land battles, added urgency to their discussions. The Air Force would have to face the same systems in the event of a war in Europe, but it was safe to assume the systems would have much better crews from the Warsaw Pact. Suter and others were concerned that, at this point, the Air Force would not be able to win that battle, a concern supported by the IAF Visit Report to Dixon, which Dixon passed on to XO. There was a consensus that the TAF needed a new program to develop combat skills and to test tactics developed during Vietnam, and, if necessary junk them and start over. XOOT provided plenty of free spaces for conversation and the Air Staff was one big IPN, so was the perfect place to develop the ideas.

Lieutenant Colonel Jim Brown was the XOOT Branch Chief and the AOs included Majors John Corder, who had been involved with the formation of the Aggressors, and Chuck Horner, both of whom went on to fame in Gulf War I, as well as Suter, and later

Majors Will Rudd, John Davis, and John Vickery. Each day at noon, they ate lunch at the conference table in Brown's office to talk about the work they were doing and brainstorm. During these lunchtime meetings, Suter and the other AOs discussed follow-ups to the Aggressor program and began developing the concepts of what would become Red Flag.[1] All the AOs were familiar with Nellis, and the talk turned to developing the large but essentially empty Nellis range complex -- an area 40X80 miles, about six million acres, where the land and airspace above were restricted to military use -- for large-scale ground-attack training. While the Air Force had used the Nellis ranges for years, in 1973 most of the range complex was a huge amount of empty space for flying with a few targets, sometimes nothing more than stacked fifty gallon drums.[2] There had been some attempts to upgrade the ranges, led by the chief of the range complex, Colonel Joseph D. Salvucci, later acknowledged as the "father" of the sophisticated range complex that was developed. Salvucci also wanted to upgrade the targets to make them more realistic, and then move a number of "threat simulators" – electronic equipment that would send out emissions similar to Soviet missile and early warning radars – onto the range so crews would have to maneuver against them. The iron majors took this idea and began to think about, in effect, converting the Nellis ranges into a combat training "Disneyland," and built on their experience with the Have Donut and Have Drill MiGs, to see it they could use actual Soviet radars given to the American military by the Israeli Air Force on the range. They also discussed upgrading the targets using various tank, truck and aircraft hulks strewn across military bases around the United States.[3]

The next question was how to present the idea to the Air Force leadership. To show a requirement for such large-scale training, there needed to be a simple intellectual "hook,"

and Suter found this hook in the Army's Pentagon library in a set of studies that showed that if a fighter pilot survived his first ten missions, his chances for surviving the rest went up from 40 percent to well over 90 percent.[4] During Korea and Vietnam, the Air Force had the luxury of allowing the new tactical fighter pilots to fly their first ten combat missions against easy targets, but Suter and the rest knew if the next war were fought in Europe against the Soviets, it would be a "come as you are trained" war. The crews would have no time for easy missions before they went against the best Soviet air defenses.[5]

The exercise that Suter and the others began to envision would provide an intense combat-type learning environment where aircrews could fly their first 10 "combat" missions as part of a larger Blue Force and learn how to adapt to missions in a real war in Europe, flying against a Soviet-style integrated surface-to-air defense system and the Aggressors using Soviet tactics. There, in a controlled training environment, pilots could develop the skills they would need to survive their most vulnerable period in real combat. The exercise would, in essence, make the aircrews combat veterans before the war started.[6]

As the idea ripened, Suter developed other analytical "hooks." If, as intended, the exercise could increase survivability like the historical studies indicated, it would be the equivalent of augmenting the Air Force in Europe by 30 percent and would shift the whole balance of power to NATO's air forces in central Europe.[7] Other data also showed that if training provided a way to help pilots survive the first ten missions, there was the potential for huge additional benefits. Studies across national boundaries from World War I, World War II, the Middle East, and Korea showed that 20 percent of fighter pilots

scored 80 percent of the kills, a characteristic found in other forms of human endeavor and known as the "Lotka curve."[8] But this skill did not begin to show up until after a pilot had survived ten missions, so to become one of these highly efficient pilots – called "hawks" in the experimental data – a pilot had to survive the first ten missions when he was a vulnerable "dove."[9] A program that would allow pilots to survive the first ten missions thus not only vastly enhanced a pilot's chances for survival, but also opened the possibility he might become a "hawk," an extraordinarily effective killing machine. Finally, combat data from the Middle East wars showed that the synergism between good equipment and well-trained pilots could result in air-to-air kill ratios of over 50:1, a ratio the Israelis approached in the War of Attrition and achieved in 1973.[10]

Suter and the others sharpened the focus of the idea of a large scale, highly realistic training exercise through 1974 and early 1975. As the idea became more serious, the lunchtime table talk in Brown's office began to explore the entire gamut of issues the exercise would raise. The members used their IPNs to ask questions of other action officers in different departments throughout the Air Staff – operations, maintenance, budget, plans, intelligence, research and development, as well as experts on ranges, test programs, and new weapons and tactics – to see what they thought of the idea. Funding was certain to be an issue, so they went to the action officers responsible for major exercise funding to see where to purloin deployment and exercise flying money. As the group made the rounds, they constantly asked "what do you think - what are we missing?" The aim was to generate hard questions, then develop answers to these question based upon input from these experts, who liked the idea but were not sure it was going anywhere in the Air Force's "fly safe" culture.[11]

As the plan coalesced, Suter and the others began to put together a briefing for a large-scale training exercise at Nellis. In the Pentagon, while a picture was worth a thousand words a briefing was the equivalent of the picture, with the added benefit of someone to explain the picture and answer questions. Suter, who had "had not only the visionary's eye but also the salesman's gift," developed the briefing while the members of the branch consulted and kibitzed.[12] Once they drafted a briefing, the XOOT AOs took it around the Air Staff to other iron majors in different branches and continued to solicit hard questions. They also conducted internal "murder boards" on the briefing, and it was continually polished and refined.

As the concept for the exercise idea evolved, there was considerable discussion about how to use it. The Air Force had Operational Readiness Inspections (ORI), developed by SAC and now used throughout TAC to test the flying and bombing skills of the crews. Many thought the exercise would have a better chance of being adopted if the participants were graded, like an ORI. Others disagreed. The problem with an ORI, they argued, was that it was a test, and the emphasis was on passing, on following established procedures, on being as conservative as possible. No one ever wanted to learn anything from an ORI except that they passed, because being innovative and failing would result in people being fired, especially wing commanders. This "no grade" group argued the aims of the new exercise should be exactly the opposite of an ORI. The exercise was to be a place for crews and commanders to experiment, to learn, and the measure of success would be how much they learned. The exercise should be an opportunity to test potential combat tactics against a dynamic enemy, and the crews and commanders had to be allowed to fail in peacetime when the lessons were cheap. Grading the exercise would discourage

innovation and experimentation. In the end, there was consensus not to grade the exercise like an ORI.[13]

RED FLAG IS UNFURLED

Once the briefing was completed to everyone's satisfaction, Brown and Suter presented it to the Deputy XOO, Brig. Gen. Charles Gabriel. Gabriel, a product of the SEA combat culture, was predisposed to like any idea that would improve training. He had flown two tours in Korea and shot down a MiG, and then had been the wing commander of the 432nd Wing at Udorn during the Lavelle bombing campaign and the early days of Linebacker when his wing's poorly trained pilots had suffered heavy losses to MiGs. He had also written an "End of Tour" report that was highly critical of the training of the crews that arrived in his wing.[14]

Red Flag was the name given to the exercise, and the first slide of the briefing was a large red Soviet flag that Roger Wells had used for his Soviet threat briefings. The briefing for Red Flag described how a TAC fighter wing would deploy to Nellis along with other TAC units, all carried by the transports of the Military Airlift Command (MAC). The Nellis auxiliary field at Indian Springs would be used as the deployment location, because it had a recently upgraded runway and facilities that closely resembled a "bare base" similar to where Air Force fighter units would be deployed in wartime. The deploying wing would bring its own "Bare Base" units to provide support, and once at Nellis, the aircrews would fly operational missions in large, Linebacker-type strike packages using live ordinance on the Nellis ranges, which would be with equipped with Soviet IADS simulators as well as instrumented assessment and feedback systems. Each day there would be a mass briefing and debriefing of the missions, much the same as

after the Linebacker missions. Once the exercise proved feasible, other groups from Army Air Defense,. Navy aviation, SAC, and a variety of other units would be invited to participate. The possibilities were endless.

Gabriel, who was intimately familiar with what happened during Linebacker, liked the idea and the briefing. He asked Brown to go with him on a tour of TAC bases in the western United States to "trial balloon" the idea. Gabriel and Brown gave the Red Flag briefing to the Tactical Fighter Weapons Center commander, the 12th Air Force Commander, and Colonel Bill Kirk, 479th Wing Commander at Nellis who had also been responsible for the Aggressors, and also presented it at the 1975 Fighter Symposium hosted by TAC at Nellis.[15] Everyone liked the concept, and when Gabriel returned to the Pentagon, he told Brown to have the briefing coordinated with the Air Staff leadership. Suter took the briefing through all of the subordinate groups and finally to the Chief of Air Force Operations Directorate, the XO, Lieutenant General Robert Huyser. Huyser approved the concept and told Suter to brief Red Flag to the other three-star directorate heads of the Air Staff for coordination and inputs before taking the briefing to the Air Force Chief of Staff, General David Jones. [16]

The coordination process in the Pentagon can be a tricky one. One of Suter's iron major colleagues remembered, "The Air Staff was a power-brokers heaven where egos are big and self-promotion was, to many, the key to advancement. A few general officers took pleasure in 'just saying no' to any package they didn't originate in their directorate."[17] As Suter and the iron majors explored the issue in their IPNs, it seemed the most likely person to oppose Red Flag was the Director of Programs and Requirements (PR), Lieutenant General Abbott Greenleaf. Greenleaf was a power on the Air Staff

because he controlled the funding for virtually all Air Force programs, and the rest of the generals were loath to challenge him on any issue for fear of retaliation in the form of 33cuts in their programs. After Suter briefed Greenleaf on Red Flag, as feared Greenleaf refused to approve the package because of funding issues. When General Huyser was told Greenleaf had not approved the briefing, Huyser – a bomber general who had not flown combat in Vietnam -- told Suter not to take the briefing to Air Force Chief of Staff Jones.[18]

Suter and his colleagues discussed the problem with the action officers they knew in lower levels of Greenleaf's PR directorate and learned that there was no way to make the general come around once he had made up his mind on an issue. Suter and the iron majors had a great idea with the approval of virtually all the general officers on the Air Staff, but also had a major roadblock that stopped it cold.

Help came from outside the Air Force. America's most famous aviation artist, Keith Ferris, whose father had been an Army Air Corps aviator and had had strong ties to the Air Force, was creating the B-17 mural "Fortresses Under Fire" at the National Air and Space Museum and was living an apartment in the Washington area with Pete Hayes, a Pentagon iron major and former instructor at Nellis with Suter. The apartment, quickly named the "Bunk House" because it housed fighter pilots visiting the Pentagon, soon was the home of almost nightly "white whiskey" gatherings.[19] Ferris would paint all day on the B-17 mural at NASM and come home to the "Bunk House" for the nightly "bull sessions" with whoever was there, and one afternoon Suter and his group stopped by the Bunk House for drinks. They talked about the recent decision by General Greenleaf to not sign the Red Flag package and the apparent derailing of the project. Ferris asked what

Red Flag was, and Suter explained the concept and how it could benefit the Air Force and other services like the Army air defense units and Navy tactical aviation. Ferris was a long-time friend of Suter and remembers, "I supported Moody in every way I could, which meant bringing together all kindred spirits I could gather." Ferris thought it was a great idea and asked Suter if he could brief other services on the Red Flag concept, because Ferris knew the Army general who was the head of the Army's air defense branch and thought he might be interested. [20]

The next day Suter discussed the Army briefing idea with Brown and the "lunch bunch," and Brown passed the idea up to General Huyser. Huyser said it was all right to give an "information only" briefing if requested by the Army, so Ferris arranged the invitation and Suter gave the briefing. The Army general, aware that the Army would be paying nothing to "piggy back" on Red Flag and that the exercise would provide a fine place to train his air defense units, was enthusiastic, and he told the Chief of Staff of the Army, General Fred Weyand, about the idea. A few days later at a social gathering, Weyand remarked to General Jones that he heard that the Air Force had this innovative realistic training concept called Red Flag and that the Army would be interested in participating. Jones knew nothing about Red Flag, and when he returned to his office, he called General Huyser demanding to know what Red Flag was and why the Army Chief of Staff knew about it and he did not. Suter immediately appeared on General Jones' schedule to brief Red Flag.[21]

One of Suter's talents was the ability to "shape-shift" his briefings to fit his audience, and the long hours of information gathering, coordination, and vetting the briefing around the Air Staff paid dividends. Suter knew Jones was interested in realistic training because

he had established a Tactical Employment School while he was commander of the United States Air Forces in Europe and Suter also knew that the main objections would come from General Greenleaf based on cost. In his Red Flag briefing to Jones, Suter pointed out there would be little cost because the electronic threat simulators and target hulks were on Air Force gunnery ranges all over the United States and could be consolidated at Nellis. The Aggressors were already based at Nellis so they would cost nothing. The ranges were available and there was parking space and housing at the Indian Springs auxiliary airfield. By now, Suter knew a great deal about deployment funding and pointed out it would be possible to reprogram money from less effective exercises, so Red Flag would not increase the budget or the days deployed by operational units. Finally, Suter pointed out that the concept of "jointness" – the services working together -- was currently a major issue with the Joint Chiefs of Staff and Congress, and the Air Force could offer Red Flag to the other services as a program for joint cooperation and training where all the other services had to do was bring their personnel and equipment. The Army had already accepted the Red Flag concept, so the exercise was a win-win for General Jones and the Air Force. [22]

Jones liked the idea and the briefing, but knew that this would have to be a TAC, not an Air Force, program. He called General Dixon, and Dixon agreed to listen to Suter's briefing. In early July 1975, Suter and Keith Ferris drove five hours south from the Pentagon to Langley Air Force Base, home of TAC Headquarters, in Hampton, Virginia. Suter knew Dixon's reputation for brutalizing senior staff officers, but the word among the iron majors at TAC headquarters was that the "Tidewater Alligator" – the name Dixon had given himself -- was much more tolerant of lower ranking officers. One

member of the TAC staff who regularly briefed Dixon told Suter it was not unusual for Dixon to pick up his telephone and call a junior staff officer when he needed additional information. What Dixon wanted, the word was, was expertise and in-depth knowledge. Suter also had a "hole card," an advocate on the TAC staff, the highly respected and recently promoted Major General Charles Gabriel. Gabriel had taken Suter's briefing on its first "road show" to the western TAC bases and to the 1975 Fighter Symposium, and was now TAC's Deputy Chief of Staff for Operations. Following established protocols, Suter first gave the briefing to Major General Howard Leaf, TAC's Deputy Chief of Staff for Requirements, who thought, "It was a great briefing" and set up Suter to brief Dixon and the full staff on 15 July.[23]

As it turned out, Dixon's *persona* fit Suter perfectly. By now, the presentation had been honed by hundreds of hours of dissection by the iron majors, all experts, from all parts of the Air Force, and most of the generals on the Air Staff had made their inputs. However, Suter's most important assets in his briefing were his expertise, his honest, unabashed enthusiasm for the idea and the firm belief, based on his own combat experience and the combat experiences of others, that the Air Force needed this program.

Suter's first slide was the bright red Soviet flag, the "Red Flag," intended to do double duty as a warning. Red Flag, Suter told Dixon, focused on a renewed emphasis on training the aircrews the Red Baron study showed had been poorly prepared for combat. Red Flag would prepare TAF crews for their first ten missions in a conventional war against the Soviets in Europe. The exercise would employ entire "strike packages" -- tankers, electronic warfare aircraft, bombers, fighters, reconnaissance aircraft, search and rescue helicopters -- against a realistic enemy that operated advanced radar systems,

integrated missile and AAA, and the Aggressors flying dissimilar interceptors using Soviet tactics. It would test Vietnam-era tactics and the tactics that TAF crews were planning to use in a war in Europe, and would force the crews to plan and execute large, combined missions while dealing with the inherent fog of war and a professional enemy force.

For each Red Flag, a single tactical fighter wing would be the “core” unit, and its aircraft and personnel would deploy to Nellis as part of the "Blue Forces.” Upon arrival, they would be plunged into a systematic process to prepare them for “combat.” First, the Blue Forces crews would go to Nellis’ intelligence center where they would examine captured Soviet equipment and receive briefings on the equipment’s capabilities, limitations and the Soviet tactics for using it. Next, the Blue Forces would fly over an electronic warfare range where the crews would practice using their electronic countermeasures equipment (ECM) against actual Soviet tracking and missile radars. Then the crews would fly one and two-ship “warm up” air-to-air missions against the Aggressors.

After these orientation flights, the Blue Force would move to integrated, large-force ground-attack missions, using a variety of tactics to attack targets such as airfields, missile sites, vehicle convoys, and tanks defended by the "Red Force," which would electronically simulate anti-aircraft artillery, surface-to-air missiles, electronic jamming equipment and the Aggressors. These missions would increase in size and complexity as the exercise moved on. After each mission, there would be what Suter and the others considered the most important aspect of Red Flag, the mass debriefing of all the crews involved in the large missions, modeled on the ones in the later part of Linebacker. The

missions would use reports and videos from the Red Forces to analyze the results, so the Blue Forces could learn exactly what they had done correctly and what needed work.[24]

In addition to outlining of the exercise, Suter had again moved within the Red Flag idea and shape shifted the briefing to make it especially appealing to Dixon. Suter suggested if Red Flag was a success TAC would get more funding for realistic training at Nellis and such TAC programs as the Aggressors, range instrumentation, and exercise flying hours.[25] Suter also knew that Dixon would want TAC to be in charge, and he had anticipated Dixon's next question -- "Suter, who gets the credit for Red Flag?" Suter had General Jones' agreement to his response -- "You do, sir!"[26] "Gen. Dixon loved it," one attendee recalled.[27]

Dixon told General Gabriel, Maj. Gen. James A. Knight, the commander of the Tactical Fighter Weapons Center, and the staff to implement Red Flag and that he wanted the first Red Flag at Nellis within six months. There was no money available, but Dixon was so enthusiastic about the exercise he told his comptroller, Col. Richard Murray, to get the resources "out of hide."[28]

There still remained the critical issue of how to deal with the Air Force flying safety culture. To provide realistic combat training, Red Flag would require that the crews fly at low level to avoid detection by enemy radar coverage, which is line of sight. Because of the curvature of the earth, low flying aircraft could avoid surface-to-air missile radars, but "low" meant very low – less than 200 feet, well below the authorized altitude for Air Force pilots at the time. This low flying would certainly cause accidents, especially early in the program when the crews were unaccustomed to such flying.

But, after discussing the Israeli Air Force losses in the 1973 Middle East War with IAF commander Bennie Peled, Dixon had had a different view about accidents than most of the senior generals in the Air Force. He was to later say:

> We had the best accident rate in TAC's history in 1974, and a little later – I think it was probably 1976 – we had the worst…I can't tell you that anybody that has a low accident rate is a hero or, conversely, a bum, but I can tell you from the reaction of the crews. Did they think they were getting realistic training[in 1974]? They certainly didn't…[29]

Dixon was prepared to try to change the Air Force flying safety culture, and after Dixon approved the briefing he called General Jones and told him TAC was ready to take the lead on Red Flag. He also told Jones that this type of realistic training involved risk, and would probably result in increased accidents for a time. Jones gave Dixon permission to waive the low level altitude rules for the exercise, and Dixon sent out a message that during Red Flag aircrews could fly at low altitude with essentially no restrictions when attacking targets, engage in air-to-air combat below 10,000 feet, and ignore airspeed restrictions.[30]

In retrospect, Dixon's immediate and unconditional commitment to Red Flag was remarkable. Almost out of the blue, he was offered an exercise program that would, in essence, tear up the entire TAC training program and rebuild it, with unpredictable results and certainly unintended consequences. It would also take money -- there was little to spare at this time -- and there would certainly be accidents, perhaps lots of accidents, whichhich could result in his unceremonious firing. Dixon's decision to relax safety rules for Red Flag flew in the face of the last twenty years of Air Force doctrine and policy. It would have been understandable if Dixon had simply said, "this is a really interesting idea; let's study it for a few months." He did nothing of the sort.

Because he knew there would be accidents, Dixon insisted Red Flag had to quantify the results so he could prove the training was worthwhile. He ordered that the Red Flag staff include a Studies and Analysis unit to document the results of the exercise.[31] One of the first things installed at Nellis was the Red Flag Measurement and Debriefing System (MDS), which included a Television Optical Scoring System (TOSS) consisting of two video cameras set on high ground a safe distance from several targets.[32] When a bomb impacted around the target, it was easy to score the bomb hit, and TOSS not only provided accurate scoring, but it also showed crews that they were "pressing" – getting too close to the target to try to get a hit. When a crew dropped real bombs in combat, releasing a bomb too low put the aircraft into the "frag pattern" of the bomb, possibly leading to the loss of the aircraft and its crew. The Red Flag measuring system also had video cameras on various simulated missile and AAA sites that showed how effectively crews maneuvered against these threats.[33]

But Dixon's enthusiasm did not automatically translate to his staff or to the flying wings. One of the staff members in charge of planning the first Red Flag remembered that when he briefed the exercise to Twelfth Air Force, the sub-unit in charge of Nellis, "there were a lot more nay sayers than 'go-for-it' guys."[34] At the same time, Suter went to Nellis to brief the officers that would organize the first Red Flag, and found them very enthusiastic and ready to go.[35]

The problems raised by various issues – fear of accidents, heavy operational commitments, lack of funding -- resulted in little initial movement. In early September, Dixon asked for a briefing on Red Flag, and from the briefing it was clear there had been little progress because the staff and the units were still working out various issues. Dixon

was incensed and lived up to his nickname of the "Tidewater Alligator." He said to fly the first Red Flag exercise in November or heads would roll, and a flurry of messages went out to make sure this happened.[36] One of the results of Dixon's outburst was the rapid development of the first Red Flag "Operations Plan." The plan was very short, only about seven pages with attachments, and the Red Flag planner at Nellis who wrote it remembered, "It was almost a 'back of the envelope' document, and I was amazed it went through the TAC staff. I guess the planners were just happy that they didn't have to spend time on it and had something to give to Dixon."[37]

The first exercise involved units close to Nellis to reduce cost and help with the logistics, so twenty-four F-4s from the 49th Tactical Fighter Wing from Holloman AFB, New Mexico, formed the core of the "Blue Force" for the first Red Flag on 29 November 1975. They were joined by reconnaissance aircraft, anti-SAM "Wild Weasels," forward air controller (FAC) aircraft, search-and-rescue helicopters, and 561 people. The 49th aircrews doubted there would be more than one Red Flag, but they had just successfully completed an ORI and they viewed this as a "good deal" temporary duty (TDY) of two weeks in Las Vegas, even it was a one-time exercise dreamed up by the TAC staff. When the 49th arrived, to their amazement they were told that the low-flying altitude restrictions were basically removed and that the Nellis range now had realistic Soviet targets and threats, laid out according to Soviet tactical principles, as well as "smoky SAMs," pyrotechnic devices that were fired ballistically from the ground (not at the aircraft, just along the route) and left a smoke trail like a real SAM. There was also an electronic warfare aircraft that jammed Blue Force radio transmissions and the Aggressors. The wing went through the entire program, flew 552 sorties, and each of the wing's forty

aircrews flew at least six air-to-ground missions and two air-to-air missions.[38] Just like in combat, after the missions the crews either went to the bar to discuss the day's missions, often with their Aggressor opponents (not quite like combat…) or stayed in the squadron to plan the next day's mission. Several times during the exercise a crew that had maneuvered poorly as shown by videotapes from the Red Flag Measurement and Debriefing System was designated as "shot down," and the next day a helicopter took the "downed" crew to the middle of the exercise area and dropped them off with just the survival gear they would have after they bailed out. Once dropped off, the crew had to use their survival radios to call for a full-fledged search-and-rescue operation. [39]

Importantly, there were no accidents in the first Red Flag, but the exercise showed some of realities of TAC training. In air-to-ground operations, many tactics that had worked in Vietnam resulted in heavy simulated losses. The Blue Force "lost" twenty aircraft, including twelve in air-to-air combat with the Aggressors, while shooting down five Aggressors, a kill ratio of over 2:1 in favor of the Aggressors.[40]

At the end of the two-week exercise, the real question was how well Red Flag was meeting its main goal of providing realistic combat training. While SEA combat experience quickly disappeared from the active units as young pilots left the Air Force or were promoted out of the cockpit, almost half the Holloman crews -- 49.2 percent – who went to Red Flag were combat veterans, and many had participated in the Linebacker operations. As part of the documentation system, Dixon had the crews rate the exercise's realism on a scale of 1 to 10, with 10 representing real combat. Overall, the Holloman crews rated Red Flag as 8.7 out of 10.[41] Comments included "Best training environment

[I've] ever encountered"; "not only let's me think about tactics but requires it!" "Outstanding training…most realistic since actual combat."[42]

The exercise summary noted Red Flag "demonstrated the principles for composite strike operations… [and] demonstrated the difficulties of determining the highest priority threat and taking the appropriate actions in a combined air-to-air and ground-to-air threat environment." It also showed the "importance of diversity of tactics and the need to shift tactics frequently." It was:

> cost effective and provided continuous training in integrated strike operations previously available only intermittently…most important, the Red Flag exercise, by emphasizing the concept of integrated operations, provided a vehicle for training units in the necessary command, control, communications, intelligence, and interoperability techniques and doctrine of combined operations and offered many advantages for increasing operations readiness through joint training.[43]

The success of the first Red Flag generated huge excitement in TAC, but even with the initial success, Dixon was cautious. He constantly pointed out that a high Red Flag accident rate would make realistic training too expensive, and he then would have to put limits on the exercise.[44] He told the flying wing commanders that, while the low level flying restrictions were off, he would "hang, draw and quarter the man that takes a young second lieutenant down there who has never trained there and gets him killed…don't take people down there that don't know how to operate down there[at low level]! That's your job…you had better know everything about him there is to know. If you kill him, you are responsible for killing him."[45] He also assured General Knight, the commander at Nellis, that he would be protected from repercussions from accidents, but that "we have to do this right or we'll set realistic training back to filling squares around the flag pole."[46]

Dixon also left a note in the mandatory "Crew Read File" at Red Flag telling the crews: "For God's sake, be a little careful about this thing, because a little misdirected enthusiasm will set us back 20 years."[47] At the same time, Dixon emphasized that if there was an accident the commander was responsible for finding out what happened and telling Dixon the truth so the staff could fix the problem.[48]

Red Flag II took place at the end of January 1976 and Red Flag III was longer, almost a month long, from 28 February - 26 March. Beginning with Red Flag III, the Air Force F-15 Operational Test and Evaluation unit permanently stationed four F-15s at Nellis to fly with the Blue Force in every exercise. Crews came from Europe to fly and A-10s came to Red Flag for the first time in Red Flag V in July 1976.[49] By the end of its first full year of operation, both Marine and Army aircraft and helicopters were participating, and Red Flag aircrews had flown more than 10,000 realistic combat training sorties. By the end of 1976, the "value of [Red Flag's] realistic simulation was universally accepted…as the ultimate test…resembling actual war as much as possible, with crews often operating under considerable strain."[50]

Later Red Flags showed Dixon was right to be concerned about accidents. In 1976, the first full year of Red Flag, there were 32 Class A mishaps. This was 4.6 times the rate of TAC mishaps per 100,000 flying hours (TAC's overall rate was 7 per 100,000 hours) and 11.4 times the Air Force rate (2.4 per 100,000 hours).[51] Dixon came under increasing pressure from Air Force Chief of Staff Jones to lower the accident rate, and at one point Dixon and Jones reportedly got into a shouting match about the accident rate in the E ring of the Pentagon. Nevertheless, despite the high accident rate and Jones' increasing doubts, Dixon remained committed to the exercise. One of his colleagues remembers

"[Dixon] was willing to take the heat for accidents at Red Flag because he believed deeply that this very realistic training would save Air Force lives in the future and contribute to victory in war. He never wavered in his support."[52]

After each exercise, there was extensive follow up. The Red Flag staff took the critiques of the participating units and circulated them to the next units scheduled to participate, and tried to add more simulators and realistic targets as quickly as possible. When there was an accident, the fighter pilots on the Red Flag and TAC staffs carefully analyzed it to look for any trends. They soon found the major cause of accidents was hitting the ground during the first week. This seemed to be because the new environment overwhelmed the aircrews the first few days when they were "pressing" to try to do well, and this lead to distraction, inattention, or channelized attention.[53] To help lower the accident rate, accident reports went out from each Red Flag to all units so they could begin to prepare and train for the environment. Gradually, as Dixon and the iron majors expected, the accident rate dropped in 1977 and 1978 as the Red Flags continued and pre-Red Flag training improved.[54]

Despite the accidents, the catchy title of "Red Flag" and the realism of the training were well received both within the Air Force and by the public, and it became a symbol of a new way of training. Dixon brought anyone who would come – senators and representatives, staffers, news people – to visit the exercise, and the commander of the Fighter Weapons Center, Lieutenant General James A. Knight, remembered, "we invited the world and they came…it was in Las Vegas [and] the downtown people were very responsive to our needs, particularly in entertaining visitors."[55]

In May 1977, TAC and Red Flag won the Collier Trophy, honoring those who had made significant achievements in the advancement of aviation, beating out the man-powered "Gossamer Condor." The citation said, "The award goes to the Tactical Air Command for developing and implementing Red Flag, an unprecedented combat simulated flight training program for aircrews of the U.S. Armed Forces and a significant contribution to national defense."[56] As Suter had promised, Dixon and TAC got all the credit and, despite their contributions, none of the XO iron majors received an invitation to the award dinner, even though it was in Washington. General Huyser, the XO, was given an eight-person table, and he gave his tickets to Suter and the other officers who had developed the idea. When General Dixon accepted the award, he thanked the assemblage on behalf of TAC and all the outstanding personnel in TAC and at Nellis who brought the exercise to fruition, but made no mention of the genesis of the idea of Red Flag. After the dinner, Dixon passed by where Suter and the XO group were standing and said, "Don't I know you from some where?" Suter smiled faintly and said, "Yes sir, Moody Suter sir!" Dixon looked at Suter and his colleagues and said, "There's an open bar in there, have yourself a good time," and walked off without another word. It was, as one officer noted, "typical Dixon."[57]

WHAT RED FLAG WROUGHT

The issues that came up in the Red Flag exercises precipitated a debate about the Air Force's Tactics Manual, Air Force Manual (AFM) 3-1. There were two schools of thought about the manual. The "safety Air Force" school held that a tactic could not be tried if it was not in the Tactics Manual. The "combat culture" school said that the Tactics Manual was a guide and that tactics or maneuvers that were not expressly

forbidden could be tried. Dixon stepped in and said to rewrite the Tactics Manual to clearly state that it was a constantly evolving guide. He made it clear that he wanted the aircrews to be creative and to try any tactic they thought would work, and only those events that were expressly forbidden were prohibited.[58] The change in the Tactics Manual was, in one sense, a bureaucratic process, but it was a formal acknowledgement of the sea change from "fly safe" to "train the way you plan to fight" that had occurred and was gaining momentum.

Red Flag initially focused on bringing existing equipment to Nellis to keep costs down, but General Greenleaf's office of Programs and Budget expected a bill was coming, and they were right.[59] In the spring of 1976, once Red Flag was firmly established, Suter wrote Air Force Required Operational Capability (ROC) 76-1 formally to request funds to improve Nellis's ranges in order to create a realistic combat training environment with a real-time scoring system for feedback. The key elements in ROC 76-1 were those discussed -- or fantasized about -- since the conception of Red Flag – more realistic targets, more instrumented ranges and instrumented aircraft on the ranges, and real-time feedback to Nellis to facilitate control, safety, and the passing of information to the aircrews. The Air Force accepted the ROC and Congress approved the funds in FY1978. These funds were a key building block in making Red Flag into a truly effective and flexible training operation. More video recorders were installed around the ranges so virtually all the events could be taped, debriefed, and used as teaching tools, but the most important new piece of equipment was the "Air Combat Maneuvering, Instrumented" (ACMI) range, an improved version of the Air Combat Maneuvering Range (ACMR) developed for Top Gun in May 1971.[60] The ACMI was not only useful for Red Flags but

also for the normal day-to-day training conducted at Nellis by the Fighter Weapons School.

The exercise steadily grew in size and sophistication, and the video footage took the guesswork out of the exercise and provided a solid link between day-to-day training and feedback. General James Knight, the Nellis commander, later said

> I went many times to the range to observe new ideas that our young crews in the squadron were trying to develop and innovate. It was obvious, when looking at it from the videos taken from the defensive side on the ground, who had a chance of surviving and who didn't by the tactics they employed.[61]

As Red Flag became more successful, its importance allowed Suter to acquire more Soviet aircraft and weapons systems, including SAMs from the Foreign Technology Division at Wright-Patterson AFB, Ohio, originally provided by the Israelis.[62]

DUPLICATING COMBAT

The combat veterans who flew Red Flag exercises thought the experience closely duplicated combat, but their impressions beg the question of "how?" Before Red Flag, military theorists had, for several reasons, considered the idea of realistic training impossible.

First, the enemy and location of the "next war" were unknown.[63] Vietnam had been a classic example of this problem as the United States Army, trained for a fast moving armored war in Europe, struggled there.

Second, there seemed to be no way to duplicate the continuing physical and psychological stress and effects of combat, both of casualties and/or other systems damaged or destroyed. For ground forces, this meant men wounded and dying, equipment disabled and/or destroyed, fire, explosions, noise, and disrupted communications. For

naval vessels, it meant all of this plus the loss or intermittent operation of ship's systems. How to resolve combat between small units was also a problem. Often during ground exercises tanks wound up gun barrel to gun barrel with their commanders screaming "you're dead" at each other. [64]

Third was the sheer logistics of having a large-scale realistic training exercise.[65] Large exercises meant moving forces from their areas of responsibility into the exercise location, often far away. Such deployments for the exercise and then redeployments took a great deal of time and resources. These considerations drove planners of large-scale exercises to make them (1) short, to minimize out-of-area time and (2) scripted, to achieve the maximum "training," as measured by the number of events that occurred during the exercise and how well they met the exercise objectives. The result was that there was little, if any, spontaneity or action/reaction, exactly the opposite of combat.

All of these factors combined – lack of knowledge of who the enemy would be and the location of the next war, inability to simulate casualties, and the need to keep the exercises short and scripted for logistical and time constraint reasons – made any large exercise very structured and thus unrealistic, because one of the characteristics of war is its chaos and unpredictability. This all contributed to the idea that realistic training – that is, training that simulated real combat -- was, for practical purposes, impossible.[66]

Red Flag was able to overcome virtually all of these problems. The first part of the first problem –location of the war -- was unimportant. All the places the United States was planning to fight– Korea, Europe, and later the Persian Gulf – had airfields, supplies, hangars, command and control facilities and other basic necessities already in place.

There was little difference in the areas where the Air Force planned to fight and Nellis, except at Nellis the weather was reliably good so training was possible year-round.

The second part of the first problem, the characteristics of the enemy, was easy because during the Cold War the Air Force knew the enemy would be the Soviets or their proxies. Air combat is heavily dependent on technology, and the Air Force knew it would be facing Soviet technology, whether manned by the Soviets in person or by their allies, and that their enemy would be using Soviet tactics because Soviet technology and tactics were inseparable.[67]

The second problem, personnel causalities and battle damage, was much less relevant in air combat than in ground or naval ship combat. In air combat each aircraft is alone, a self-contained unit, linked to others only by radio. A damaged or shot down aircraft simply drops out of formation, perhaps with a radio call. It does not disrupt the flow of the air battle – it is simply gone. This situation is easily duplicated in training, when an aircraft designated as "shot down" is called on the radio and told to leave the fight, a process known as "kill removal." When an aircraft is "kill removed," the rest of the formation adjusts to fill the gap to accommodate the new numbers, just as they would do in combat.

A combination of factors neutralized the third problem, logistics. The Air Force planned to fight in areas that all had the same basic facilities that were in place at Nellis. Because most of the tactical Air Force was based in the United States, deploying quickly to Europe or Asia was part of each unit's war plans, so a deployment to Nellis was realistic and allowed each unit to practice its deployment plans. Once deployed, the units become part of an in-place command and control and supply network, just as they would

in combat. The referees and documenting procedures were also in place, and disputes were resolved after the day's missions. Finally, once at Red Flag, units faced a situation that closely replicated combat. They were away from their homes and families and all they had to do was "plan the missions, fly, fight, and go to the bar." The movement and relocation of forces that was such a difficult task for land forces and surface ships was a plus for Red Flag because it added additional realism.

Red Flag also duplicated combat by placing the crews in an unfamiliar environment. They were flying over a vast range that was new to most of them and had no familiar landmarks. They had new targets every day, so on every mission the crews had the challenge of navigating and maneuvering to avoid defenses to and from the target area, then actually finding the proper target and dropping real bombs. Not only that, but the crews were responsible for scoring their own bomb impacts, as they would have to do in combat. When the crews returned and debriefed, they reported where the bombs hit, then in the mass debriefing at the end of the day their reports were compared to the actual results as shown by video and films.

The realism generated by Red Flag was synergistic. In the air, combat veterans with hundreds of missions against heavy defenses recognized that Red Flag came very close to duplicating the basic nature of combat. Militarily analysts and combat veterans alike have long recognized that combat is a uniquely dynamic situation, men against men, and for each move, there is a countermove. In this sense, it is much like a game, but with magnified consequences because of the finality of the outcome. Aircraft speed increases the dynamism. Modern jet fighters travel at eight to ten miles a minute and can arrive or depart a combat zone in a few seconds, so air combat is an area of what this author calls

"accelerated dynamism." A combat pilot has not only to be concerned with what is going on at the immediate moment, but what will be going on in the next minute or two because the speed of the actions can entirely change the nature of the battle in a moment. Red Flag was able to duplicate the dynamism and uncertainty of combat because the crews never knew what kind of defenses they would encounter, where, or how many. This was to help the aircrews develop what is known in the fighter community as "situational awareness," the ability to keep track of multiple, high-speed events at the same time while still keeping focused on the mission.

Red Flag also brought new levels of realism to air-to-air combat training. When the Aggressors visited TAC wings, their missions were "canned" to get maximum training for all the crews. An Aggressor visit began with one versus one combats, then moved on to two versus two, then four versus four as the visit progressed, all in pre-scheduled air-to-air combat training areas. While these canned missions were useful and the best way to maximize training benefits during a short visit, realism was sacrificed because both sides began with a crucial element of situational awareness -- each knew exactly how many enemy aircraft there were, as well as when and where the engagements would take place.[68]

This was the not the case at Red Flag, where there were unknown numbers of "enemy" aircraft and a large area where engagements could take place. The Blue Force never knew how many Aggressors it would find, or when and where it would be attacked. Sometimes flights would get in and out and never see an Aggressor, while other flights might be attacked both inbound and outbound.[69]

Maximum realism was also built into the ground-attack missions. Every crew had the opportunity to carry a full combat load of real bombs on at least one Red Flag mission, forcing both the aircrews and the ground crews to follow the procedures for arming and safeing weapons on the ground and arming the weapons before delivery. It demonstrated to the aircrews how difficult it was to fly heavy aircraft and how important proper switch positions were.[70] More than one crew hauled two tons of live bombs to the range and delivered them accurately only to get a large cloud of dirt instead of an explosion because they had forgotten to arm the weapons. The video of such mistakes was a source of great amusement of the rest of the crews at the mass debriefing, and served to reinforce the point.[71]

Finally, Red Flag was able to simulate the ubiquitous "the fog of war," where Clausewitz famously noted, "even the simplest tasks become difficult."[72] At Red Flag, the problems that developed from flying large, coordinated strike packages – flights being early or late, being in the wrong place, aircraft aborting, radio and other communications problems – were no different from the problems that arose in combat, because they are endemic to trying to get large numbers of aircraft airborne and in position to execute a plan. The "fog of war" appeared naturally, simply by using large numbers of aircraft.

It is important to note that Red Flag did not offer the crews "by the book" answers for every problem that would arise in combat. In fact, it deliberately tried not to provide specific solutions to specific problems. Red Flag intended to show the aircrews that during a large exercise, as in combat, things would go wrong and the crews needed to have a flexible mindset so they would be mentally prepared for problems.[73]

THE NEW FIGHTER PILOT CULTURE – "REALISTIC FLYING SAFETY"

Red Flag and the Aggressors proved to be extremely popular with the aircrews, and provided a huge psychological benefit. Flying fighters had always been "fun," but now realistic training provided the Type A fighter crews not only with new challenges but also with the feeling that they were doing something worthwhile. Crews looked forward to going to Red Flag to fly low level over a strange range, work in large strike packages with new people in different aircraft against realistic air and ground threats, drop live bombs, and have good, meaningful debriefings. They looked forward to the Aggressor visits as a chance to have their skills tested against the best. This feeling of doing something worthwhile was one of the reasons the crews had come to fly in the Air Force, and all they had to do to keep this type of training was to follow the rules.[74]

With the commitment to realistic training, another cultural change began to take place in the fighter force. The older crews and low-level commanders were combat veterans and knew the training they were getting was exponentially better than any training they had gotten before and was going to help them survive and be effective in the next war. They also knew the quickest way to end this type of training was to have accidents. The Rules of Engagement were as loose as possible, but they had to be enforced, and in the squadrons, the older aircrew became the "guardians of the ROE." They had been through both real combat and "around the flagpole" training, and they were not going to have the realistic training they had prayed for jeopardized by a young officer who would not follow the rules. Another "guardian of the ROE" was the Aggressors. They had credibility not only because of their expertise but also because of their attitude. They

were not flying to win, but to teach, and thus were willing to call any violation of the ROE, even on themselves.[75]

THE IMPACT OF RED FLAG ON THE AIR FORCE

Red Flag was successful beyond anyone's expectations, and was a milestone in the iron majors' push for realistic training. Prior to mid-1973, the average Air Force fighter pilot received virtually no air-to-air combat training, and no air-to-ground combat training except for trips to the local range. Three and a half years later – at the beginning of 1977 – virtually every fighter pilot in the Air Force had flown against the Aggressors in demanding air-to-air combat training, and over 700 aircrews, about half the TAF fighter force, had flown in Red Flag exercises.[76]

Dixon enthusiastically pushed the Air Force to expand Red Flag to provide benefits of realistic training to other commands, including Strategic Air Command and the Military Airlift Command (MAC). Both agreed to participate in Red Flag IV, and for both of these commands the introduction to realistic combat training was a rude one. When SAC's B-52s came to their first Red Flag, SAC headquarters was so concerned that its crews perform well that SAC headquarters planned the entire mission. The B-52s came in at high altitude in the contrail level, so they dragged long lines of thin white clouds behind them. The Aggressors, "laughing so hard they could hardly keep them in the gunsight," "shot down" every one. That afternoon at the mass debrief, to jeers and raucous comments, the B-52 mission commander explained how the crews had to fly the mission in the contrails "because that was the altitude SAC headquarters planned, and we couldn't deviate." The results of the missions went back to SAC headquarters, and from that point on the SAC crews took over their own mission planning.[77]

During that same Red Flag, MAC sent several large C-141 transports to participate, but MAC failed to appreciate that the C-141s were painted "MAC White" on the top of the aircraft for heat dissipation. Even though the C-141s flew at low level they were easily spotted by the Aggressors who, once again, shot down every one.[78] This led MAC to reconsider is color schemes, and later Red Flags found B-52s and C-141s – now painted grey and green – dodging in and out of the mountains at low level to avoid the Aggressors and the other defenses. [79]

There were many lessons learned for the TAF as well. Many Vietnam-era TAF tactics – airborne forward air controllers, reconnaissance missions, and Wild Weasel attacks on SAM sites – were extensively modified as a result of flying Red Flag missions. Each Red Flag sent out "Lessons Learned" briefings throughout the TAF, where the aircrews devoured them.[80] Performance at Red Flag became a unit's measure of merit, and the units scheduled for Red Flag began to focus on it long before their arrival. Dixon made it clear unit commanders bore the responsibility for preparing their units for the demands of Red Flag, especially flying at very low level. [81]

Flying at low level was an acquired skill, like flying air-to-air combat, but TAC lacked a teaching template to instruct the young pilots how to do it. At this point, another "iron major," Major John Jumper, stepped in to provide an innovative way to teach low-level flying and the other combat skills needed for Red Flag. had served in Vietnam during the heaviest fighting of the war and afterwards went to fly F-4s in Europe, where he saw the steady deterioration in flying skills because of "around the flagpole" training. He also actively participated in the informal, undisciplined ways the aircrews tried to keep their flying skills, such as disregarding low-level altitude restrictions and engaging

in large, unbriefed, multinational dissimilar aircraft dogfights over the North Sea.[82] In 1975, Jumper went to the Air Command and Staff College at Maxwell Air Force Base, Alabama, where he wrote his thesis on a way to improve aircrew skills called "Building Block Training." In the paper Jumper outlined in great detail a program where young aircrews began low-level training by flying in formation and doing hard maneuvers and turns at 500 feet, then once they were proficient there dropping down to 300 feet where they would repeat the training, and once proficient there drop down to the Red Flag altitude, 100 feet. Before moving to the lower altitudes, the crews would fly with instructors and their progress documented in their grade book.[83]

Jumper, like Suter and the iron majors in the Pentagon, consulted closely with other fighter crews to make sure his ideas were solid. But Jumper's thesis, another example of "bubble up" innovation, might have languished in the library at Maxwell had Jumper not been sent to Nellis as an instructor in the Weapons School just after he finished Air Command and Staff. When he arrived at Nellis, Jumper found that, because of a reshuffling of bases, the F-4 Fighter Weapons School was canceling its advanced weapons school classes to teach a basic F-4 flying course for crews new to the aircraft. This was a simple task compared to the flying the Weapons School instructors had been doing, and it left the instructors with time on their hands. Their squadron commander, Larry Keith, "encouraged" them to work on new ideas for training as part of Red Flag and Dixon's push for realistic training.[84]

With this encouragement, Jumper's fully formed "building block training" ideas found fertile ground. Jumper took his building block thesis to the quarterly Fighter Weapons School magazine, *USAF Fighter Weapons Review*. It was accepted, and the

entire Winter 1976 and Spring 1977 issues of the *Review* were devoted to new training methods, led by Jumper's "building block" approach. The aircrews generally read the *Fighter Weapons Review* carefully, and the units quickly adopted the new training suggestions. Training standards soared, and soon crews had to fly more missions to qualify for a Red Flag deployment than they had to fly for combat operations over Hanoi.[85]

While Jumper's ideas on building block training were not a pedagogical revolution, they were a significant part of the Air Force's innovation in the mid-1970s, in some sense as important as Red Flag. The iron majors knew it was not enough to say, "We're poorly trained." They had to have venues in which to train – like Red Flag – and they had to learn how to train. Red Flag and the building block approach to training were codependent.

THE IMPACT OF RED FLAG ON THE AMERICAN MILITARY

The Army was watching Red Flag closely, and once the exercise began, it made a huge impression on the service. Dixon invited Army generals to visit, and less than a year after the first Red Flag, Major General Paul Gorman of the Army's Training and Doctrine Command (TRADOC) wrote a glowing evaluation of the exercise and recommended – almost demanded -- that the Army adopt a similar exercise program. Gorman said that the Army has "every reason to hasten to emulate TAC" because Army training was evolving in the same direction as TAC's but was "five years or more behind."[86] On August 9, 1979, the Department of the Army announced the founding of the National Training Center at Fort Irwin, California. The National Training Center was officially activated 16 October 1980, with an Opposing Force (OPFOR) simulating Soviet forces much like the

Aggressors did for the Air Force during Red Flag. The first exercise was held in January 1982.[87]

Ironically, the Navy was the slowest to follow. The service was quite pleased with Top Gun, but because carrier air wings had every type of aircraft and usually launched full strike packages autonomously, the service was slower to move on to large air-to-ground attack exercises. But after a disastrous performance by Navy attack aircraft around Beirut, Lebanon, in May 1984 Navy Secretary John Leman ordered the Navy to establish the Naval Strike Warfare Center at the Naval Air Station at Fallon, Nevada, for studying and training for strike missions. It was quickly christened "Strike University" and worked closely with Top Gun.[88]

The flags continued to unfurl. With encouragement from Dixon and help from the TAC staff, the Canadian military created Maple Flag at Cold Lake, Alberta, Canada, which more closely simulated the German weather than the deserts of Nellis, and TAC established Blue Flag at Hurlburt Field, Florida, to train personnel for the command and control system in the European theater.[89]

There have been few changes in American military history that have been as profound as the ones brought on by Red Flag, and certainly none that took place as quickly in peacetime. In late 1968, realistic combat training was considered impossible and not even attempted. Top Gun and the Aggressors brought some small changes in one specific area, but in 1975, realistic training for most of the American military was still a pipe dream, blocked by seemingly impenetrable structural and cultural impediments. Yet by the late 1970s, the culture of "realistic training" was an established part of American

military philosophy, and every training program or exercise had to meet a simple criterion – combat realism.

DIXON'S OTHER CHANGES

Dixon next focused on improving TAC's combat capability by increasing the combat sortie rate. He was extremely interested in the high sortie rates the Israeli Air Force regularly generated and how they were able to "surge" in the 1973 Middle East War. After consulting with Bennie Peled, Dixon added a new "flag," Black Flag, which exercised the ability of maintenance crews to support two days of flying at the maximum wartime sortie rate. Black Flag was successful, but his conversations with Peled confirmed to Dixon that the TAF needed a more basic change.[90] As discussed earlier, in its beginnings TAC used the concept of squadron maintenance, where personnel assigned to the squadron did most maintenance.[91] When General Sweeney took command of TAC, he introduced the SAC concept of centralized maintenance, where the wing, not the squadrons, did all maintenance. On the surface, this seemed to make sense, because it allowed a single set of specialists and equipment maintain all the aircraft in a wing, rather than each squadron having its own specialists and equipment.

For a variety of subtle but important reasons that Dixon understood, the system was unpopular and unsatisfactory for fighters,. One of the main effects of wing maintenance was psychological. With squadron maintenance, the maintenance crews and the aircrews were in the same small unit and came to know each other, but with wing maintenance, crew chiefs were assigned at random and often changed aircraft, and this bond was broken. Dixon and many others in the TAF felt this "lack of ownership" made the maintenance personnel less invested and thus less interested in their job, and it also cut an

informal bond between the enlisted maintenance personnel and the officer pilots. When IAF commander Peled told Dixon that much of the reason for the high sortie rate generated by the Israeli Air Force during the Yom Kippur war was the intangible bond between aircrews and the maintenance personnel, it simply confirmed something Dixon already believed.[92] It was, like realistic training, focused on the men rather than the machines.

This intangible "touchy-feely" relationship was not the only reason Dixon wanted to bring back squadron maintenance. He knew that, compared to bombers, fighters required relatively little centralized, specialized maintenance and more "quick fix" and turn-around maintenance, so there was relatively little benefit from centralized maintenance. More important, squadron maintenance was of a piece with Red Flag and the other programs Dixon introduced to increase the TAF's readiness to fight a war. Red Flag showed that, under combat conditions, some form of squadron maintenance was necessary to keep the aircraft at the exercise flying, and is was clear that TAC squadrons needed enough specialists and equipment to deploy with the units. In 1976, Dixon began to press the Air Force to allow him to introduce a system called Production Oriented Maintenance Organization (POMO), which was essentially the old system of squadron maintenance.[93] But POMO was "combat culture" thinking that was still not fully absorbed by the Air Force. Unlike Red Flag, which TAC essentially controlled, changing TAC's maintenance concept was difficult because it would mean changes in the entire Air Force maintenance system.

There were seemingly good arguments for keeping the wing maintenance system. Concentrating specialists in one place required fewer people than spreading them around

in the squadrons. Even Dixon admitted that a wing would need almost twice as many specialists to keep them in the squadrons rather than keeping them in centralized maintenance. While Dixon was a powerful voice, he had to convince the other Air Force four-stars to agree to change Air Force manning requirements to give more maintenance people to TAC – not an easy task, because the Air Force was having recruiting problems in the post-draft and post-Vietnam War era. Then, even if the Air Force agreed to the manning, the schools at Air Training Command had to increase the number of maintenance men they were training, a time consuming process. Dixon knew which buttons to push to make this happen because he had been the Air Force Chief of Personnel, but he was fighting other four-star generals who had their own personnel needs and there was only so much Dixon could do. The change was slow and evolutionary, and it was not until after Dixon left TAC that the command fully adopted squadron maintenance.[94]

The reorganization in maintenance and maintenance manning in TAC might seem to be relatively unimportant, but proper maintenance manning was a key to TAC's readiness and combat capability. The changes were gradually implemented, but the temporary shortage of maintenance personnel and equipment were to become major issues as the F-15 began to come into service with its sophisticated systems.[95]

DIXON'S LEGACY

In the end, Dixon – along with Moody Suter -- must go down as what scholar Charles Murray calls "System Builders." System Builders propose ideas that have a profound impact that transcends the immediate and marks a fundamental change in a worldview.[96]

Before Dixon and Suter initiated Red Flag, realistic training was considered impossible. When Dixon left TAC, it was well on its way to being a way of life in the military.

To make sure his TAC programs would continue, Dixon used his knowledge of the personnel system to have more general officer slots allotted to TAC, including two three-star general positions in his subordinate commands, Ninth Air Force and Twelfth Air Force. This was part of an ongoing and ultimately successful attempt by the TAF senior officers to take over the Air Force from the SAC generals. Dixon said later "I could run TAC without either of these numbered Air Forces….but I wanted to train more generals." He continued that in the mid-80s the "Pentagon was run by former colonels that come out of TAC," and one former member of his staff was chief of staff, one vice chief of staff, one assistant vice chief of staff, one the deputy chief of staff for plan and operations (XO), and one the deputy chief of staff for research and development.[97]

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2. C.R "Dick" Anderegg, Col. USAF, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C: Air Force History and Museums Program, 2001), 91.

3. James A. Knight, Lt. Gen. USAF, Oral History Interview, 17 August 1988, K239.0512-1544, AFHRA, 227; author's interview with Col. Joseph D. Salvucci, February 2006.

4. Where precisely Suter got these numbers is not clear. Vickery's e-mail of 21 June 2005 says they came from a Litton study in the Pentagon library, but during this period the author observed in the XOOT offices a copy of the *Feasibility Study to Predict Combat Effectiveness in Selected Roles: Fighter Pilot Effectiveness,* ARDA Contract Study MDA 903, 76 C0169, MDC E1643, (St. Louis Missouri: McDonnell Douglas, 29 April 1977). This extraordinary document is a compilation of a variety of studies, and the information on the connection between increased survivability and the number of missions is discussed in pp. 3-6, *passim*, especially in Section 3, pp. 9-10. The information is also contained in Herbert K. Weiss, "Systems Analysis Problems of Limited War," *Annals of Reliability and Maintainability,* July 1966, 5. In fact, the actual

studies showed the 10 percent rule was for "decisive" missions, missions where combat was so intense someone was shot down.

5. Vickery and Rudd e-mails.

6. Ibid.; Red Flag Briefing slides in author's collection, provided by John Vickery.

7. Suter briefing to US Army Training and Doctrine Command (TRADOC), described in Anne W. Chapman, "The Origins and Development of the National Training Center 1976-1984," TRADOC Historical Monograph Series, (Fort Monroe, Virginia: US Army Training and Doctrine Command [TRADOC], 1997), 7.

8. Alfred Lotka, "The Frequency Distribution of Scientific Productivity," *Journal of the Washington Academy of Sciences,* 16 (1926): 317-323; Feasibility Study, 3-9.

9 "Fighter Pilot Effectiveness," 3-11, 3-12.

10. Merav Halperin and Aharon Lapidot, *G-Suit: Combat Reports From Israel's Air Wars* (London: Time Warner Books UK, 1990), 2.

11. Vickery and Rudd e-mails.

12. Vickery e-mail; Knight, 210.

13. Anderegg, 90-91.

14. John Corder, Lt. Gen. USAF, phone interview by author, 13 April 2005; End of Tour Report, Col. Charles Gabriel, Commander, 432nd TRW, 14 September 1972, 8-9, AFHRA.

15. *History of the Tactical Air Command, Volume One, July–December 1975, Volume One* (Langley Air Force Base, Virginia: Headquarters, Tactical Air Command, March 1976), 105.

16. Vickery e-mail 6 June 2005; Rudd e-mail 13 May 2005.

17. Vickery e-mail, 19 June 2005.

18. Anderegg, 92; Vickery e-mail, 19 June 2005. For Huyser's biography, see http://www.af.mil/bios/bio.asp?bioID=5900 (accessed November 2005)

19. Ferris interview with author March 16-17, 2006, Morris Hills, NJ. "White whiskey" includes vodka, rum, and gin, which is considered to be less hangover inducing than "brown whiskey" such as blended whiskey, bourbon, and scotch.

20. Ibid.

21. Ferris interview; Vickery e-mail; Anderegg, 93.

22. Vickery e-mail; Ferris interview.

23. Ferris Interview; *Tactical Air Command History, Jul-Dec 1975*, 76.

24. Red Flag briefing slides.

25. Ibid.

26. Vickery e-mail, 16 June 2005.

27. Robert Dixon, Gen. USAF, "Addendum to USAF Oral History Interview," K239.0512-1591, 19 October 1999; Leaf to Dixon (underling in original), Appendix A in "Addendum"; also Robert Dixon, Gen. USAF, Oral History Interview, 21 September 1988, K239.0512-1591, AFHRA, 246.

28. Leaf to Dixon.

29. Dixon Oral History, 246-247.

30. William Edwards's letter, Appendix D to Dixon "Addendum"; Leaf letter; *TAC History 1975*, 105; James A. Knight, Lt. Gen. USAF, Oral History Interview, 17 August 1988, K239.0512-1544, AFHRA, 236.

31. *TAC History 1975*, 78.

32. General Larry Welch letter to Dixon, Appendix C, Dixon, "Addendum."

33. Anderegg, 94.

34. Vickery, e-mail.

35. Author's Interview with Col. Joseph D. Salvucci, February 2006.

36. Dixon Addendum Appendix C. For a full list of the messages, *see TAC History, Volume 1, 1975*, 105, footnote 157; p. 106, footnote 159.

37. Corder interview with author. A normal exercise plan runs seventy to eighty pages. For the plan itself, see "Red Flag Implementation Order." TAC Programming Plan Number 20-75, Headquarters Tactical Air Command, Langley Air Force Base, Virginia, 11 November 1975.

38. *TAC History 1975*, 110-113.

39. Ibid., 113; "Bold Eagle-Red Flag," *USAF Fighter Weapons Review*, Spring 1976, 17.

40. "Final Report, Red Flag One," in *Twelfth Air Force History, 1 Jul 1975-31 December 1975, Volume One* (Bergstrom Air Force Base, TX, 1976), 7

41. Ibid., 8-9.

42. Ronald L. Rusing, Major USAF, "Preparing the Fighter Force – Red Flag/Composite Force" (Master's Thesis: US Army Command and General Staff College, 1980), 25.

43. *TAC History, 1975*, 119. For a fuller account, see "Final Report, Red Flag , 29-November-20 Dec 1975," USAF Tactical Fighter Weapons Center, Nellis AFB, NV, 21 January 1976, in *Twelfth Air Force History 1975,* Appendix C.

44. Dixon Oral History, 247.

45. Ibid., 282

46. Ibid., 247-248. James Knight, Lt. Gen. USAF, letter, Appendix E in Dixon, "Addendum."

47. Dixon Oral History, 248.

48. Ibid., 282-285.

49. *History of the Tactical Air Command, Volume One, January-December 1976*, (Langley Air Force Base, VA: TAC Headquarters, March 1977), 95, 99.

50. Ibid., 108.

51. Air Force Safety Center statistics quoted by James A. Colley, Maj. USAF, "Red Flag – Is Realism Worth the Cost?" (Student Thesis: US Army War College, 1987), 57.

52. Dixon, Addendum, Appendix F; Knight 237, *passim.*

53. Colley, 61.

54. Ibid., 59.

55. Knight, 241, 245.

56. Anderegg, 94.

57. Vickery, e-mail 19 June 2005.

58. Dixon, Oral History, 256.

59. Ibid., 249; Vickery e-mail 19 June.

60. John Corder, Lt. Gen., USAF, phone interview by author, 13 April 2005.

61. Knight, 241.

62. *TAC History, 1975*, 108; also Anderegg, 114-115.

63. Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca: Cornell University Press, 1984), 12-13.

64. Author's notes as an observer for Exercise Gallant Eagle, Fort Hood, Texas, March 1975. In subsequent conversations with Army officers, the author learned this was a normal but nevertheless frustrating problem.

65. Vickery e-mail; the problem was also alluded to in Chapman, 4-5, *passim.*

66. Posen, 16; Williamson Murray and Allan R. Millett, eds. *Military Innovation in the Interwar Period* (Cambridge, UK: Cambridge University Press, 1998), 9-11; Robert Cowley and Geoffrey Parker, *The Reader's Companion to Military History* (New York: Houghton Mifflin, 2001), 355-356. This did not mean good, useful training could not take place. It simply did not duplicate combat.

67. The Soviet system for air combat was tightly linked together and thus forced certain tactics. It might have been possible to change the tactics, but Soviet proxies in the Warsaw Pact were forced to use Soviet tactics while the other countries the Soviets supplied their systems to – e.g. the North Vietnamese and Arab states – did not have the expertise to develop new tactics. Williamson Murray, *Air War in the Persian Gulf* (Baltimore, MD: Nautical & Aviation Pub. Co. of America, 1995), 79-80.

68. Colley, 25.

69. This was also good training for the Aggressors, who had much the same problem – they never knew when they would be "bounced" or by how many aircraft. John Voss, "Red Flag: Realism on the Range," *Air Force Magazine*, August 1978, 42.

70. Anderegg, 100.

71.Vickery e-mail, 16 June 2005.

72 A full translation of *On War:* http://www.clausewitz.com/CWZHOME/On_War/ONWARTOC.html (accessed February 2006); the quote is from Book One, Chapter Seven, "Friction in War."

73. Anderegg, 94; Vickery e-mail, 16 June 2005; Everts e-mail 29 July 2005.

74. Anderegg, 100.

75. Joe Lee Burns, Maj. USAF, "Points on the Star," *USAF Fighter Weapons Review*, Winter 1974, 23.

76. It should be noted that, at this point, no crews from the Pacific Air Forces (PACAF) and United States Air Force Europe (USAFE) had deployed to Red Flag; these crews represented about 1/3 of the tactical fighter crews in the Air Force. However, by 1976 the Air Force not only had two squadrons of Aggressors in the U.S. but one full Aggressor squadron in Europe to train USAFE crews and one Aggressor squadron in PACAF to train PACAF crews. Colley, 32.

77. Vickery e-mail, 21 June 2005.

78. *TAC History 1976*, 97, 101.

79. Colley, 89; Vickery e-mail 21 June 2005.

80. Jack LeForge, Col. USAF, e-mail 27 June 2005.

81. Dixon, Oral History, 282; Rusing, 27-28.

82. Anderegg, 32.

83. John J. Jumper, Capt. USAF, "Training Towards Combat Capability," USAF *Fighter Weapons Review*, Winter 1976, 2.

84. Anderegg, 53-54.

85. Knight, 239-240.

86. Paul Gorman, Gen. USA, "Phase I Division Restructuring Study, Volume II, The Heavy Division. Appendix C, Towards a Combined Arms Training Center," (Fort Monroe, VA: TRADOC Headquarters, 9 November 1976), Annex C (full document published 1 March 1977), C-6-7.

87. Chapman, 3-4.

88. Dan Moore, Capt., USN, "A TOPGUN For Air-Ground Ops," *Naval Institute Proceedings*, October 2002, 42.

89. James C. Slife, "Creech Blue: General Bill Creech and the Reformation of the Tactical Air Forces, 1978-1984" (Thesis: School of Advanced Air Power Studies, Maxwell Air Force Base, AL June 2002), 46, *passim.*

90. Dixon Oral History, 223.

91. Edgar Ulsamer, "Streamlining Airpower for Theater Warfare," *Air Force Magazine*, February 1978, 17.

92. Dixon, Oral History, 224.

93. David Anderton, "POMO and POST: Keystones of TAC Readiness," *Air Force Magazine*, January 1979, 46; Dixon Oral History, 229-231.

94. Dixon Oral History, 253, 268; Knight, 218.

95. Anderton, 49-50.

96 Charles Murray, *Human Accomplishment: The Pursuit of Excellence in the Arts and Sciences, 800 B.C. to 1950* (New York: Harper Collins, 2003) 150-153.

97. Dixon Oral History, 258-259.

CHAPTER TEN: WASHINGTON WARS

F100 ENGINE PROBLEMS

Through 1973, while the lightweight fighter competition was in progress, F-15 development was continuing. The airframe and systems were performing well, but the F100 engine had been having difficulties with the 150-hour endurance test that was part of its Military Qualification Test (MQT). Under the milestone program, this would delay the F-15s entry into service, so in April 1973 the director of the System Program Office, General Benjamin Bellis, made the fateful decision to waive the 150-hour endurance part of the MQT testing requirements. Bellis made the decision without telling his Air Force superiors, Secretary of Defense Schlesinger, or Congress, because he felt the F-15 was critical to national defense and needed to go into active service, and thus the urgency to begin production of the F100 engine.[1] This was the beginning of the problems with the F100, caused by both Pratt & Whitney and the Air Force.[2]

The fundamental problem came when, after President Gerald Ford reduced the defense budgets, the Air Force took a calculated gamble and spent its limited funds buying weapons systems rather than spare parts, a decision that was to have far-reaching repercussions.[3] For the F100 engine, this led to a decision not to buy the recommended numbers of spare engines or spare parts, despite warnings from Pratt to the Air Force that the service was ordering too few spare parts.[4] There were also conflicts between Pratt and the Air Force on other issues. The Air Force wanted to improve the F100's performance

and reliability by installing a Digital Electronic Engine Control (DEEC). According to the Air Force, Pratt agreed and also agreed to split the $80 million bill. But after the Air Force obtained the $40 million from a reluctant Congress, when the time came to sign the contract Pratt demurred, and then said that adding the Digital Electronic Engine Control actually would cost $200 million, two and half times what it had proposed originally. The F100 never received the DEEC, and the Air Force felt betrayed.[5]

To make matters worse, in mid-1975 Pratt began to claim that financial problems might force the company to slow production of the F100. The Air Force needed the engines as quickly as possible to put them into the F-15s that were rolling off the production lines at McDonnell-Douglas, and the possibility that Pratt might delay engine deliveries pushed the Air Force in September 1975 to agree to drop the critical "correction of deficiencies" clause in the F100 engine contract. Now Pratt was not only the sole producer of the F100 engines that the Air Force needed for its F-15s and F-16s, but it also had a contract that would make the Air Force, rather than Pratt, pay for the correction of deficiencies in the Pratt-produced engines.[6]

BUDGET BATTLES

In early 1975, the Ford administration proposed a FY1976 budget of $107 billion, despite internal complaints from Defense Secretary James Schlesinger that it was too low (he had proposed a budget of $117B). Schlesinger warned about the erosion of real purchasing power by inflation and said that the low budget would place the United States behind the Soviet Union in defense spending by the late 1970s. Despite the warnings, Congress cut the FY1976 budget by $7.4 billion, though these cuts did include $1.3 billion intended for South Vietnam. Sen. John Culver (D-Iowa) of the Senate Armed

Services Committee spoke for many senators when he said, "we may have gotten to the crossroads where the United States does not have to be first in every area of defense."[7]

This was the high-water mark in congressional attempts to rein in the Pentagon, and after the cuts were announced Schlesinger said publicly that they were "deep, savage, [and] arbitrary," and many in a sharply divided Congress agreed.[8] Democratic Senator Henry M. "Scoop" Jackson and a growing group of bi-partisan hawks saw a more aggressive Soviet attitude marked by increasing military assistance to the Arab confrontation states, brinksmanship, threats of an intervention during and after the 1973 War Arab-Israeli war, and Soviet support for guerillas in Angola, southern Africa and other areas. A special sticking point for Jackson was the Soviet limitation of Jewish immigration.[9]

There was also a confluence of evidence the Soviets were embarking on a large-scale conventional forces buildup. U.S. Air Force Chief of Staff General David Jones noted that not since the expansion of Nazi Germany in the 1930s had there been such a "single minded emphasis on military expansion by a major power."[10] The dovish Senator Culver commissioned the Library of Congress to do an independent analysis of Soviet military capabilities, and the analysis indicated that the Soviets had markedly increased defense spending, and that in 1975 15 percent of Soviet GNP went to their defense budget, 40 percent of that to new weapons. The study concluded, "the quantitative balance of military power had begun to shift to the Soviet Union in 1965 and US qualitative superiority never compensated completely [for the new Soviet weapons] and, in certain respects was slowly slipping away."[11] This and other intelligence information was wind beneath the wings of the hawks, and a later analysis by the *Congressional Quarterly*

concluded that Soviet actions during this period "guaranteed the success of later proposals to increase defense budgets."[12]

For the Air Force, the biggest problem with reduced budgets was their effect on the Airborne Warning and Control (AWACS) program. In the House, Representative Pat Schroeder (D-CO) and other liberal Democrats tried to cut the program completely, citing a GAO report about the system's vulnerability to jamming and enemy fighters. Some in the Senate made a similar proposal to drop the system.[13] Though the attempts were defeated when the GAO backed off its assertions in the face of a more detailed DoD study, Congress only approved funds for four of the six AWACS the administration requested. Additionally, $30 million for AWACS spare parts were cut, as were over $20 million in spares for the TAF, $22 million from the F-15 program, and 10 percent of the O&M funds.[14]

Schlesinger's blunt opposition to cuts in the defense budget was personally costly. His relations with Congress were often strained and he did not enjoy the personal rapport with legislators that Laird had. The strain carried over to President Ford, a former congressman, who viewed Schlesinger as a pedant and did not care for either Schlesinger's style or his constant carping for higher defense budgets when Ford, with the encouragement of Secretary of State Henry Kissinger, wanted to cut the defense budget. Schlesinger's semipublic disagreements within the administration and with Congress over the defense budget, as well as his differences with Kissinger over détente, all contributed to Ford's decision to fire him in November 1975.[15] Ford replaced him with the forty-one year old Donald Rumsfeld, viewed by many as a tough, talented organizer and by others as overly ambitious and unprincipled.[16]

The firing of Schlesinger was seen as a piece with Kissinger's push for détente and, combined with the administration's low defense budgets, set off a political firestorm. Jackson, conservative Republican Ronald Reagan, and other Cold War hawks made stinging, public attacks after the firing on the Nixon/Ford/Kissinger détente and defense policies, and the Schlesinger firing arguably laid the groundwork for Reagan's political rise and the eventual defense buildup in the 1980s when he became president.[17]

THE F-15 AND THE REVOLUTION IN AIR-TO-AIR COMBAT

The establishment of a full-time detachment of F-15s at Red Flag in 1977 quickly showed that the new fighter was more than an improvement, even a great improvement, over previous fighters -- it was a quantum leap. It proved able to dominate any other fighter in the inventory with the power of its two F100 engines, its aerodynamics, and its advanced avionics. The mainstay of the avionics suite was the pulse Doppler "look-down radar, shoot down" radar that could, unlike any previous radar, detect aircraft flying below the F-15 and relay the information clearly to the pilot. In mock combats, the power of the two F100 engines meant that the F-15 could out-climb, out-turn, and out-accelerate any of its adversaries. Additionally, its aerodynamics made it completely controllable at all airspeeds and all flight positions. It was so effective that later in its career an Israeli F-15 was involved in a mid-air collision and had one wing completely torn off, but was still able fly for fifteen minutes and land safely.[18] Interestingly Critic John Boyd, whose energy maneuverability charts had helped sell the F-15 to OSD, tried to hamstring the F-15's performance by limiting it to 51/2 Gs because that was the speed at which his energy maneuverability charts said the F-15 was most efficient. Fortunately, Moody Suter found

out about the idea and passed it to Dixon and the F-15 community, who quickly squashed the proposal.[19]

By 1975, the Israeli Air Force had heard the reports from the USAF and McDonnell-Douglas about the F-15's performance and began to press for the sale of a few F-15s to Israel. General Bennie Peled pushed on Dixon, the IAF pushed on McDonnell-Douglas, and Israeli supporters in Washington pushed on Congress, using the argument that the Syrians had received the reconnaissance version of the high-flying, Mach 2+ MiG-25 "Foxbat," which could fly over Israel unthreatened by IAF F-4s.

The IAF was fortunate because the Air Force had bought twenty pre-production F-15s for testing, but the test program proceeded so smoothly that it became obvious that the number was excessive for the Air Force's needs. With extra aircraft available, the temptation for both Dixon and McDonnell-Douglas to provide the extra F-15s to the Israelis was irresistible. Such a sale would confound the Critics by showing the most combat-ready air force in the world wanted the fighter, it would "score points" with pro-Israeli supporters and members of Congress, and there was also an excellent chance the F-15s would be tested in combat.[20]

Four F-15s from the Air Force/McDonnell-Douglas joint test unit were brought up to production standard and sold to the IAF, and the four planes flew across the Atlantic and arrived in Israel on Friday, 10 December 1976, at Hatzor Air Force base. A huge welcoming committee was on hand, including Prime Minister Yitzak Rabin, the entire cabinet, and members of the ultra-Orthodox religious parties. The F-15s were delayed on route, and by the time they arrived it was so late in the afternoon the members of the religious parties had left to begin the hour-long drive to Jerusalem before the beginning

of Shabbat. The rest of the cabinet and Prime Minister Rabin stayed for the arrival and post arrival ceremonies. When the religious parties learned that the members of the government had violated the Shabbat, they withdrew support from the Rabin government and it fell, and immediately the F-15s were credited by the press with their first "kill."[21]

The IAF received twenty-one more F-15s in 1977 and 1978, but most of the pilots chosen to fly it were young pilots with little experience, to the chagrin of many of the IAF's older aces. Most of these aces flew the Mirage III, a very small, simple, French fighter with virtually no avionics and armed with only cannon and simple heat-seeking missiles. Israeli Air Force pilots universally accepted the idea it was the pilot and his skills, not the aircraft, which made the difference in a dogfight, and these old aces initially looked forward to training dogfights in their Mirages against the F-15s flown by the young "rookies."[22]

But their first engagements with F-15s left the Mirage pilots shaking their heads. One Mirage ace with fourteen kills described his first fight with an F-15 whose pilot was just out of F-15 training school to the author. "The rules were that he could not use his AIM-7s, so the fight began with a head-on pass. I started to turn and he pulled up and came around on me. I saw him make three or four mistakes on the way that I could have easily taken advantage of if he had been in a regular fighter, but there was nothing I could do to counter the F-15. He shot me down within forty seconds. I flew home in my Mirage, both of us feeling very old and out of date."[23]

The IAF F-15s went into action for the first time on 27 July 1979, when four F-15s engaged eight Syrian MiG-21s over Lebanon. The F-15s shot down four of the MiGs,

three with the radar-guided AIM-7Fs fired from beyond visual range, and over the next three years IAF F-15s shot down seven more MiGs without loss, most with AIM-7Fs.[24]

THE TEMPORARY END OF DEFENSE BUDGET CUTS

From FY1973 to FY1976 Congress had been aggressive in cutting military budgets, with the high water mark the $7.4 billion in cuts in FY1976.[25] But even such a staunch liberal as David Broder of the *Washington Post* noted in 1976 that domestic expenditures had risen to 78 percent of government expenditures while defense decreased to 22 percent, and said that "unless new international agreements are reached…domestic program growth will have to slow. The armed services cannot continue to subsidize its expanding cost."[26] The recognition that the defense budget was a legitimate need meant the FY1976 budget marked the end of the slide in defense funding.

Ford was in a difficult position after firing the hawkish Schlesinger, and this made it easier for new Secretary of Defense Donald Rumsfeld when he wanted to increase the FY1977 defense budget. Ford agreed to building real growth into the new defense budget, and the budget asked for $112.7 billion, $14.4 billion more than Congress approved in FY1976 and a real growth of $7.2B. In his FY1977 annual report to Congress, Rumsfeld justified the increase by saying that trends in comparative American-Soviet military strength had not favored the United States for fifteen to twenty years, and that if these trends continued they "would have the effect of injecting a fundamental instability in the world." Rumsfeld supported his claims with two CIA reports using different methods (the "ruble" method and the "dollar" method) to show the Soviets were spending much more on defense than the US. These studies, as well as the previously cited Library of Congress study, showed the Soviets were on the way to gaining

qualitative superiority to go with their existing superiority in numbers.[27] Adding to the pressure on Ford was the presidential candidacy of Ronald Reagan, and on 4 May 1976, after a stunning defeat by Reagan in the Texas Republican presidential primary, Ford asked for a $974 million supplemental to the defense budget for more warships.[28]

Congress approved real growth after inflation of $7 billion in the FY 1977 defense budget, giving preference to "general purpose" nonnuclear forces by allotting them $40.2B. The budget made no cuts in the funds requested for procuring the four major TAF systems -- 108 F-15s, 6 AWACS, 100 A-10s, and 16 F-16s.[29] The bill also approved the entire requested O&M budget and directed the president to include in the FY1978 budget, for the first time, an increase in O&M funds to cover "reasonably foreseeable" inflation in the coming years.[30] Still, some noted that in constant dollars the FY 1977 defense budget was $5 billion less than it had been in FY 1956.[31]

THE CARTER/BROWN YEARS

Numerous polls in 1976 showed high public support for increased defense spending, but this had little impact on the 1976 presidential race because both parties' defense "hawks," the Republicans' Ronald Reagan and the Democrats' "Scoop" Jackson, lost in their party's primaries. [32] Reagan ran a very successful campaign attacking détente, the Strategic Arms Limitation Talks (SALT) with the Soviets, and the federal government in general, but while his campaign was well received Reagan could not overcome the power of incumbency and lost to President Ford, 1,070 votes to 1,187. Jackson was the early Democratic front-runner but skipped the first presidential primary in New Hampshire, won by eventual Democratic nominee Jimmy Carter. Jackson's campaign generated hostility from the party's left and was handicapped by allegations of illegal contributions

by Boeing and other defense contractors, and despite winning several later primaries, Jackson dropped out of the race after losing the crucial Pennsylvania primary to Carter. Carter, in contrast to Jackson, pledged to make annual $5-7 billion cuts in the defense budget, though this call was caveated by claims it would be from "fat."[33]

After Carter became president, he chose the highly qualified Harold Brown as his Secretary of Defense. From 1961 to 1965 Brown had worked under Robert McNamara as Director of Defense Research and Engineering (DDR&E), had served as Secretary of the Air Force from October 1965 to February 1969, and from 1969 and 1977 he had been president of the California Institute of Technology. He was the first scientist to become Secretary of Defense, and this was to influence not only Air Force programs but also national defense policy.

It would have come as no surprise if Carter, as a Naval Academy graduate and former Navy officer, had some sympathy for the military as it struggled with the post-Vietnam era and the all-volunteer force, but he did not. The new president set three general goals for defense policy -- slow down the nuclear arms race, strengthen American conventional forces in Europe while keeping the balance in South Korea and withdrawing American troops from the country at the same time, and restraining the defense budget by cutting manpower and closing bases.[34]

These goals, and the specific programs to implement them, quickly made Carter and Brown unpopular with the military. One of the first problems arose when Carter expanded President Ford's 1974 clemency program for Vietnam War resisters. Ford's program covered convicted draft violators, convicted military deserters and those who were "Absent Without Leave" (AWOL), draft violators who had never been tried, and

veterans with less than honorable discharges for absence offenses. Nevertheless, the program had strict conditions – signing an oath of allegiance and twenty-four months of alternative service, while military deserters automatically received bad conduct discharges. Carter's program was much more lenient. In January 1977, he declared an unconditional amnesty for draft resisters, both accused and those who could face possible prosecution. Later that year, he set up the two-stage pardon process for military "absentees."[35] After the trauma of Vietnam, this did not sit well with the armed forces. One former Air Force general spoke for most of the uniformed military when he said Carter's action seemed "deliberately intended to leave a bad taste in the mouth of those who did go to that war and performed honorably….President Carter welcomed home deserters with what seemed to be more warmth than had ever been shown veterans, welcomed [anti-war protestor] Tom Hayden to the White House, and rewarded [anti-war former Attorney General] Ramsey Clark by making him a special envoy. It was [the beginning of] a sorry era."[36]

The Brown/Carter FY1978 budget further increased the animosity of the military. Ford presented his $123.1 billion FY1978 defense budget to Congress just before leaving office in January 1977, but after Carter's inauguration he and Brown proposed a series of amendments to the proposed budget that had the effect of reducing it by almost $3 billion, mainly by cutting traditional military benefits such as the military commissaries.[37] Though Congress overwhelmingly rejected the Carter/Brown proposals, for the uniformed military, struggling to make the new all-volunteer armed forces successful, the attempt to cut benefits, combined with the very generous amnesty program for those who had refused to serve in Vietnam, were the beginnings of a deep distrust of the Carter

administration.[38] The final defense bill passed by Congress was slightly over $110 billion, and Carter scored a major victory when he was able to eliminate the B-1 bomber program.[39] This was a huge blow to SAC and highlighted how far the command had fallen in the last fifteen years, and was to have serious implications for the TAF as well.

Carter regarded the strengthening of NATO as a key national security objective, and the Air Force's tactical fighter procurement programs, many of which were scheduled to support NATO commitments, were generally untouched. Nevertheless, Congress had to rebuff one administration attempt to slow production of the F-15, because many of the fighters were destined for American forces assigned to NATO.[40] Brown did make a significant formalization of American defense doctrine by officially mandating an "offset strategy" whereby American high-technology weapons would be used to offset Soviet numbers. The "offset strategy" supported TAC's new fighters and included improved command and control, including AWACS, an emphasis on the suppression of enemy air defenses, especially the SAMs that had taken such a heavy toll on the Israeli Air Force in 1973, and more and better precision-guided munitions. One of Brown's most important initiatives was development of "stealth" technology, which offered the promise of producing planes with very low radar profiles better able to elude enemy defenses. The overall "offset strategy" doctrine, while in many ways just the formalization of a policy the United States had been pursuing since World War II, became the doctrinal mainstay of American weapons system acquisition policy for the next five administrations.[41]

In other areas, the TAF was prospering. The new realistic training programs were going well. Three new, modern fighters-- the F-15, F-16, and A-10 -- were coming into the inventory, and at the same time the Air Force appeared to have won several important

bureaucratic battles with the Critics. The service had met Packard's and the Critics' demand for prototyping, not only with the F-16 and A-10, but also with the radar and engine of the F-15. The F-16 and A-10 broadly met the Critics' and their congressional allies' proposals for inexpensive, simple fighters. The bad old days of McNamara, TPP, and the F-111 with their cost overruns and poor performance seemed to be over. Finally, Pierre Sprey had left the Pentagon, and John Boyd and Everest Riccioni had both retired from the Air Force.[42] But below the surface things were changing, and the Carter administration was to prove a trying time for the Air Force.

F100 ENGINE PROBLEMS – STALL/STAGNATIONS

The problems began with the Air Force's most glamorous program, the F-15. By 1977, serious problems had surfaced with the F-15's F100 engines when they began to exhibit a phenomenon called a "stall-stagnation" in simulated air combat. The cause of the "stall/stag," as it was dubbed, was a disturbance in the airflow to the engine, marked by a loud bang, or series of bangs, a sheet of flame shooting out of the engine, and a rapid rise in engine temperature that damaged the turbine blades if it exceeded their temperature limits. The only cure was shutting the engine down and restarting it if it had not overheated, an awkward maneuver in the middle of a dogfight.[43] This was bad enough in the twin-engine F-15, but was clearly unacceptable in the single-engine F-16, which used the same engine. [44] The commonality in engines that had seemed such an advantage had now become a problem.

Additionally, the F100 engines were using up spare parts at an astonishing rate compared to projections. As noted earlier General Benjamin Bellis, the F-15 SPO Director, had waived the 150-hour endurance test, but even when the engine had been

endurance tested for shorter periods the engine had been run to maximum RPM speed and left there. There was no throttle movement because, in a dogfight, experience had shown the engine would be left at full power the entire time. By leaving the engine at a steady power setting, the engine only went through two "cycles" – the move up to full power, then the move back.

But once in service, the F100 engines proved so powerful that the F-15 pilots often had to reduce power for a maneuver, and in a fast moving dogfight, the F-15 pilots were moving the throttles rapidly and often. Tests showed the F-15 pilots were moving their throttles to control their airspeed six times more often than expected, thus creating many more "cycles." Each time the engine cycled, it changed its internal temperature, and the rapid change in temperature weakened parts of the engine, especially the turbine blades. To prevent them from coming apart and destroying the engine, the turbine blades had to be replaced at a certain number of cycles or when the engine overheated. This meant the F100 engines were using spare parts at six times the planned rate. There was no budget for additional spare parts, and as increasing numbers of F-15s and F-16s came into the inventory and thus more engines, the problems with spare parts increased. [45]

By mid-1977, the F100's problems had drastically curtailed F-15 flying, and it dropped from the normal rate of thirteen-fifteen flights a month for a pilot to two-three flights a month. When they did fly, F-15 pilots had to keep looking at their engine gauges instead of paying attention to their mission, so training and proficiency dropped even further. To reduce the stall/stag rate until a fix was found, the engines were "de-tuned" so they would not run at the high heat generated at maximum RPM. While this cut down on the over temperatures that came with stall/stags, it noticeably reduced the performance of

the engines. The loss of performance of their once dominant jet, the reduction in flying time, combined with engine problems when they did fly, sent morale plummeting in the F-15 units.[46]

In the single-engine F-16, the problem was obviously more critical, but the smaller numbers of F-16s allowed the Air Force to give their F100s a mechanical fix. The F-16's F100 was fitted with a "proximate splitter," a forward extension of the internal engine casing that split the incoming air from the compressor fan and passed some of this air into the core, while diverting the rest down the fan duct and into the afterburner. By closing the gap between the front end of the casing and the rear of the fan to just under half an inch, the splitter essentially solved the problem. Engines fitted to the F-16 fleet incorporating the proximate splitter had only 0.15 stagnation stalls per 1000 hours of flying time, much better than the F-15 fleet. The proximate splitter worked equally well in the F-15, but even such a small fix was costly and this feature was not introduced on the F-15 production line because the loss of a single engine was seen as less hazardous in the twin-engine F-15.[47]

THE AIMVAL/ACEVAL CONTROVERSY

While the F-15 was plagued with engine problems, in 1977 there were more serious questions raised about its operational effectiveness, ironically because of a joint Air Force-Navy exercise that would eventually vastly improve both services' air combat capability. While their performance was outstanding, the F-15 and the F-14 had major problems with armament. Their designers had learned a lesson from the early F-4s, which had been handicapped because they only had missile armament, and both the F-15 and F-14 carried a 20mm cannon. However, the missiles the new fighters carried were only

slightly modified variants of Vietnam-era AIM-7s and AIM-9s, and it was clear that to fully utilize their radar and avionics' capabilities these fighters they would need better missiles. With only enough development funds for one type of missile, both services agreed the first priority was a new, short-range, heat-seeking missile, the Advanced Short Range Air-to-Air Missile (ASRAAM), to replace their AIM-9s. To define exactly what characteristics the missile would need the Air Force and Navy commissioned a large-scale exercise study, called Air Intercept Missile Evaluation/Air Combat Evaluation, AIMVAL/ACEVAL.[48]

AIMVAL/ACEVAL took place at Nellis and the test aircraft consisted of a highly instrumented "Blue Force" of F-14s and F-15s against a "Red Force" of Northrop F-5Es flown by the Aggressors. Because the AIMVAL/ACEVAL tests were to look for the best characteristics for short-range missiles, the Rules of Engagement (ROE) forced close-in dogfights. The ROE varied depending on the specific test, but generally they were Vietnam War ROE, which required a visual identification (VID) of the target as hostile before firing. In the real world, the American fighters had ways to identify Communist aircraft beyond visual range, notably the previously mentioned Vietnam-era "Combat Tree," but because Tree was still classified the system was not part of the exercise.[49]

The result of the ROE was that the Blue Force could not use its long-range AIM-7 missiles, thus negating one of the F-15/14s' main advantages. Additionally, Red Force always outnumbered the Blue Force fighters and the Blue Force had no ground radar control, while ground based radar guided the Red Force F-5s (which had no radar) to an attacking position. Thus the Rules of Engagement produced the worst possible case for the Blue Forces – ROE for a Third World conflict, but a large number of enemy aircraft

with excellent radar control, numbers and control that would only be found in a major war in Europe. With the ROE the battles invariably started when the two sides caught sight of each other, and this gave an advantage to the small, hard to see, well flown and more numerous F-5s. The problems with fighting large numbers of small aircraft in close-in, turning dogfights was well known in the Air Force fighter force, and was one of the reasons the service insisted the F-15 have a beyond visual range missile. At the end of the exercise, although fighting outnumbered and with the F-5s having all the advantages, the F-15/F-14 Blue Force had a kill ratio of 2:1. This was satisfactory, and besides it was irrelevant – the purpose of the test was to try to develop characteristics for a new short-range missile. [50]

In terms of developing a new missile, from Air Force's and Navy's point of view the tests were highly successful and crucial to future air-to-air missile programs. The tests showed that a modified AIM-9, the AIM-9L, had a performance close to the proposed (and very expensive) new ASRAAM, and a newer AIM-9, the AIM-9M, would actually be superior to the ASRAAM. This meant the services could accept improved, inexpensive AIM-9s and shift their limited missile development funds from the ASRAAM to a new, radar-guided, medium-range missile to replace the AIM-7. This new missile was designated the Advanced Medium Range Air-to-Air Missile, or AMRAAM.[51]

After the exercise, the AIMVAL/ACEVAL test results and kill ratios were contained in a large body of complex documents that were classified because they showed the capabilities of the various missiles tested, as well as the capabilities the Air Force and Navy considered most important. There was some small concern that the complex data might be misinterpreted, but that was a minor consideration.[52]

This was to prove a mistake. AIMVAL/ACEVAL was a highly successful program for what it was intended to achieve, but proved to have some serious unintended consequences as the "open spaces for communication" and IPN channels that had served the iron majors so well for Red Flag and other programs proved a two-edged sword. In the hard fought air battles, at times the well-trained F-5 Aggressor pilots gave as good as they got. When the Aggressors made their regularly scheduled training visits to TAC fighter bases around the country, the Aggressor pilots recounted their own highly colored versions of AIMVAL/ACEVAL around the bar. The urban legend soon spread that the F-5s had beaten the F-15s in head-to-head air combat.

This story soon arrived in Washington where Colonel Everest Riccioni, retired and working for Northrop, the builder of the F-5, pounced on it. [53]At the same time John Boyd, despite his retirement, had maintained his contempt for the F-15 and multi-role F-16 and continued to cultivate a group of officers he had hired in the Pentagon. Boyd learned of the cheap, simple F-5's "success" in AIMVAL/ACEVAL and saw this as an opportunity to strike back at those who had changed the F-16 into a multi-role fighter. At the same time, Riccioni and Sprey (whom Northrop also had hired as a consultant) saw this as an opportunity to push an advanced version of the F-5, the F-20, on the Air Force.[54] For technical reasons, the F-20 had only a pure air-to-air capability, so it fit perfectly with what the Critics still wanted, a simple, high performance air-to-air fighter.[55] For the next several years Riccioni, aided by Sprey and Boyd, tried to sell the F-20 – which TAC commander Wilbur Creech said had "no utility in big league combat" -- to the Air Force, then to overseas customers, then to the Air Force National Guard and Reserves, without success.[56] The multi-role F-16 offered more capability, and Northrop's

business practices with overseas customers gave the American government pause; when two out of the three of the F-20 prototypes crashed, the program ended.[57] However, the Critics continued to use the "results" of AIMVAL/ACEVAL to hector the F-15 program and Air Force weapons selection in general.

PRATT & WHITNEY VS. THE AIR FORCE

Once Pratt & Whitney established itself as the sole producer of Air Force fighter engines and had a contract that dropped the "correction of deficiencies" for the F100, the company seemed to the Air Force to lose all interest in good-faith efforts to solve the engine's problems. Air Force officers who tried to discuss the F100's problems said they had to meet with Pratt's lawyers before they met with the engineers, and the huge profits Pratt was now making from the engines, while the Air Force was saddled with the F100's problems and cost, soured the atmosphere of the meetings that did take place.[58] The Air Force was furious, but it seemed to have few options.

However, Pratt and Whitney's initial competitor for the F-15 engine, General Electric, was watching these events with interest. GE had modified the F101 engine used in the initial F-15 competition to fit in the Navy's F-14, and Congress had allocated $41 million for the program in FY1977 and FY1978. However, the Navy, for complex F-14 program budget reasons, had decided it would not spend the funds, to GE's chagrin.[59]

In late 1977 Gerhard Neumann, the head of GE's engine group, visited General Dixon at TAC headquarters. Dixon was by now highly frustrated with the F100 and especially Pratt's attitude, so he was more than willing to listen while Neumann explained how a modified F101 would fit in the F-15 and F-16. Dixon, intrigued by the idea, passed the information on to General Alton Slay, commander of Systems

Command, and Dixon also emphasized how much TAC needed an alternative source of F-15/16 engines.[60] Slay, who had an unpleasant experience when an F-15 he was flying had a stall/stag and lost an engine in bad weather, strongly agreed. He remembered the $41 million that Congress had allotted for the Navy F-14 engine and set about trying to get the funds transferred to the Air Force to pay GE for tests of the new F101 in the F-15/F-16. Congress, annoyed that the Navy had not spent the money, concerned about the F100 engine, and unhappy with Pratt & Whitney's attitude, agreed to transfer the funds to the Air Force, which in turn reallocated them to General Electric.[61]

While there was considerable interest in looking to General Electric's F101 as an alternative to the F100, there also were major problems. President Carter had cancelled the F101-powered B-1 bomber program, thus ending the funding for the engines. With no firm orders for the F101 and therefore no production line, investing scarce dollars in an engine that would essentially duplicate the F100, except for the promise of better reliability (the original F101 had been judged better than the F100 in that category) and better service seemed to be a poor investment in a time of limited defense budgets. Pratt & Whitney heard about the GE offer and pushed this valid point to Congress, and the idea seemed like it would be stillborn.[62]

THE FY1979 DEFENSE BUDGET

As Carter's first term continued, he found that he and Brown had to walk a tightrope on defense spending. Congress had shown its traditional willingness to defer to the president on weapons issues so Carter had won victories in canceling the B-1 and a fifth nuclear aircraft carrier, but by 1978 world events eroded and soon washed away Carter's determination to continue cutting the defense budget. The emergence of mid-level threats

in the world in the late 1970s posed a real problem for "bargain basement" American military forces -- McDonald's cashiers had higher wages than plane handlers on the carrier USS *Nimitz* – and Carter found he could not ignore the repeated reports of a Soviet arms buildup and public support for increasing the defense budget.[63] Political realities forced him to provide real annual increases in the defense budget despite rising inflation.

The FY1979 defense budget Brown presented to Congress in early 1978 was a record $126 billion, a 3.5 percent "real" increase, and it also, for the first time in the Carter era, asked for modest increases in pay for lower ranking enlisted personnel. Brown noted to the House Armed Services Committee on 2 February 1978 that there was an "increasingly precarious" balance between NATO and the Warsaw Pact, and that NATO must be prepared to stop a fast moving Soviet attack across Europe. The FY1979 budget, he said, would do that. At the same time, Brown disingenuously insisted the budget would save $5-7 billion as Carter had pledged, because "it was $8.4 billion less than the Ford administration had projected in its budget for 1979." Brown also said future defense budgets would show 3 percent annual increases in real growth because the Soviets had increased their defense budgets by 3-4 percent per year over the previous fifteen to twenty years.[64]

Most of the increases in the FY1979 budget went to American forces dedicated to NATO. The FY1979 budget gave the Air Force the 78 F-15s and 145 F-16s it requested, as well as 3 more AWACS, along with a huge new air refueling tanker, the McDonnell-Douglas KC-10, and money to re-engine existing air refueling tankers. Notably, the bill added $1.4 billion to the $37.3 billion requested for O&M to allow for inflation because

Congress saw prior budgets did not have this protection built in, and the services had to "eat" any O&M inflation increases.[65] Despite the increases, defense hawks noted FY1979 defense spending was 5.1 percent of the GNP, as opposed to 8.1 percent in 1964 just before the Vietnam War.[66]

Carter also proposed increasing the defense budget by about 5 percent a year from FY1981-1985 in real terms, ending his 1976 election pledge to cut the defense budget by $5-7 billion a year. This dismayed many of his supporters, and liberals in the House, led by Pat Schroeder, tried to overturn the House Armed Services Committee's approval of the budget, but were easily repulsed.[67] In the Senate, Critic and liberal Senator Gary Hart took another tack. He argued for, and received, more money for the Navy's McDonnell-Douglas AV-8 Harrier vertical take-off "jump jets" because he saw the Harrier as the backbone what Hart really wanted, a fleet of small, low-cost carriers to replace the Navy's large attack carriers. However, the approval of the Harrier money was simply a way for hawks to add more money to the defense budget, not an acceptance of Hart's ideas about carriers. When Hart tried to cut money for the F-18 intended for the larger carriers, the Senate soundly rejected his proposal.[68]

Carter vetoed the first defense bill sent to him, mainly because it still contained a nuclear carrier as well as other increases above what he had requested. Congress sustained the veto, but in the end, the bill passed substantially unchanged except for the removal of the carrier.[69] A new era in defense spending was in the offing.

1. David M. Kennedy, *The Great Engine War (*Cambridge, MA: Kennedy School of Government, Harvard University, 1985), 21; Robert W. Drewes, *The Air Force and the Great Engine War* (Washington. DC: National Defense University Press, 1987), 39-42.

2. Drewes, 66-67.

3. Hans Driessnack, Gen. USAF, "The Key to Readiness: O&M," *Air Force Magazine,* October 1980, 55.

4. Kennedy, 96.

5. Ibid., 110; also, author's discussion with the F-15 engine SPO officer at US-Israeli F-15 Program Review, April 1978, Tel Aviv, Israel.

6. Drewes, 44-45.

7. Congressional Quarterly, *US Defense Policy: Weapons, Strategy and Commitments, Third Edition* (Washington, DC: GPO, April 1984) 9, 13, with an excellent chart.

8. *Congressional Quarterly Almanac, 93rd Congress, 2d Session, 1974, Volume XXX,* 379.

9. Ibid., 365-366.

10. Quoted in Air Force Association Policy Paper, "Force Modernization and Readiness," *Air Force Magazine,* March 1976, 10.

11. *US Defense Policy: Weapons, Strategy and Commitments, Third Edition,* 13-14.

12. Congressional Quarterly, *US Defense Policy: Weapons, Strategy and Commitments* [First edition, but not numbered as such] (Washington, DC:GPO April 1978), 3-A.

13. *Congressional Quarterly, Volume XXX,* 368.

14. Ibid., 379.

15. Amos A. Jordan and William J. Taylor, *American National Security: Policy And Process* (Baltimore: Johns Hopkins University Press, 1984), 204; Congressional Quarterly *Defense Policy,* April 1978, 18-A.

16. *Congressional Quarterly Almanac, XXX,* 362.

17. Congressional Quarterly, *Defense Policy, April 1984,* 11.

18. Merav Halperin and Aharon Lapidot, *G-Suit: Combat Reports From Israel's Air Wars* (London: Time Warner Books UK, 1990), 136-142.

19. Richard M. "Moody" Suter, Col. USAF, "Corona Ace" interview by Lt. Cols. Gordon Nelson and John Dick, 26 January 1977, AFHRA, 30-31.

20. Ibid., 29.

21. After the government fell, Prime Minister Rabin called for new elections. He seemed to be on his way to an easy victory, but in the course of the campaign, it became known that Rabin's wife Leah had a dollar bank account in the United States, strictly against Israeli law. The scandal this caused, and Leah Rabin's arrogant response, is generally considered the reason Rabin lost the election and brought to power, for the first time, Menachem Begin's Likud party, which until that time had been considered a fringe party. Dan Kurzman, *Yitzak Rabin: Soldier for Peace* (New York: Harper Collins, 1998), 198-202.

22. Most American fighter pilots also accepted the idea. Moody Suter noted in 1972, before the F-15 arrived, "an excellent fighter pilot will beat the pants off a mediocre jock [pilot] in the best air machine you can build him." "Der Baron" (Richard M. "Moody" Suter, Col. USAF), "…anything else is rubbish", Fighter *Weapons Review*, Summer 1972, 33.

23. Author interview with Avraham Salmon, Colonel IAF (ret.), Ramat Ha Sharon, Israel, 17 September 2004.

24. *G-Suit*; also author's notes made while serving as Air Attaché to Israel, January 1977-June 1980.

25. Congressional Quarterly, *Defense Policy*, April 1978, 3-A.

26. David Broder, "How Much is Too Much," *Washington Post*, 19 June 1976, A10, quoted in *Air Force Magazine*, October 1976, 10.

27. *Congressional Quarterly Almanac, 95th Congress, 1st Session, 1977, Volume XXXIII*, 229-231.

28. Ibid., 232.

29.Congressional Quarterly, *Defense Policy, April 1978*, 26-A; 273.

30. *Congressional Quarterly Almanac, Volume XXXIII*, 279.

31. David Jones, Gen. USAF, "FY 1976 Posture Statement," *Supplement to Air Force Policy for Commanders #4-1975 (*1975), 21-42.

32. *US Defense Policy*, 15.

33. Ibid., 5.

34. Charles Witze, "The Budget is Not Stable." *Air Force Magazine*, January 1977, 8-9.

35. Harold Brown, *Thinking About National Security: Defense and Foreign Policy in a Dangerous World* (New York: Westview Press, 1983), 121.

36. T. R. Milton, Gen. USAF, "Lessons of Vietnam," *Air Force Magazine*, March 1983, 106.

37. *Congressional Quarterly Almanac, 95th Congress, 2nd Session, 1978, Volume XXXIV*, 320.

38. Congressional Quarterly, *Defense Policy*, April 1978, 5-6.

39. "Transcript of the President's News Conference," *New York Times*, 1 July 1977, 10.

40. *US Defense Policy, 4*-5.

41. Harold Brown, *Thinking about National Security*, 8, *passim*; William Perry, "Desert Storm and Deterrence," *Foreign Affairs* 70 (Fall 1991): 66.

42. Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown and Company, 2002), 76-78.

43 Art Bergman, Col. USAF, "Stall/Stagnation -- The Pilot Factor," *USAF Fighter Weapons Review*, March 1979, 4-7.

44. Kennedy, 80-81; James Fallows, "Trouble With Air Force's Eagle," *The Atlantic Monthly*, January 1982, 64-65.

45. Dawes, 60-62; Fallows, "Problems," 65;

46. Fallows, "Problems," 52-53.

47. Dawes, 68.

48. Except for the Phoenix, the F-14's armament was similar to the F-15's.

49. Marshall Michel, *Clashes: Air Combat Over North Vietnam 1965-1972* (Annapolis, MD: Naval Institute Press, 1998), Appendix A, 214.

50. Author's interview with Tad Olmstron, Lt. Gen. USAF, Cambridge, MA, October 2005, March 2006.

51. Edward Griffith, Maj. USAF, "Aimval-aceval" [lower case in title], *Fighter Weapons Review Winter* 1976, 7-9. The article is a good, if technical, unclassified description of the exercise.

52. Knight, 231-233.

53. Coram, 104, *passim.*

54. Grant T. Hammond, *The Mind of War: John Boyd and American Security* (Washington, DC: Smithsonian Institution Press, 2001), 105.

55. The F-20, like the F-5, had a low-mounted wing that sat very close to the ground. This meant that large external stores such as bombs and large fuel tanks were difficult or impossible to carry. http://www.wpafb.af.mil/museum/research/fighter/f20-3.jpg (accessed March 2005) has a picture of the F-20 on the ground and shows its low ground clearance.

56. Creech felt political pressure made Secretary of Defense Brown interested in the idea. Creech Oral History, 231.

57. "On A Wing And a Payoff: Northrop faces an F-20 Probe," *Time,* 20 June 1988, 54-55.

58 Drewes, 55, 66-67, *passim.* Pratt later admitted this; see Victoria M. Hayes, "Analysis of the Air Force and the Great Engine War" (Student Thesis: Air Force Institute of Technology. Defense Technical Information Center, Alexandria, VA, 1988), 20.

59. Drewes, 95.

60. Dixon, Oral History, 223-224.

61. Kennedy, 102.

62. U.S. Congress, Senate, Committee on Armed Services. *Department of Defense Authorization for Fiscal Year 1980,* 96th Congress, 1st sess., 2 April 1979, 1227; Drewes, 79.

63. "A plane handler on the nuclear-powered carrier *Nimitz* normally works 16 hours a day or about 100 hours per week… he makes less per hour than a cashier at McDonald's, lives below the poverty level and is eligible for food stamps, and probably has not seen his wife and child for six months." Quote from Melvin R. Laird, "What Price a Good Volunteer Military?" *Across the Board,* 19 June 1980, 7.

64. Congressional Quarterly, *US Defense Policy*, Washington, April 1978, 5-6

65. *Congressional Quarterly Almanac, 95th Congress, 2d Session, 1978, Volume XXXIV,* 178.

66. Congressional Quarterly, *US Defense Policy*, Washington, DC. April 1978, 9, 11.

67. Ibid.,13-A; *Congressional Quarterly Almanac, XXXIV,* 325

68. *Congressional Quarterly Almanac, XXXIV,* 329.

69. Ibid., 343-345.

CHAPTER ELEVEN: CHANGING OF THE GUARD

CREECH TAKES OVER TAC

In 1977, General Bennie Peled stepped down as commander of the Israeli Air Force, replaced by General David Ivry, a quiet, serious officer very different from the emotional and critical Peled. The following year, on 30 April 1978, Peled's friend and fellow traveler General Robert Dixon stepped down as commander of TAC. General Wilbur Creech, a long-time protégé of Air Force Chief of Staff General David Jones, replaced Dixon. Jones was so fond of Creech he allowed him to stay on active duty even after Creech had a serious heart attack, something that normally would have forced even a general to retire.[1]

Dixon seems to have been unhappy with Creech's selection because Dixon and Jones were locked in an ongoing battle about the Red Flag accident rate, and Dixon seemed to feel that Creech's categorical imperative was to lower TAC's accident rate, even at the expense of realistic training. Dixon was afraid Creech would gut Dixon's realistic training initiatives when he got the chance, and one of the results of Dixon's unhappiness was that he refused to participate in the change of command and his own retirement ceremony, which made the turnover, at best, awkward.[2]

Dixon left a bipolar legacy. Professionally Dixon, along with Moody Suter and the iron majors, were the "Systems Builders" responsible for the development of realistic training, certainly one of the most important revolution in military affairs in American

history and on a par with history's most significant peacetime military innovations, such as the development of the concepts of the *blitzkrieg* and carrier warfare between World War I and World War II. Additionally, Dixon protected those who developed the specific ideas that made realistic training a way of life and "train the way you plan to fight" the culture of the Air Force. Dixon fostered the atmosphere that made it possible to bring new ideas about realistic training forward, and he was willing and able to push these ideas through the top leadership and obtain funding. As a result, Red Flag and other realistic training exercises steadily improved because the officers working on the exercises knew that the more realistic they were, the better Dixon would like them. Most important, Dixon took the heat when accident rates began to rise. When Dixon turned over TAC, the realistic training culture revolution was complete, and from that point on any suggestion that realism was less important than flying safety would meet with stiff resistance.[3]

Dixon also supported the standard Air Force way of innovation, new high technology systems. During his tenure, the new weapons systems he supported -- the F-15, F-16, A-10, and AWACS – began to flow into the inventory, as well as the Lockheed F-117 Stealth fighter, the Northrop B-2 bomber, and the entire range of other stealth systems that today play a key role in America's air arsenal. Dixon increased the number of precision-guided munitions (PGMs) and sponsored development of a new generation of such weapons, and when he retired TAC had 30,000 laser bomb guidance kits and was procuring more at the rate of about 10,000 packages a year. [4] In addition, Dixon was no desk bound commander. In 1974, when a question arose about restrictions on head-on gun attacks during Aggressor training because they were "unsafe," Dixon went to Nellis

and flew in the back of an Aggressor T-38 to watch the attacks, then approved them for training.[5]

On the other side, there is no question that Dixon's treatment of his senior subordinates was a major problem. Dixon's method of dealing with people and his rule by fear clearly made him less effective as a leader than his innovative ideas, his willingness to stand up for them, and his other accomplishments warranted. His supporters might argue this was part of his constant pressing for creative solutions and in-depth answers. This seems disingenuous, but it is true different people interpreted Dixon's rants differently. One of Dixon's favorite threats was "if you screw this up I'm going to burn your house down, kill your wife and family, and rape your dog." Moody Suter and other lower ranking officers whom Dixon favored did not take this seriously, saying it was just "Dixon being Dixon."[6] But for higher-ranking officers on the TAC staff and for officers in the field who had little contact with Dixon, the comments had a different impact. The words of other officers who had dealings with Dixon speak volumes. One strong supporter of Dixon noted he was "short tempered and impatient."[7] Another – no supporter – said Dixon was "a rude arrogant human being who left the Tactical Air Command literally on its ass….I am convinced he got all that crap from serving on LeMay's staff at SAC headquarters [from 1958-1962]."[8] Dixon's two *capos* -- Lieutenant General James D. Hughes, the commander of 12th Air Force at Bergstrom Air Force Base, Texas, and Lieutenant General James Hartinger, commonly known as the "Grrrr," commander of 9th Air Force at Shaw Air Force Base, South Carolina, reflected Dixon's style and were generally viewed by TAC officers with the same approbation. Both Hughes and Hartinger left their commands less than a month after Dixon left TAC.[9]

Personally, the difference between Wilbur Creech and Dixon could not have been starker. One officer, a supporter of Dixon because of what he did for TAC, noted, "Creech was totally different… [He] was a gentleman, and I never heard him raise his voice or embarrass anyone in public." Another – a Creech supporter -- said, "Gen. Creech was at all times a polite gentleman." As befitting someone who had led an Air Force acrobatic team, Creech paid a great deal of attention to his personal appearance. He was impeccably groomed, had his hair dyed once a week, and reportedly changed his uniform twice a day.[10]

Creech also had a very strong, highly developed view of how officers should behave. He quit a position in the highly regarded Fighter Weapons School because he could not stomach his immediate commander's emotional immaturity, his inability to hold his temper, and his willingness to break rules to insure the Fighter Weapons School would win the annual Air Force gunnery meet. The result was Creech was transferred and his boss gave an Officer Effectiveness Report (OER) that Creech later said "made me look like I robbed a bank," but the base commander, who knew Creech well, countermanded the OER and Creech's future prospects were unscathed.[11]

Creech viewed the SAC generals who had been controlling the Air Force with a jaundiced eye. He believed that, because of World War II, they had moved rapidly from captains to general officers without having spent much time in the intermediate ranks, and thus had no idea about how to do staff work or to how work with a staff in a peacetime environment. Creech knew one general whose aide kept ten spare sets of eyeglasses to replace the ones he broke throwing them across the room when he was

displeased, and Creech felt that most general officers of that era imitated General Curtis LeMay, the "master intimidator." Creech later said that "the leadership technique of the time was to be an SOB [who] related control of people with their personal loss of control" and, even worse, "the railing and ranting and bombastics included tightening the screws of control; every time there was an accident there were six more regulations." Creech felt that Dixon, while he was one of the most creative, bright, and imaginative four stars the Air Force ever had, was, like LeMay, a master intimidator.[12]

At the same time, Creech had seen what he considered some good examples of leadership. He spoke of one general who, when it was necessary to fire a commander, flew three and a half hours across the country to tell him in person. The general met the commander, told him that he was very sorry but he had to relieve him, and said that if there were anything he could do for the commander or his family he would do it. The general then got on the plane and flew three and a half hours back to his headquarters. There was no doubt in Creech's mind what kind of commander he wanted to be.[13]

Dixon was at least partially correct about the reasons Creech came to TAC. Jones was not happy with TAC's high accident rate or the F-15 maintenance and spare parts problems that were leading to a sharp decrease in the amount of flying time for TAC pilots and aircraft. TAC was also having difficulty in retaining pilots, though less difficulty than the rest of the Air Force, and the decline in flying time was seen as not only lessening the TAF's skills but also as a direct cause of the high number of fighter pilots leaving the Air Force. Creech wanted to make changes, but not to dismantle most of what Dixon had done.[14]

Creech was very much an Air Force "company man." He had been an active participant in the Air Force's attempt to limit Army aviation in 1962, and he had worked for Secretary of Defense McNamara and had been General Sweeney's aide to when Sweeney, as commander of TAC, tried to "SACemcize" the command.[15] Sweeny had chosen Creech to be his aide because Sweeny, as a "bomber general" with no experience in fighters, wanted someone with fighter experience on his staff. Creech later remembered that Sweeny was "heavy handed," but also felt that Sweeny "professionalized TAC."[16]

When General David Jones was commander of United States Air Forces, Europe (USAFE), Creech had been Jones' Director of Operations, and his primary focus was flying safety. Creech's guidance to the USAFE flying units was to teach the Soviet/Warsaw Pact threat, but only academically. One officer who worked for Creech in USAFE remembered, "We wanted to prepare the aircrews but Creech was emphatic that the idea was train but not have accidents. Many of the junior officers felt the accident rate was high because of inferior training but USAFE's focus was "'fly safe,' not train realistically, while Creech was there."[17]

Creech had an exceptionally strong fighter background and was, by all accounts, an outstanding "stick and rudder man." He had been the commander of the Skyblazers aerobatic team and had flown fighter combat tours in Korea and Vietnam, and Creech's time in combat strongly influenced his approach to tactical air power. His flew his Korean combat tour in F-80s, America's first jet fighter and one that was approaching obsolescence by the time of the war. The F-80s' main mission was ground attack, but Creech had vivid memories about being completely outclassed when modern Soviet

MiG-15s attacked his F-80. He also saw how the Chinese and North Koreans moved most of their equipment and supplies at night with little interference because the American air forces had no weapons systems that were effective at night. Fifteen years later, as an F-4 pilot in Vietnam, he saw the same situation when the North Vietnamese were able to move troops and supplies down the Ho Chi Minh trail at night, again with relatively little American interference.[18] While the operational commander of USAFE, Creech became very familiar with the Soviet war plans that included fighting twenty-four hours a day, preferably in bad weather, to counter NATO's tactical air power. These experiences had an obvious impact on Creech's view of tactical air warfare, and he was determined to develop new night-fighting systems and other high-tech weapons to offset the Warsaw Pact's numerical superiority.[19]

Creech was a "ground attack guy" and viewed the pure air-to-air arena with some suspicion. A former Air Force Chief of Staff noted, "Creech was a believer in destroying enemy aircraft on the ground and thus always pushed for multi-role fighters," and it seemed Creech might bring another doctrinal change by dropping the emphasis on air-to-air combat that had brought in the F-15.[20] The problem many – including Dixon – saw with this approach was that it was difficult to kill aircraft on the ground. Air bases were well protected, and the aircraft sheltered in hardened hangers. Many thought it was easier and much cheaper to kill aircraft in the air, and this had been Israeli experience in the 1973 War.[21]

Creech was certainly interested in flying safety – one of his proudest boasts was that while he had commanded the Skyblazers they lost no pilots in accidents while the stateside Air Force aerobatic team, the Thunderbirds, had eleven major accidents and had

five pilots killed during that period.[22] Still, when he took over TAC in mid-1978, Creech seems to have been very conscious that Red Flag and the new culture of realistic training had taken over the Air Force, were popular with the aircrews, and that there were fears he would cut into realistic training in the name of flying safety. Creech knew he had to be careful not to make changes seen as returning to the "bad old days" of "around the flagpole" training.

Still, it seems that Creech's *persona* may have influenced and limited the people to whom he chose to listen. While the dapper Creech was a wing commander in Europe in the early 1970s, the less-than-dapper Moody Suter came over to brief a Weapons School program. Creech did not like the briefing and told Suter so, and it seems Suter did not take the criticism well.[23] One former general officer who knew Creech well said, "I'm not sure Creech would have taken the Red Flag initiative message from Moody [Suter], who was a bushy-tailed activist. I think Creech would have been skeptical of the message because of the messenger…[but Creech] was handed Red Flag along with TAC and he made it go."[24]

As a further impetus to keep realistic training, the Air Force had suddenly begun to have a pilot shortage. In FY 1978, the service had a surplus of over 3,800 pilots, while in FY 1979, it showed a shortfall of over 1,300 pilots, and by the end of calendar year 1978, the Air Force was retaining less that 40 percent of its pilots. [25] This was serious, and since rewarding and meaningful flying time was one of the biggest pilot "satisfiers," Red Flag and other realistic training clearly had to stay.[26] While Creech wanted to cut TAC's accident rate, he also understood he had to approach the reintroduction of flying safety into the calculus of realistic training carefully.

"ROLL BACK"

To alter realistic training in a way that would produce fewer accidents, Creech needed a philosophical "hook," which he provided when he called all his wing commanders to a "Warfighter Conference" at TAC headquarters almost immediately after he took over.[27] At the conference, Creech laid down a new doctrine for the way the TAF would fight a conventional war. General Dixon's doctrine, while understanding the need for defense suppression, emphasized attacking important targets and only attacking SAM sites and their radars as required, but Creech introduced a complete change to this doctrine. At the Warfighter Conference, he told his commanders "from now on we're going to make defense 'roll back' our first order of business."[28] According to the new doctrine, the TAF would focus on the enemy air defense system as its primary target and wreck it, piece by piece. Only then would the TAF begin active attacks against other ground targets. "Roll back" called for attacking the air defense systems closest to the front line at medium altitudes with precision guided munitions, and then moving towards the rear. This seemed to mean a drastic cut in low-level penetration to avoid SAMs, a tactic that Creech called the "low level disease." Creech told his commanders to take this new information back to their wings and "launch a major effort to educate tactical people throughout the Air Force on this major shift and the reasoning that lies behind it."[29]

There was no dissent. While Creech was not a "screamer" or a commander who humiliated his subordinates, he had his own way of dealing with those who did not follow his directives. He simply fired them, and his reputation had preceded him.[30] The message was clear. "Roll back" was the new TAC party line, and the troops had to get on board or get out. There were certainly doubts among the attendees, though wisely they went

unstated and the commanders dutifully took the new party line back to their wings.[31] Creech also sent out the full TAC briefing team to brief the new doctrine to all the fighter pilots in the TAF, including those in Europe and the Pacific, as well as fighter pilots in the Air National Guard and Air Force Reserve.[32]

But no dissent in public did not mean all the commanders in TAC agreed with "roll back." Many disagreed with Creech's new approach, including his predecessor, General Robert Dixon, and many of the iron majors. As the new doctrine circulated through TAC and the TAF, those who disagreed with Creech's doctrine felt it was an open question if Creech was sincere about the military utility of "roll back" or whether he was simply looking for a way to rationalize deemphasizing low-level flying training and thus accidents, since low-level flying was the biggest source of accidents in TAC.[33]

Others disagreed with the basic idea of "roll back." The doctrine seemed to mean that the enemy air defenses, particularly the SAM sites and radars, would be the primary target of the fighter force and that the TAF would only participate in the land battle after suppressing the air defenses. All agreed roll back was the best plan if time permitted, but in case of a surprise attack, roll back seemed to involve attacking the air defenses first instead of attack Soviet ground units, leaving NATO ground forces on their own for a long period until the TAF had reduced the air defenses.[34] By spending time suppressing defenses, some thought Creech's doctrine might allow the Soviets to sweep through and capture the NATO bases while their aircraft were still attacking the air defenses. This seemed to be a serious flaw, and notably the other NATO air forces did not accept roll back as a primary doctrine.[35] Roll back spawned a cartoon by a wag in USAFE

headquarters showing two Russian tankers in a café in Paris post-WWIII with one asking the other, "By the way, who won the air battle?"[36]

TECHNOLOGY OR TRAINING?

Before taking over TAC, Creech had been the Commander of the Air Force Systems Command's Electronic Systems Divisions (ESD) and became enamored with technology. At the first Warfighter Conference, in addition to roll back, Creech announced his commitment to innovation by technology, telling his commanders TAC was going to begin a "a full court press to develop and field systems and munitions that fit our new tactics."[37] While the Critics would say he personified the previously described "Icarus Syndrome" of technology for technology's sake, in fact Creech focused on the mission, though primarily on technological ways to accomplish it.

Creech's main technological focus was on night and all-weather combat. He had seen the Chinese in Korea and the North Vietnamese in SEA move mainly at night, and he knew that in the winter poor weather dominated Germany. Statistics showed that in central Europe there was only an average of about 4.5 hours of good flying weather during the short daylight hours in the winter, while at night and flying under the weather there were 14 hours a 24-hour period.[38] Creech was thus completely committed to all-weather attack systems, but he was not an engineer and did not have a deep understanding of engineering problems. When he had an idea, he would push it by fiat, no matter what the practical difficulties, and this was to cause a number of problems. Many of the new systems Creech championed were plagued with long development times, cost overruns, and reliability problems. This caused Creech and the Air Force a number of problems, not only operationally, but also with the Critics and their

congressional allies, but Creech never wavered in his belief that such systems were absolutely critical to the TAF.[39]

Roll back and the commitment to high technology did not seem to many to be fully consistent with the commitment to low-level flying at Red Flag. The incessant push for more high-tech systems meant TAC had to speak out of both sides of its mouth, saying on the one hand that high technology weapons were necessary, while continuing to emphasize the significance of the training at Red Flag where the TAF crews trained to go in low, preparing for an immediate "come as you are" war. The seeming dichotomy did not seem to bother Creech. He was nothing if not a careful and thoughtful commander, and he realized that to most people "realistic training" meant low-level flying. Even as he pushed for higher technology in TAC's weapons systems, he recognized this perception that realistic training meant low-level flying was part of TAC's "combat culture," and he took pains to point out it was not changing under his regime. In 1980, for example, TAC's deputy commander, Lt. General Robert Mathis, boasted "the number of low-level missions [TAC has] flown below 200 feet has more than tripled in fiscal year 1979 [Creech's first year in command] compared with fiscal year 1978." [40] Creech would explain this by saying such training was necessary for the present but that the Soviets were developing systems to deny the TAF low-level penetration and that low level had its own set of problems, and he continued his push for new, expensive, high-technology systems so the TAF could roll back the defenses from medium altitude.

Creech's attempts to reduce accidents at Red Flag had little effect initially, but Red Flag's accident rate gradually came down to the point where in two out of the last three years of the Creech regime (1982 and 1984) it was even with the overall TAC accident

rate.[41] Creech has claimed credit for this, but credit probably more properly should go to General Dixon's insistence on teaching pilots how to fly low level and the full implementation of such training concepts as Johnny Jumper's "building block approach," which began prior to the Creech reign.[42]

The "Flag" exercise concept was extraordinarily flexible, and Creech introduced improvements in the exercises, including a new emphasis on night attack. Red Flag 78-8 and 79-2 introduced night scenarios; as expected, they did not go well, mainly because most of the fighters lacked terrain following and night delivery systems.[43] This confirmed Creech's belief that the TAF needed new night weapons delivery and navigation systems and that technology was the best type of innovation.[44] Additionally, Creech thought the TAF was sadly lacking in electronic warfare training, so he ordered the development of an electronic warfare exercise, "Green Flag," to integrate electronic warfare into TAC's attack plans. TAC held the first Green Flag exercise in the spring of 1981, and as Creech suspected 72 percent of the sorties were "ineffective" against a sophisticated jamming threat. Creech "got on his soapbox" and ordered better training as well as new electronic warfare systems, both offensive and defensive.[45]

CHANGING THE TAF'S DOCTRINE

Creech had several critical assets in his push to change the TAF's focus from low-level attack to roll back of the air defenses and to develop a high technology, all-weather strike force focused on interdiction. First, Creech was able to take his own ideas and make them the TAF's "doctrine" unilaterally because the Air Force did not have a "doctrine command" like the Army's Training and Doctrine Command (TRADOC),

which developed Army doctrine. Doctrine was important because, as an Air Force historian Irving B. Holley noted

> …doctrine defines the scope and potential capabilities of [Air Force] weapons systems. Doctrine lies behind the decisions of what weapons will be developed and gives guidance to the relative importance of several competing roles. When the time comes to apportion the invariably inadequate supply of dollars, doctrine provides the rationale for favoring one weapon system over another.[46]

Creech had another asset that came into play once he had established his "all-weather, roll back" doctrine. The Air Force had given TAC, and TAC alone, the authority to define the weapons systems requirements for all of the TAF. Representatives of TAC, USAFE, and PACAF had semiannual meetings to certify requirements, but in the end, the decisions about systems were made by TAC – which meant Creech.[47] Thus, as Creech's biographer notes, "Creech had the organizational imperative -- as the TAF spokesman for requirements -- and the personal influence through his relationships with the chiefs of staff and key officers on the Air Staff – to play a significant role in…aircraft, systems, and munitions developments."[48]

Creech's final asset was the Air Force Chiefs of Staff while he commanded TAC. He and General David Jones were close, and when General Jones left to become Chairman of the Joint Chiefs of Staff on 21 June 1978, a few months after Creech took over TAC, General Lew Allen replaced him. Allen was personable but, even though he was a pilot, he had no combat experience, despite having been in the Air Force during World War II, Korea, and Vietnam.[49] He was happy to give Creech free rein and so Creech, during much of his time as commander of TAC, had both an Air Force Chief of Staff and a

Chairman of the Joint Chiefs of Staff who had complete confidence in him and accepted virtually all of his systems acquisitions recommendations.

While Creech unilaterally formed the TAF's doctrine and selected its systems, his ideas were as welcome throughout the TAF as Dixon's realistic training initiatives. This was especially true of the development of a night and all-weather capability. Every aircrew knew how successful the North Vietnamese had been in moving troops and supplies down the Ho Chi Minh trail at night during the Vietnam War, and they also knew the winter weather in Europe was poor, so the idea of developing systems to fight at night and in bad weather made good sense. There was also support for the AMRAAM radar-guided missile, because most fighter pilots knew about the shortcomings and failures of the AIM-7 family, and for "stand off" systems like the Maverick air-to-ground missile.

The new high-tech push proved to be a two-edged sword, because Creech's instincts were not always on the mark and his wants were sometimes excessive. One of the most costly technical overreaches was the Precision Locator Strike System (PLSS), a complex system intended to detect all types of enemy radars with high-flying U-2-type aircraft. The U-2 would pass the information to a central command station, which forwarded the locations on to the strike bases for roll back operations against air defenses. Though Creech called PLSS "absolutely critical," it was highly complex, extremely expensive and in the end unworkable, though parts of it proved successful in other successful programs.[50] There was also the problem of passing over the "good" in favor of "the best," notably in the area of laser bomb designation systems, and this would affect TAF capabilities in the Gulf War.

"DEAR BOSS," AIR FORCE ETHICS, AND VOTING WITH YOUR FEET

In 1978, the percentage of pilots who could leave and did leave the Air Force was varying from 35-40 percent, twice the historical rate.[51] More disturbing was that, for the first time, fighter pilots were getting out in large numbers, even after Creech took over.[52] Creech knew he needed to keep these officers, but he had relatively little control over many of the Air Force policies that were driving them out. Privately Creech also felt that the main reason pilots left the Air Force was the high pay and seemingly light workload of the airlines, and that pilots used Air Force policies as a way to rationalize their decision.[53]

One of the major irritants that led to the increasing departure of Air Force pilots was the "Controlled Officer Effectiveness Report" (OER), which began in August 1973. Because of perceived "inflation" of OERs, the Air Force began a "quota system" by mandating only a certain percentage of officers in a unit could receive the highest numerical blocks – 22 percent could receive the highest "1," the next 28 percent a "2," and the remaining officers had to receive a "3." The changes aimed to make the process of promotion boards easier, and the head of Air Force Personnel decreed, "A better system has been established. It has been three years in the making. It is the approved system; it is a fair system; and it will be an effective system, with the anticipated support."[54]

Unfortunately, the new OER system was not thought through. Despite the fiat, the system had obvious problems and was a disaster from the beginning, especially for pilots. A glaring example of the problem arose in the new F-15 squadrons. The pilots were hand picked by TAC headquarters as the best in the TAF, but despite this selection process

once the pilots arrived in the squadron they found their commanders had to give half of them "3s," a numerical rating that put them in the "lower half" of the Air Force. At the same time, 22 percent of the pilots in less selective squadrons -- pilots not selected for the F-15 -- received a "1," putting them at the top of the Air Force's officer ranks. Many Air Force general officers disagreed with controlled OER – Creech called it "dumb as dirt" -- but it remained for several years and had a pernicious effect on aircrews.[55] After a short period commanders learned how to "game" the controlled OER, but the sight of commanders spending hours trying to determine how to adjust the OER numbers in their squadron instead of simply writing straightforward reports contributed to the pilots' feeling that the Air Force's priorities were misplaced and hastened their departure from the service.[56] Shortly after Creech took over in 1978 the Air Force abandoned the controlled OER system, but the serving officers' records were not expunged and the bad feelings remained.[57]

The problems the TAF had with retention were highlighted by a remarkable letter written in early fall 1978 by one of the iron majors, Ron Keys, a missive that became quickly and universally known as the "Dear Boss" letter. Keys, an instructor at the Fighter Weapons School at Nellis, was told to contribute his views to a report on "why young pilots were leaving the Air Force." Keys had to provide his thoughts the night before he left for a short TDY in Alaska and, pressed for time, he wrote his contribution in the form of a letter that expressed the concerns of his friends who had left and were leaving the service (Keys himself was not planning on leaving). He then turned in the letter and departed on his TDY. The letter contained a litany of issues, including the controlled OER, summed up in the final paragraph:

> I'm resigning because of long hours with little support, entitlements eroded, integrity a mockery, zero visible career progression, and senior commanders totally missing the point (and everyone afraid or forbidden to inform the commander)….the Commander of TAC arrives and is impressed with shoe shines and scarves and clean ashtrays, not what we can do in combat.[58]

After Keys dropped off the letter what happened becomes fuzzy, but it was separated from the rest of the contributions, widely copied, and circulated around the Air Force. The letter appeared in several versions and one appeared in the October 1978 in the influential *Armed Forces Journal,* widely read by defense *cognoscenti*. The *Air Force Times,* a weekly newspaper read almost universally by Air Force personnel, also published a version, and soon reached Creech's desk.[59] Some Air Force generals tried to silence the criticism, but Creech was much wiser.[60] His general philosophy was that he wanted to make TAC better for the people that were going to stay and not worry about the ones that are going to leave, so he resisted the impulse to have Keys "decapitated" and instead called him to TAC headquarters.[61] Creech and Keys spent several hours alone discussing the complaints, and at the end of the meeting Creech promised to talk to other young officers and take action on their concerns. Creech was as good as his word, and brought in a number of young officers to TAC headquarters to discuss these issues and others.[62] Keys returned to Nellis unstigmatized, and Creech's reputation with the iron majors soared. In September 2005, Ron Keys – now General Ron Keys – was appointed the commander of Air Combat Command (ACC), which had been formed by merging SAC and TAC in 1992 -- Creech's old position.

Still, Air Force pilot retention numbers continued to fall, dropping to 26 percent in 1979.[63] Creech continued to believe that the Air Force could not realistically compete for

pilots when the airlines were in a hiring cycle and offering high paying jobs, but he also continued working on issues such as increased flying time that would keep TAC pilots in the service.[64]

READINESS AND FLYING TIME ISSUES

One of Creech's most immediate problems was increasing the amount of time TAC flew, because low flying time was not only a major reason so many young fighter pilots were leaving the Air Force but also, more important, it was cutting into combat readiness.[65] Shortly before Creech took over TAC, the command's fighter Utilization Rate (UTE), the number of sorties and hours tactical fighters flew a month, had steadily declined and reached a historic low in February 1978 of 11.5 sorties/17 hours a month.[66] Only 34 percent of TAC's F-15s were flyable at the end of any given day, and an inspection found the F-15 wing at Langley incapable of deploying to its forward base in Europe, even with three weeks notice.[67]

The problems originated in the Air Force decision in the mid-to-late 1970s to spend its limited procurement budget on new aircraft and buy only the minimum number of spare parts, because spares also came out of the procurement budget. General Jack Chain, the director of Air Force Operations and Readiness, said in 1980, "Our aircraft at the end of the Vietnam War were tired and were facing a new generation of Soviet equipment. We had a choice: we could have either a new airplane or we could have bought spares for our old ones. We couldn't buy both."[68] Additionally, as one general noted, spare parts were simply not "sexy" and lacked a constituency in the acquisition process when the question was "two more F-15s" or "5000 more extra tires and 10,000 more widgets for the radar."[69] While this decision was later lambasted by the Critics and some in Congress,

more objective assessments suggest the Air Force choice to buy systems instead of spares at this time was not an unreasonable one. A 1994 analysis written by the Congressional Budget Office noted that during this period "the underlying problem…was an imbalance between defense resources and national security commitments that made it impossible for DoD to buy both readiness and modernization."[70]

Additionally, the new Air Force systems simply required more spare parts than the older ones. Older systems could be repaired at the base by a specialist, but aircraft like the F-15 had many "line replaceable units" (LRUs) that were removed and replaced when there was a malfunction and the malfunctioning part sent back to a central repair facility. LRUs made maintenance quicker and required fewer specialists, but required many more spare parts.

The fall off in flying time was also due to the lack of Operations and Maintenance (O&M) funds. O&M funds fall under a general category called "Readiness," which is intended to keep the operational military machine running smoothly. Readiness funds pay for fuel, for exercises such as Red Flag, maintenance of equipment, and a myriad of other items that contribute to the day-to-day capability of American military forces. O&M funds are a perennial problem with the military, and the Chairman of the Joint Chiefs of Staff, General David Jones, said repeatedly in the late 1970s that on visits he heard "the wings' most critical needs for improving readiness are more training and exercises….O&M did not produce jobs like new weapons systems, so it was an orphan except for the military [leaders]."[71] For the Air Force, O&M was about 30 percent of budget, and while it grew faster in dollar terms than the defense budget from FY1964 to FY1981, fuel costs and the devaluation of the dollar absorbed much of that increase.

While the Air Force regularly asked for significant increases of O&M funds, Congress equally regularly cut these requests because they often saw O&M funds as "wasteful."[72]

This combination of the Air Force's decision to purchase systems at the expense of spare parts, the problems with the F100 engine, and the decreasing budgets of the Nixon, Ford, and Carter administrations were beginning to bite when Creech took over TAC. While both the funding for spare parts and O&M were out of his area in Washington, Creech had wide latitude to make changes in TAC and he took advantage of Jones' confidence in him to begin a series of measures he could take on his own to improve the situation. Creech finalized Dixon's push for decentralized maintenance, which Creech hoped would not only improve morale and thus retention, but also increase the number of aircraft available to fly. Because he controlled TAC's budget, Creech was able to move some money into the spare parts accounts, and he also made two controversial decisions that he thought would help solve the problems. First, he opened up some of TAC's War Reserve Munitions (WRM) stocks, spare parts held in reserve in case of combat, and used them to provide spare parts for training. Second, he authorized "cannibalizing" of spare parts, that is, taking operable parts from aircraft in scheduled maintenance and using them to replace inoperable parts on aircraft scheduled to fly.[73] In 1978, Creech's first year in command, TAC "cannibalized" F-15 parts over 15,000 times because of lack of spares. The result was an increase of flying time, but cannibalization showed up in a different statistic, known as the "fully mission capable" (FMC) rate. These were the number of aircraft that were ready to fly the next day at end of each flying day, and even though cannibalization allowed more aircraft to fly during the day, at the end of the day the FMC numbers only showed aircraft that had all their parts; cannibalization had no effect on that

number. In 1978, the TAC FMC average for its F-15s was at an all time low of 35 percent, and by 1980, despite some budget increases and Creech's manipulation of the supply situation, the average F-15 FMC rate was still only 56 percent.[74] While this might seem a considerable improvement, it still meant that, at the beginning of a normal day, only a little more than half of TAC's F-15s were flyable. During Creech's tenure, except for his last year, on average he had more aircraft grounded for lack of spare parts than in the last full year of Dixon's tenure, 1977.

Hindering Creech's ability to fix the problems were further difficulties with Pratt & Whitney and the F100 engine. In April 1979, there was a strike in two of Pratt's F100 subcontractors that slowed spare parts production, and by early 1980 the Air Force was almost 100 engines short for its F-15s and F-16s. The situation was so desperate that older F-15s under modification at the McDonnell Douglas plant in St. Louis had their engines removed and installed in new F-15s coming off the production lines so they could fly to their bases.[75]

To try to solve the F100 problems, Congress had been more than willing to give General Slay the Navy's $41 million authorized for the General Electric F101 engine. Congress also approved Slay's plan to launch a low-cost project to test the GE engine in the F-16, as well as permission and funds to prepare a program for an alternative engine competition for all the future F-15s and F-16s. Throughout 1979 Pratt & Whitney and its congressional allies fought to keep funding for these programs at a minimum, but the test program on the GE engine continued.[76]

CARTER'S FY 1980 DEFENSE BUDGET

By late 1978, liberal Democrats were pillorying Carter because he announced that he would allow the defense budget to grow at 3 percent a year, at the expense of domestic welfare programs.[77] Nevertheless, despite liberal opposition, at that point there was no longer talk of cutting defense budgets, just discussion of how large the increase should be. In early 1979 Carter and Brown requested a defense budget of $132 billion for FY1980, and in the end Congress only cut the request by about $1.3 billion. As a further sign of the times, Congress easily passed an authorization for a new nuclear carrier, despite having upheld Carter's veto of such a ship less than a year before. Carter bowed to the inevitable, accepted the carrier, and signed the bill.[78]

Congress also added $2.4 billion more for weapons systems to the DoD request, increasing the number of F-15s to 60, F-16s to 175 and A-10s to 144, as well as 4 KC-10 super tankers. Congress added the aircraft because it thought Brown's plan would "stretch out" the aircraft buy resulting in higher unit costs and perhaps an eventual cut in the number of F-15s. Congress also thought the administration's inflation estimates -- 7.6 percent for FY1980, dropping to about 6 percent over five years -- were unrealistic.[79] Despite the increases, a later report by the *Congressional Quarterly* noted that the defense spending levels required the Air Force to decrease the number of systems it bought, and the process fed on itself because smaller purchases increased the unit costs of weapons, thus further decreasing the number of weapons bought on a given budget.[80]

These procurement gains were somewhat offset when Congress cut $1 billion in O&M funds because many on the House appropriations committee still considered O&M

"pork" to be cut.[81] The cut in O&M funds resulted in reductions in exercises, including the cancellation of some Red Flags, and this low funding, combined with the F100 engine problems, meant most F-15 and F-16 pilots were only getting eight hours of flying a month, a third of the time they needed to stay proficient.[82]

Pressure to increase the defense budget continued to build and added to Senator Jackson's fierce anti-Soviet opposition to the Strategic Arms Limitations Treaty (SALT) II treaty in the Senate. In June 1979, Carter signed a supplemental budget that added $11 billion to the defense budget, including $42 million for additional F100 engine purchases, to placate his pro-defense critics. Nevertheless, the SALT hearings that began in July 1979 were a disaster for the administration as hawkish critics of Carter's defense policy gave example after example of an increasing Soviet weapons buildup.[83]

JAMES FALLOWS JOINS THE CRITICS

While Creech was securing his grip on TAC and pushing for new weapons programs, in Washington John Boyd had retired and was working as an unpaid "advisor" to DoD, still pushing for large numbers of low-tech weapons. He joined Riccioni, now working for Northrop, and Sprey in trying to pressure the Air Force to buy Northrop's simple, relatively inexpensive F-20, and also cultivated a group of journalists to try to sell the Critics' ideas. Boyd made a major breakthrough when, in early 1979, James Fallows, Washington editor of *The Atlantic Monthly*, called on him to discuss increasing defense budgets.[84]

Fallows had impeccable liberal credentials. He had graduated from Harvard in 1970 where he was the president of the *Harvard Crimson*, avoided service in Vietnam and had been an anti-war protestor, then went on to study economics at Oxford University as a

Rhodes Scholar. Fallows became a member of Ralph Nader's group "Nader's Raiders," then began his journalism career as editor of *The Washington Monthly* and the *Texas Monthly.* Fallows was not a New Left or McGovernite liberal but a "neoliberal," a political ideology that was in fashion in the mid-1970s. Neoliberals had a distinctive way of looking at public policy and believed that traditional liberalism had to find new methods to achieve its goals. Neoliberals, in contrast to traditional liberal Democrats, wanted to lower expectations about what government would do and claimed to be "tough-minded" about the need for a strong national defense, while at the same time lowering the defense budget and diverting the funds to social programs. Neoliberals believed that large defense budgets resulted from a national security policy devised by military men and defense analysts whose thinking was out-of-date and inflexible, and the neoliberals wanted to adopt a more sophisticated approach and change, or at least significantly modify, long-accepted tactical and strategic concepts to produce a better strategy. Not surprisingly, these new concepts would result in cheaper weapons and allow cuts in military budgets. The neoliberals cast a wide net, and at various times included Jimmy Carter, Al Gore, Bill Bradley, Richard Gephardt, Les Aspin, former California governor Jerry Brown, and Gary Hart.[85]

Jimmy Carter became the first neoliberal president, and from 1977-1979 Fallows served as Carter's chief speechwriter. Fallows found the position frustrating because Carter was a man who could see both sides of an argument and, as Fallows later lamented, he was "capable of holding two ideas about the same thing in his head at the same time."[86] Fallows was more interested in selling a single, simple idea and less interested in the nuances or other options, but Carter was not willing to do what Fallows

wanted him to do, to articulate his ideas in simplistic, black-and-white terms. This drove Fallows to leave in 1979.[87]

Fallows believed that editorial writers in certain parts of the media, generally those in the orbit of the *New York Times*, were "opinion elites" and played a significant part in the development of public policy by leading and shaping the opinions of their readers, the "political elites." He thus believed that the key to making public policy was stroking the egos of the opinion elite editorial writers and columnists who had the greatest influence on the political elites' perceptions, then presenting these editors and columnists with a simple but seemingly impressive piece of reasoning with an easy-to-grasp theme that provided quotable commentary and good news stories. Fallows wanted "ideas that resonated with the editors of the *New York Times*" and would bring "editorialists to an enthusiastic frenzy." Once one of these simple ideas was accepted, Fallows believed, it would have a ripple effect with other opinion elites, and the editorials would echo and resonate for at least six months.[88]

As a neoliberal Fallows was frustrated by the seemingly mindless increases in Carter's defense budget, and when he left the administration in 1979 he began to research an article on new military weapons for *The Atlantic Monthly*. Fallows wanted to talk to people who would confirm the neoliberal philosophy and say, in simple terms, the defense "experts" were wrong, that America was buying the wrong weapons, and that they were too expensive. Because Fallows believed that the large defense budgets were caused by "experts," he eschewed anyone who was seriously associated with the defense establishment because they would understand, if not agree with, the philosophy behind the weapons the military was procuring. He also knew -- or sensed as a reporter -- that as

Samuel Huntington noted, Americans love "defense iconoclasts and military mavericks."[89] To find them, Fallows later said he "deliberately left the mainstream of defense analysis and moved towards the fringe."[90]

For Fallows to make his argument, he needed individuals who had at least a modicum of credibility, and when he met John Boyd in 1979, Fallows had found his man. Boyd was bitter about not being promoted to general and more than happy to tell Fallows what was wrong with the armed forces.[91] Fallows was entranced by Boyd's glib and charismatic manner, and Boyd introduced Fallows to Pierre Sprey and a new member of the Critics, Franklin "Chuck" Spinney, a non-flying former Air Force officer who was now a civilian analyst in the Office of the Secretary of Defense.[92]

When Fallows appeared on the scene, the Critics were no longer involved with the policy making process in the Pentagon, and had become permanent outside opponents of DoD weapons systems. They were still trying to sell their "cheap and simple" ideas to anyone who would listen, generally using Riccioni's Northrop F-20 to constantly bring up the AIMVAL/ACEVAL exercise and the F-15 problems.

Fallows had hit the mother lode – articulate malcontents and "colorful characters" who shared his worldview of the military, and who also had a "certain kookiness" and the edge Fallows found lacking in the professional military.[93] They were not experts by any conventional measurement, but Fallows decided to anoint them as "experts" and make them into a personally appealing group of iconoclasts to align against the faceless, generic "Air Force," "Pentagon," "defense planners," and "contractors," groups Fallows implied – quite incorrectly – were an enormous monolith with identical points of view.

By this time, John Boyd had his patter about what a genius he was down to perfection. He said he had written a book on philosophy used at the Air Force Academy, as well as a book on physics that was reviewed by unnamed "theoretical physicists, mathematicians, and systems scientists" and was being used at the University of California (there is no evidence that these books ever existed).[94] He also claimed to have participated in designing the F-16, which he certainly did not.[95] While he was head of the Academic Section at the Fighter Weapons School in 1960, Boyd had been assigned to write the tactics manual for the Fighter Weapons School that was adopted by the Air Force, though the tactical formations Boyd put in the manual were poorly designed and cost many lives over North Vietnam before they were finally corrected in the mid-1970s.[96]

Boyd had avoided flying in Vietnam, so to give him combat credibility Fallows said, "Boyd was one of the most successful pilots in the Korean War," despite the fact that Boyd only flew twenty-two missions (a normal tour was 100), never led a flight, never fired his guns despite being in several engagements, and certainly never shot down an enemy aircraft.[97] Fallows took Boyd's assertions of his genius at face value, and to explain why the brilliant Boyd was not promoted to general Fallows echoed Boyd's bitterness -- Boyd "wouldn't play the game" and was too smart and innovative for the military's anachronistic promotion system.

Boyd's complaints meshed nicely into what was to become one of Fallows' central themes, that American military leaders were incompetent and refused to promote innovators. It followed that if the American military leadership was incompetent, then the

expensive programs they supported could be discredited, making way for less expensive programs that would free up money for social programs. Fallows wrote later:

> Most of today's generals and admirals are men who got there because they were procurement wizards, or adept at punching their tickets, or careful not to make waves. Simply on a human level, I was struck by how little "edge" most of the generals seemed to have to their characters, how bland most of them seemed, not only in comparison with the captains and colonels beneath them, but also compared to successful men and women in other fields—politicians, doctors, businessmen, teachers, and writers.[98]

Fallows never seemed to consider that general officers, especially after the Vietnam War experience, might show a journalist a bland face, nor did Fallows check to see most officers became generals were truly "procurement wizards" or "ticket punchers." Had Fallows done some research, he would have learned that every fighter pilot of this post-Vietnam generation promoted to general flew at least one combat tour in SEA, and since Boyd avoided flying a SEA combat tour he simply did not meet a basic requirement for promotion. Additionally, Boyd also spent most of his career in the Pentagon while his contemporaries, besides flying combat tours in Vietnam, were commanding operational flying units.[99]

Fallows' statement was also revealing because it showed that he believed one of the main criterion for an authentic military officer was the need to be "edgy." Why this should be important is unclear – certainly history is full of great military leaders who were not "edgy" (Lee and Grant spring immediately to mind) -- but by setting "edgy" as an important criteria Fallows supported his idea that military leaders were incompetent, and thus their conventional defense thinking had to be wrong. Simply put, Fallows did not view the military leaders as professionals. Had he viewed them as professionals, like

doctors or lawyers, it is inconceivable he would have gone searching for the truth "on the fringes." As a comparison, one might consider the reaction to a writer who wrote a series of articles and a book on how cancer research could be improved by following the advice of non-MD "experts" from fringe groups who supported the use of Laetrile because these "experts" were "edgy," then saying that real oncologists and cancer researchers were not credible because they were not "edgy."

However, Fallows needed other experts besides Boyd. "Chuck" Spinney's analytical background made him easy to designate as an expert, and Spinney brought an extra edge because he was a crusader who was convinced of the "inherent corruption" in the defense procurement process. Spinney gave the Critics' arguments a moral tone, saying that the differing views of new weapons were not honest differences of opinion but a Manichean contest of good vs. evil, of honest men like himself fighting against a cabal of corrupt military officers and contractors who were only interested in profits, not combat capability. Spinney described to Fallows a pattern of "organizational cancer" that led to unrealistic military planning. This approach appealed to Fallows' strong streak of self-righteousness, a characteristic he was to continue to develop to the annoyance of many, including the *Washington Post* newspaper critic who noted that "many in Washington's media establishment regard [Fallows] as sanctimonious."[100]

Spinney used his analytical skills to develop the Critics' arguments into a long briefing he called "Defense Facts of Life: The Plans/Reality Mismatch," also known as the "Spinney Briefing."[101] Fallows praised Spinney's briefing as "extraordinary" and "the most useful document for understanding Tac Air," even though Fallows had admitted he was no judge of the arguments.[102]

Fallows also chose William Lind, one of fellow neoliberal Senator Gary Hart's staff, as an expert. Lind had no military experience but had worked for Senator Robert Taft (R-OH), writing a Defense White Paper in 1976 that suggested a drastic restructuring of national defense with large budget cuts, mainly from reducing the size of the army while building up the navy. When Taft lost his reelection bid in 1976, Lind went to work for Hart and soon joined Boyd, Canby, and Sprey in trying to cut defense budgets by eliminating "gold plated" weapons. Lind had the "certain kookiness" Fallows treasured and could be counted on to say things like, "Clausewitz would not have lasted two weeks at West Point."[103]

Pierre Sprey was difficult to portray as an expert in any military area because he had never served in the military, had no visible expertise in military history, and was now working on environmental water cleaning systems. On the plus side, Sprey was highly colorful, a perfect "character." He had a knack for promoting himself as an "insider's outsider" and was relentlessly self-aggrandizing, claiming to have written the test program for the A-X [by this time the A-10] at the Air Force test center at Edwards Air Force Base, and to have worked on the F-15 with NASA, both untrue.[104] Best of all, he could be counted on to say outrageous things and to make wild accusations, such as, "TAC headquarters [personnel] are none too technically competent and can't define what high performance means…in almost every program they have even been involved in they have some disastrous requirements that were gong to ruin the airplane"; "the Air Force has no clear concept of what a fighter is"; and "the Air Force Systems Command at Wright Patterson is extraordinarily technically incompetent."[105] Sprey had also developed what he claimed were the four "measures for success in air-to-air combat," based on

"historical data." The four measures of success – numbers, maneuverability, firepower, and simplicity -- showed that large numbers of small, simple aircraft would be more effective than a few larger, more sophisticated aircraft.[106] But even Boyd thought Sprey was "weird," so to make Sprey an "expert" Fallows had to fall back on journalistic word games, defining Sprey as an expert because he was "renowned in defense circles for support of simple weapons," implying that "simple was good" was a given, when in fact that was the argument.[107]

Designating these Critics as "experts" allowed Fallows to make seemingly legitimate "appeal to authority" arguments, assuming no one would point out that the experts were not experts and that their arguments were actually *argumentum ad verecundiam*, the fallacy of appealing to the testimony of an authority outside his special field. It also allowed him to use the journalistic technique of "reinforcing experts." Spinney echoed the Sprey line that AIMVAL/ACEVAL showed that "increasing numbers of participants changes the nature of [air] combat and tactics required," while Sprey supported Spinney's claims of the inherent corruption by saying the Air Force bought expensive systems because "the more expensive a program is…the better it is for the Air Force" and that "there is zero incentive anywhere in the Air Force or any other service to ever not produce a gold plated system."[108]

Finally, the "experts" allowed Fallows to absolve himself of the normal journalist's responsibility to check their facts. He later said, "I did not have the expertise to judge whether their arguments were correct, but I was impressed by the freshness and coherence of their arguments and their vision of a once-in-a-generation opportunity to use new resources for the military."[109] Fallows thus admitted he was not searching for truth, at

least not American philosopher William James' conception of the truth: "True ideas are those we can assimilate, validate, corroborate, and verify. False ideas are those we cannot."[110]

Having established his "experts'" credentials, Fallows went on to proclaim, "they really knew, first hand, about the realities of weapons design and weapons contracting and weapons effectiveness in combat. They were not afraid to think innovative thoughts and challenge powers-that-be to get their points across." Thus, Fallows set the measure of merit for the Critics' arguments – "freshness and coherence…innovative thoughts" that "challenge the powers-that-be." Such common journalistic standards as "accurate" and "true" went unmentioned. Fallows went on to say, "I came to respect them and value them more than anyone I have ever met."[111]

Fallows introduced his "experts" in his *Atlantic Monthly* article "Muscle Bound Super Power," published in October 1979, which became one of the seminal arguments for what would become known as the "Defense Reform Movement" (DRM). The article began by asserting that "the United States has become shackled to high technology that may fail when it meets the ultimate test [of combat]." Fallows then considered the arguments of a number of critics of American defense policy who had alternative strategies, including one group that wanted to remove all American forces from Germany and give each German family an antitank weapon to stop a Soviet invasion.[112] On the more serious side, he introduced the experts he created to back up his basic arguments: Boyd, the innovative, unappreciated military genius who was not promoted because he would not "play the game"; Spinney, the "courageous DoD analyst" who showed how corrupt the whole weapons procurement system was; and Sprey, the maverick who

pointed out specifically what was wrong with the weapons America was buying. To make their arguments more compelling, Fallows presented the Critics as courageous lone voices crying in the wilderness, as "public servants" willing to take on the formidable generic entities of "the Pentagon," "the contractors," "the planners," and "the Air Force" in a rigorous, public debate.[113]

Fallows' "reinforcing experts" all agreed America's defense policy was flawed and they agreed on what specifically was wrong and how to fix it. What the US military, specifically the Air Force, needed to do was stop buying expensive, high-tech weapons and instead buy large quantities of inexpensive, easy to maintain, reliable weapons systems to meet the huge number of Soviet weapons arrayed across Europe in the Warsaw Pact. This would be more combat effective and save money at the same time.[114]

Selected parts of the AIMVAL/ACEVAL tests were perfect for the Critics' argument. Since the kill:loss ratio in AIMVAL/ACEVAL was only 2:1 in favor of the F-15s over the F-5 and four F-5s could be bought for one F-15, then the F-15 should be dropped in favor of more F-5s. To explain why the Air Force could not see this obvious truth, Fallows quoted Spinney, who said that the Air Force bought F-15s instead of F-5s because defense planners chose weapons for contractor profits and their own promotions.[115] In fact, most Air Force officers promoted to general were pilots with combat experience, not procurement officers, but such details were ignored in favor of Fallows' simple, easy-to-understand main point -- America was wasting money on defense because the Air Force's new high-tech weapons were too expensive to be bought in adequate numbers and too complex to work in combat. [116]

Interestingly, the Air Force itself gave the Critics several opportunities to express their views. Boyd and Sprey wrote an article about the "simple vs. complex" fighter question in the *Fighter Weapons Review,* though the Air Force followed with an article criticizing the approach in a later issue.[117] Steve Canby, a new Critic who focused on the flaws in US strategy, offered a criticism of Creech's "roll back" strategy in a 1979 article in *Air University Review* where he noted the Europeans, like the Israelis, chose to go low and trained for it, and that he thought that Creech and the TAF were going in the wrong direction:

> The U.S. approach has evolved toward a high technology system, based on real-time command and control, sophisticated defense suppression, and precision-guided munitions. The Europeans, on the other hand, argue that this system is unduly costly, too susceptible to countermeasures (i.e., nonrobust), and that it is based on an incorrect perception of the nature of the ground war. They make the telling point that the medium-altitude window in which the USAF is attempting to fly is in fact closed, and can only be kept open by hyperexpensive and uncertain defense suppression means. European programs, on the other hand, are oriented to the still-open low-altitude window. They have derived different views on command and control, operational methods, ordnance choice, and aircraft design, relying more on organizational technique than on high-cost technology.[118]

Canby disregarded Air Force training for low-level operations at Red Flag, though this might have been an honest misunderstanding brought on by Creech's two-track approach of flying a larger number of Red Flags while pushing publicly for new weapons for his roll back doctrine.

THE CARTER DOCTRINE AND CARTER'S ELECTION YEAR EPIPHANY

Following hard on the heels of Fallows' article was the Iranian hostage crisis in November 1979, which focused the public and the Congress on American military capabilities, or the lack thereof. The Soviet invasion of Afghanistan in December 1979

not only increased the scrutiny of alleged low levels of defense spending but also insured that the Senate would not accept the SALT treaty, forcing Carter to withdraw it from consideration. The invasion also led Carter, in his 1980 State of the Union address, to proclaim the "Carter Doctrine": "Let our position be absolutely clear: any attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America. And such an assault will be repelled by any means necessary, including military force."[119]

Simply put, the Carter Doctrine meant America would fight to preserve the flow of Middle East oil, and was the first presidential public announcement since Vietnam that threatened the commitment of American troops to protect essential United States national interests. In so doing, the Carter Doctrine extended America's military shield to the Persian Gulf region and modified the Nixon Doctrine, which primarily relied on allies in a region to defend themselves and protect American regional interests with United States material aid. To implement the Carter Doctrine, the United States military formed the "Rapid Deployment Joint Task Force" (RDJTF), which in 1983 under Ronald Reagan became the United States Central Command (CENTCOM). [120]

The *Congressional Quarterly* noted that in 1980, "Congressional alarm over the U.S.-Soviet military balance had reached a new level of intensity," and Carter's FY1981 defense budget, presented in the 1980 election year, reinforced this. The budget was $161.8 billion, $34 billion over the amount Congress had approved the previous year, and included pay raises, funds for 30 more F-15s and 180 F-16s, and provision for about $75 million for new avionics to allow the "simple" A-10s to find targets at night. [121] Carter also committed to an annual real growth rate of 5 percent in the defense budget.[122]

Nevertheless, O&M funds continued to be contentious. The Air Force asked for a 5 percent increase in O&M, but the House Appropriations Committee made "efficiency-oriented" O&M cuts, despite strenuous protests by DoD and Air Force officials that such cuts were eroding the readiness of the forces. The committee was not sympathetic and complained that "the Department of Defense often goes to great lengths to leave the implication that any reduction [in O&M funds], no matter how made or applied, will have a direct and reverse impact on readiness."[123]

But while cutting some O&M, the committee increased the number of F-15s from the thirty Carter wanted to forty-two, added $680 million for spare parts and missiles and $100 million to the Air Force's flying budget for F-15s and F-16s. Congress made the additions to the flying budget when it found out that DoD had only planned to have F-15/F-16 pilots fly ten hours a month because of projected engine problems. The committee believed the engine problems would be fixed and increased the budget for flying time to fifteen hours a pilot, considered the minimum needed to maintain flying proficiency. [124]

STEALTH AND CARTER'S CREDIBILITY

During his 1980 presidential campaign against Ronald Reagan, President Carter claimed that he had "reversed the Republican decline" in defense spending, but several events undercut his credibility. In late April 1980, an American hostage rescue operation collapsed at a field inside Iran known as Desert One, and the miserable failure was blamed, correctly or not, on Carter's cuts in the defense budget. [125]

Then, in a Washington news conference on 22 August 1980, Defense Secretary Harold Brown announced the existence of the formerly highly classified Stealth aircraft

program "because there have been several leaks about the stealth program…[so] I believe it is not appropriate or credible for us to deny the existence of such a program."[126] Since Stealth technology was in the highly classified "Black World," Carter's critics pounced on the announcement as an example of how little Carter cared about national security. These critics claimed he announced the program solely to boost his reelection chances by countering assertions he was weak on defense, much as President Lyndon B. Johnson had revealed the existence of the Mach 3 SR-71 reconnaissance spy plane during his presidential campaign against Barry Goldwater.[127] This added to Carter's credibility problem on defense, which increased even further when Carter threatened to veto the defense budget with the increases he had initially supported because the budget had too much defense spending and not enough domestic spending.[128]

CREECH AND THE CARTER DOCTRINE

During his time at TAC, one of Creech's main assets was that he was superb at aligning TAC with the national military strategy and was consistently able to offer the kind of military capabilities the executive branch wanted. He was especially prescient – perhaps lucky – when it came to events in the Persian Gulf. In 1978, long before the Gulf became an area of public concern, Creech asked the TAC staff for a study of long-range, all-weather strike aircraft, called the "Enhanced Tactical Fighter" (ETF).[129] Officially, the ETF was supposed to be a supplement or replacement for the F-111, but the ETF requirement overlapped the capabilities of the Lockheed F-117 Stealth fighter-bomber, which, in 1978, was still in the "Black World." It was so secret that few politicians or Washington bureaucrats knew about its planned role, and the secrecy that surrounded the F-117 program worked to Creech's advantage. Congress is normally quite skeptical when

the armed services ask for a new weapon when they already have a program that will meet the requirement, and had they known about the F-117 the ETF study might have been quickly killed. Instead, the secrecy surrounding the F-117 allowed Creech to proceed with the study.[130]

The initial ETF study recommended the purchase of more F-111Fs. While the early history of the F-111 had been disaster after disaster, the Air Force had continued to pour money into fixes, and the latest version, the F-111F, was an excellent aircraft. But the F-111F was not the answer that Creech wanted. He wanted a multi-role fighter-bomber that could conduct a strike mission alone by fighting its way in and out of the target area if necessary, without the need for fighter escort, electronic jamming aircraft, or AWACS support – in other words, a ground attack version of the F-15.[131] The pure air-to-air "not a pound for air-to-ground" F-15 was already in the inventory when Creech took over TAC, but Creech knew the F-15 had a great deal of room for growth (15 cubic feet of empty space vs. F-16's two cubic feet) and early in the F-15 development program the aircraft had displayed considerable air-to-ground capability.[132]

The F-111F, while a capable air-to-ground aircraft, was helpless in air-to-air combat, so the name of the TAC study was changed from the Enhanced Tactical Fighter (ETF) to the "Dual Role Fighter" (DRF), a word change that eliminated the F-111F from the competition. [133] TAC had no money for a full development program to look at the F-15 as a ground attack aircraft, so Creech approached George Graff, the president of McDonnell Douglas , and "solicited an unsolicited proposal" for an improved F-15. Graff was more than willing to help because McDonnell Douglas was concerned about the F-15 production line ending and about competition from the F-16. For some time Graff had

been pushing a two-seat F-15 with extremely long range provided by large conformal fuel tanks call Fuel and Sensor Tactical Packages, or "FAST Packs," fitted under the wing at the fuselage join. The aircraft would carry an extensive array of sensors to give it all-weather capability and the ability to guide "smart" bombs. At the same time, it would have most of the regular F-15's air-to air capability.[134]

With encouraging words from Creech, McDonnell Douglas and Hughes Aircraft collaborated in a privately funded study of the feasibility of adapting the basic F-15 to the air-to-ground role. McDonnell Douglas took a two-seat F-15B, added a Hughes synthetic aperture radar for high-resolution ground mapping, and configured the back seat for a Weapons System Officer (WSO) to operate the radar and a suite of sophisticated navigation and weapons delivery systems. The aircraft was equipped with extra weapons pylons on the bottom of each of the FAST packs, giving it a total of 15 air-to-ground weapons' pylons. Named the "Strike Eagle," the aircraft also carried a large, external laser bomb designator pod called "Pave Tack," the first laser designation system that provided the capability for autonomous delivery of laser-guided bombs at night.[135] The Strike Eagle functioned well in tests and, best of all, to this point the program cost TAC nothing.[136]

After seeing the results, Creech, in his role as the Air Force's tactical weapons requirements officer, had the DRF included in the Air Force's FY 1980 defense budget. To show the Air Force was trying to contain costs, Creech told Congress TAC would also consider a conversion of the F-16 to meet the DRF requirement, but under no circumstances would the Air Force try to develop an entirely new aircraft.[137] Thus, when Carter announced the formation of the Rapid Deployment Joint Task Force, Creech

already had a very long-range strike aircraft under development that would be perfect for the long distances in the Gulf region.

MORE HIGH-TECH SYSTEMS

Creech also continued to push for even more advanced systems to give the TAF an all-weather capability. While the large Pave Tack pod was a perfectly serviceable system for all-weather weapons targeting for F-4s, F-111s and F-15Es, Creech had visions of a large force of all-weather attack F-16s, and this meant a much smaller system that could fit on the F-16. Creech enthusiastically supported the development of a system called Low Altitude Navigation and Targeting, Infrared, Night (LANTIRN), which consists of two integrated pods, a navigation pod and a targeting pod, mounted externally but small enough to fit on the F-16.[138] The navigation pod contained a terrain-following radar that made automatic inputs to the aircraft's autopilot to allow the aircraft to maintain a preselected altitude above the terrain and avoid obstacles while flying low level in darkness and bad weather, as well as a wide-field infrared system for the pilot for visual navigation. The second, separate targeting pod contained an infrared sensor and a laser designator/rangefinder for delivery of laser-guided munitions, with automatic target tracking to allow a fighter to attack targets with precision-guided weapons on a single pass.[139]

By way of explanation, laser guided bombs (LGBs) are simply conventional bombs with a laser guidance head and small, moveable guidance fins added. LGBs can be carried and dropped from any aircraft with a bomb rack, but they have to be guided by a laser designator system that is often not carried on aircraft dropping the LGB. When Creech took over TAC, the TAF already had two laser designator pods in service, the

Vietnam-era Pave Spike and the large, all-weather Pave Tack. The Pave Spike (AVN/AQ-23) was a small system, weighing a little over 450 pounds and about 6 feet long, and could fit into the F-4's forward missile well, but was only usable in day and good weather. The Pave Tack (AVQ-26) was a follow on system, much larger – about 15 feet long and weighing over 1300 pounds -- that used imaging infrared (IIR) sensors for target acquisition and weapons delivery. It had a night and limited bad weather capability. The size of the Pave Tack meant only large fighters like the F-4, the F-15E, and F-111 could use it, the F-4 and F-15E carrying it on below the belly on the centerline station, while the F-111 carried it in the bomb bay. The Pave Tack, while effective, was unpopular with F-4 crews because of its drag, and was nicknamed "Pave Drag." Underappreciated at the time was another important capability of Pave Tack, the ability to videotape the results of the bomb impacts with a video camera slaved to the sight. While intended for use as a bomb damage assessment tool, it was to assume great importance in Air Force public relations.

But Creech wanted a system that would work for both the F-15E and the F-16; while Pave Tack fit well on the F-15E, the drag it generated would dramatically reduce the Strike Eagle's range and it was much too large for the F-16. While all involved with the program conceded LANTIRN's capabilities, they also agreed it was complex and would take a long period to develop. Nevertheless, as TAC commander Creech was able to make LANTIRN a priority.[140] Production of the Pave Tac pods was ended after about 150 were made, much fewer that originally intended, and the DRF, instead of having the Pave Tack system installed, would have to wait for LANTIRN.

Creech also continued to designate the "fire and forget" radar-guided AMRAAM a TAC top priority. The AMRAAM would replace the earlier beam-riding AIM-7, whose firing aircraft could only guide the missile to one target at a time, and also required the firing aircraft keep its radar beam on the target and follow the missile, a huge tactical disadvantage,. The AMRAAM was free of these limitations and it was possible to fire six AMRAAMS from one aircraft at six different targets at ranges three times greater than the AIM-7, and then break away from the targets after firing because the missile's guidance system was internal, a system known as "fire and forget." Creech did not believe that any aircraft was capable of modern air combat without a radar missile, so he insisted that the AMRAAM be small enough and light enough for the F-16.[141] The challenge of making AMRAAM and LANTIRN small enough to fit on an F-16 was a daunting one which, combined with the systems' general high technology, meant both systems shared many of the same cost overruns and delayed development problems. From 1981 to 1985, the projected cost of the LANTIRN program doubled, and the AMRAAM was even worse. [142] The missile was 11 feet long, 7 inches in diameter and weighed about 335 pounds, but it carried what were essentially miniaturized versions of the AIM-54 Phoenix missile electronics, a missile that was 13 feet long, 15 inches in diameter and weighed over 1000 pounds.[143] The result was the AMRAAM took longer to develop – ten years – than the F-15 or F-16, and its unit cost soared from $110,000 in 1978 to $900,000 in 1989 before an Air Force cost-cutting program lowered the cost to $400,000 in 1993.[144]

Another system Creech promoted because it offered great all-weather capability was the Imaging Infra-Red (IIR) Maverick missile, intended mainly for the A-10. The

Maverick was relatively small (about 500 pounds), internally guided "fire and forget" antitank weapon with a range of about twelve miles – well outside of range of enemy defenses – and could be used by the A-10, with a few modifications, in all weather conditions. The IRR seeker head located the thermal image of a target, and then projected it onto a television-like picture on a cockpit display, after which the pilot locked on to the selected target and fired. [145] Like LANTIRN and AMRAAM, IIR Maverick was plagued with problems, especially in the high-tech seeker head. These problems, its relatively high cost, and the idea of a high-tech, all-weather weapon mounted on the simple A-10 made the Critics apoplectic.[146]

FALLOWS' MAY 1980 ARTICLE

In May 1980, in his own stroke of prescience, Fallows wrote another article in *The Atlantic Monthly* titled "America's High Tech Weaponry." The article lambasted the high-tech weapons that Creech was pushing and quoted Sprey at length, as well as mentioning Spinney's "extraordinary Plans and Reality Mismatch" briefing.[147] A few months the assertions in the article appeared to be confirmed when the Air Force's premier F-15 unit, the First Tactical Fighter Wing, failed what should have been a routine Operational Readiness Inspection (ORI). This was especially embarrassing because the First Wing was collocated at Langley AFB with TAC headquarters and considered the best wing in the command. Creech quickly fired the wing commander, but the damage had been done. The media gave the failure a great deal of attention and wrote a number of scathing (but accurate) stories about the situation. Both ABC and CBS had prime-time programs on the failure; CBS called the F-15 a "turkey," and ABC called the F-15 a "dinosaur." [148]

The First Wing's failure highlighted the problem with lack of spare parts. Increases in the defense budget in the later years of the Carter administration had helped, but most of the improvements came from an elaborate "shell game" Creech used to keep aircraft flying by moving spare parts and using wartime supplies.[149] But this was not a negative point. Creech realized that TAC needed to continue its program of realistic flying training, and used his full tool kit of management options to keep TAC's aircraft flying. While Creech was later to claim credit for the improvement in flying time and sortie rates and that the improvement in TAC "came well before the Reagan build-up dollars kicked in," the failure of the First Wing shows that was not the case – the shortage of spare parts was still the issue.

With Fallows' article, the continuing problems with the F100 engine, and the unfavorable publicity from the First Wing's failed ORI, Creech realized that the Critics' arguments were beginning to gain traction. He understood that he had to publicly demonstrate that the cause of the problems with TAC's advanced aircraft was a lack of spare parts, not the aircraft themselves. This author believes that Creech, ever the "company man," understood that the failures were adding to President Carter's credibility problems on defense, and he took action to keep TAC aligned with, and supportive of, national defense policy. In mid-1980, Creech gave the Carter administration a much needed boost with an impressive demonstration of TAC's combat capability, as well as a demonstration what he saw as the real problem, lack of spare parts. Creech knew the nuances of TAC's supply system and so he sent a squadron of the much-maligned F-111Fs to their wartime base in England with a full complement of supplies taken from War Reserve Supply Kits (WRSK). In England, under combat conditions, the F-111s

flew twice their wartime scheduled sortie rates and had a 150 percent increase in their fully mission capable (FMC) rates, that is, the number of aircraft that were ready to fly the next day's missions after a day's flying. A few months later, in the fall of 1980 and just before the election, in an exercise called "Combat Eagle" Creech sent a squadron of F-15s from its home base at Eglin AFB, Florida, to its wartime base at Bremgarten AFB, Germany, this time with its normal (but full) complement of supplies. There all the F-15s flew three sorties a day, twice their wartime sortie rates, and had a higher "mission capable" (MC) rate at the end of the day than at their home base in the United States.[150] The message Creech was sending was clear. The Air Force's high-tech systems worked fine if they had enough parts, but that required more money.

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2. Jack Van Loan, Col. USAF, e-mail to author, 19 June 2005.

3. John Corder, Lt. Gen, USAF, phone interviews with author, 23 March, 28 March, 10 April, 13 April 2005; C.R "Dick" Anderegg, Col. USAF, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C: Air Force History and Museums Program, 2001). 76-78, *passim.*

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6. Richard M. "Moody" Suter, Col. USAF, "Corona Ace" interview by Lt. Cols. Gordon Nelson and John Dick, 26 January 1977, AFHRA, 56; Jack Van Loan e-mail 13 May, 15 May 2005.

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10. Tom Clancy and General Chuck Horner, USAF, *Every Man a Tiger: The Story of the Gulf Air War* (New York: Penguin Putnam, 1999), 137.

11. Wilbur Creech, Gen. USAF, Oral History Interview by Hugh Ahmann, 19 June 92, K239.0512, AFHRA, 56-58.

12. Ibid., 94-98.

13. Ibid., 98-101, 255.

14. Ibid., 76.

15. For a brief but relatively complete account of this attempt to build up Army aviation, see J. Kristopher Keener, *The Helicopter Innovation in the United States Army* (Cambridge, MA: MIT Security Studies Working Paper, 2001).

16. Creech Oral History, 71.

17. John Vickery, Col. USAF, e-mail, 19 June 2005.

18. Creech, Oral History, 30-31, *passim.*

19. Ibid., 157.

20. Jones quoted in Slife, 36; Creech also makes it clear in correspondence that he was more interested in air-to-ground than air-to-air. Creech e-mail, March 18, 2000, provided to author by Keith Ferris; Creech e-mail to Jack Van Loan "Boyd and Fallows," 13 March 2003, forwarded to author by Jack Van Loan July 21, 2005.

21. Dixon Oral History, 281.

22. Creech Oral History, 46.

23. Michael Mosley, Gen. USAF (current Air Force Chief of Staff), e-mail to William "Snake" Clark, Lt. Col. USAF, passed to author 4 June 2006.

24. Bradley Hosmer, Lt. Gen. USAF, e-mail to author 28 Jun 2005.

25. Robert B. Fisk, Major USAF, "Air Force Pilot Retention – 1988" (Research Study 88-0915: Air Command and Staff College, Air University, Maxwell AFB, AL, 1988), 2.

26. John D. Rhodes, Lt. Col. USAF, "Pilot Retention: An Historical Analysis," (Research Report: Air War College, Air University, Maxwell AFB. AL, 1986), 6, 13.

27. Creech, Oral History, 224-227.

28. Ibid., 26-27.

29. Creech, Oral History, 226.

30. Bradley Hosmer, Lt. Gen. USAF, e-mail to author, 7 July 2005.

31. General Larry Welch, USAF, quoted in Slife, 47.

32. Creech, Oral History, 227.

33. Suter, Oral History 86; Vickery e-mail to author, 22 June 2005; Everts e-mail to author, 5 Feb 2005.

34. Dixon, Oral History, 299-301.

35. Rudolf "Rudi" Peksens, Brig. Gen. USAF, interview with the author September 2005, Boston MA.

36. Cartoon in author's collection.

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38. Wilbur Creech, Gen. USAF, Address to the Air Force Association, Los Angeles, CA, 13 November 1981, typed transcript in Creech Papers, 168.7339-754, AFHRA.

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41. James A. Colley, Maj. USAF, "Red Flag – Is Realism Worth the Cost?" (Student Thesis: US Army War College, Carlisle Barracks, PA, 1987), 59.

42. *Tactical Air Command History, Jan-Dec 1981, Volume One* (Langley AFB, VA: TAC Headquarters, March 1982), 28-30.

43. *History of the Tactical Air Command, Jan-Dec 1978, Volume One* (Langley AFB, VA: TAC Headquarters, March 1979), 237-238; Creech, Oral History, 32-33, *passim*.

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45. Ibid., 191-192.

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49. James A. Knight, Lt. Gen. USAF, Oral History Interview, 17 August 1988, K239.0512-1544, AFHRA, 254.

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52. Knight, 255-256.

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54. Raymond C. Preston, Lt. Col. USAF, "The New Officer Effectiveness Report," *Air University Review* (March-April 1974). http://www.airpower.maxwell.af.mil/airchronicles/aureview/1974/mar-apr/preston.html (accessed October 2005). The head of the Air Force Military Personnel Center was General William V. McBride, strongly believed in the system, and many years later still could not understand why it was so widely disliked. William McBride, Gen. USAF, Oral History Interview, 29-31 January 1989, K239.0512-1188, AFHRA, 220-221.

55. John P. Flynn, Lt. Gen, USAF, Oral History Interview, 13 August 1981, K239.0512-1187, 304-305. AFHRA; Creech, Oral History, 217.

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62. Slife, 80.

63. Fisk, 2.

64. Creech, Oral History, 211.

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81. Congressional Quarterly, *US Defense Policy, Second Edition,* 59-61, 15-A.

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83. *Congressional Quarterly Almanac, XXXIV*, 319.

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89. Samuel P Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations* (Cambridge, MA: Belknap Press of Harvard University Press, 1957), 37.

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91. Jacob Neufield, interview with author, 16 April 2005, Washington, DC; Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War (*Boston, Little, Brown, 2002), 65.

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94. John Boyd, Col. USAF, Corona Ace interview #K239.0512-1066, AFHRA, 63.

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104. Pierre Sprey, Oral History Interview by Jacob Neufield, 12 June 1971. K.239.0152969, AFHRA, 2, 5, 12.

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106. Ibid., 64-66. Also see Fallows *National Defense*, 120.

107. Author's interview with Neufeld; Fallows, "Muscle Bound," 64.

108. Walter Isaacson, "US Defense Spending: Are Billions Being Wasted?" *Time*, 7 March 1983, 26-28; Sprey Oral History, 19, 46.

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122. *Congressional Quarterly Almanac, XXXVI,* 37.

123. Ibid., 39.

124. Ibid., 189.

125. Congressional Quarterly, *US Defense Policy, Third Edition,* 23, 26.

126. Harold Brown, Secretary of Defense, statement 22 August 1980, quoted in *Supplement to Air Force Policy Letter for Commanders,* October 1980, 9-11.

127. Congressional Quarterly, *US Defense Policy, Third Edition,* 26. There remains the urban legend that the SR-71 was originally named the RS-71, RS standing for "Reconnaissance-Strike," the same acronym applied to the cancelled RS-70 bomber. When President Johnson announced the program he accidentally reversed the designation to SR, and the Air Force had to rapidly come up with a new acronym for SR, settling on "Strategic Reconnaissance." Clarence L. "Kelly" Johnson, "Development of the Lockheed SR-71 Blackbird,**"** *Studies in Intelligence,* Summer 1982, 58.

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130.Slife, 192.

131. Ibid., 57-58.

132. Serge Herzog, *Defense Reform and Technology: Tactical Aircraft* (Westport, CN: Praeger, 1994), 27, 32.

133. Slife, 62.

134. Ibid., 63-65.

135. The Pave Tack pod had a laser designator that allowed the carrying aircraft to guide the weapons rather than depending on an outside laser designator. Herzog, 35.

136. Creech, Oral History, 171.

137. Congress, Senate, Committee on Armed Services, *Department of Defense Authorization for Fiscal Year 1980*, Hearings, 96th Congress, 1st sess., 2 April 1979, 2213.

138. Clifton Berry, "TAC: Ready to Fly and Fight," *Air Force Magazine*, December 1979, 55.

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140. Herzog, 74.

141. Ibid., 63.

142. Herzog, 33.

143. Tad J. Oelstron, Lt. Gen. USAF, interview with author, 17 October 2005. Cambridge, MA.

144. Herzog, 57.

145. John Correll, "The Many Battles of Maverick" *Air Force Magazine*, March 1983, 98-103.

146. For cost, see Joseph Large, *Cost Estimates and Estimating Procedures in the IR Maverick and AMRAAM Programs* (Santa Monica, CA: Rand Project Air Force, 1998), 12, *passim.* For the Critics' view, see Fallows, "High Tech Weapons," 25. While the IIR Maverick did have difficulties, it became a reliable weapon. "Maverick Scores Seven Bullseyes, One Miss," *Defense Week,* 17 August 1981, p. 2.

147. Fallows, "America's High Tech Weapons," *Atlantic Monthly*, May 1981, 25.

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149. Creech Oral History, 213-214, 216-218.

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CHAPTER TWELVE: THE REAGAN YEARS

INITIAL BUDGETS

The Iran hostage crisis, the disastrous rescue attempt, and the seeming American impotence in the face of the Soviet invasion of Afghanistan contributed to a perception of America's decline. For a variety of reasons, not the least of which was this perception, the hawkish Republican Ronald Reagan defeated Carter in November 1980. Reagan's campaign emphasized giving a high priority to rebuilding America's armed forces, and the Air Force, as well as the rest of the military, was immensely gratified by his election. The Air Force Chief of Staff said in a post-election article titled "USAF's Renewed Spirit" that "the 1980 election signaled without a doubt a significant increase in patriotism and the national will."[1]

Many pundits were surprised when Reagan chose businessman Caspar Weinberger to be Secretary of Defense, but he proved to be in many ways an inspired choice. While Weinberger had little experience in defense, he knew the ins and outs of political bureaucratic infighting and quickly established his dominance over the Defense Department by firing, with Reagan's tacit approval, the Reagan campaign advisor on defense and darling of the conservative hawks, William R. Van Cleve.[2]

Weinberger's limited expertise in defense policy, combined with the White House's extensive philosophical vetting of high-level Pentagon civilian positions, meant that there were long delays in filling many DoD positions, and military men filled the gap as

Weinberger's advisors. However, since both Reagan and Weinberger agreed that it was time military men had more influence in the various decision-making processes, it made little difference on the overall philosophy of DoD. Everyone involved – Reagan, Weinberger, and the military – agreed that American military capabilities were in danger of being eclipsed by the Soviets.[3]

The Reagan defense buildup formally began ten days after the inauguration when Weinberger and Budget Director David Stockman added $32.6 billion to the Carter defense budgets for FYs1981-82, which had already provided $20 billion in real growth over the two years. The justification for the increase was a series of intelligence reports that said from 1974 to 1980 the Soviets out-produced the United States 2.3:1 in tanks, 3: 1 in other armored vehicles, and 9:1 in artillery/rocket launchers.[4] Weinberger told a Senate committee on 4 March 1981 that, "The principal shortcoming of the defense budget we inherited is not so much it omitted programs entirely…but rather that [the Carter administration] failed to provide full funding for many programs it conceded were necessary but felt unable to afford."[5] The main thrust of the larger budgets was to procure the same aircraft and missiles Carter and Secretary of Defense Brown had proposed, but to produce more of them at a faster rate -- for example, an increase of about $2 billion to begin a program of multi-year procurement for the F-16.[6] The plans for multi-year aircraft procurement would, it was hoped, cut costs, but there was considerable question if it would or whether it would simply add stability to the process.[7]

This was the beginning of a program to modernize every aspect of America's military arsenal. The most substantial additions were the restarting of the B-1 bomber program, the first steps towards building a 600-ship navy with more aircraft carriers, and a sharp

increase in O&M funding. More than half the money allocated to "general purpose forces" was given to tactical aviation because the Reagan/Weinberger defense strategy was still basically Brown's "offset strategy" that called for the tactical air forces to offset the Soviet numerical superiority in ground systems. The new defense program called for expanding the TAF from twenty-four to twenty-six active tactical fighter wings and from twelve to fourteen reserve wings by FY1986, for a total of forty modern fighter wings. Intelligence reports indicated the Soviets were out producing the West 1.2:1 in tactical aircraft, so given the Soviets' greater numbers it was accepted as a given that American aircraft had to be high-technology force multipliers.[8] These were the types of force multiplying tactical air systems Creech had been pushing, so his programs and the doctrine they supported continued to be aligned with the national defense strategy. The budget also contained $35 million to continue the competitive fighter engine program between Pratt & Whitney's F100 and GE's F101, as well as the funds Creech requested for his long-range, all-weather interdiction Dual-Role Fighter.[9] Reagan also called for a $181.4 billion increase in Carter's FY1982-1986 five-year defense program, up from $1.27 trillion to $1.46trillion, and the enlarged budget called for the purchase of 4,800 aircraft instead of Carter's 4,200. Most of the difference came from continued production of the F-15, which Carter had planned to end after 1983.[10]

The increase in the defense budgets was not surprising, but while it was substantial, many considered it relatively small. The Reagan administration had been expected to make an even more drastic break with post-Vietnam defense budgets, but it did not because of concerns about projections of large budget deficits, deficits caused not only by the increased defense budgets but also because of inflation, tax cuts, and congressional

reluctance to cut domestic spending. The feeling was that a flood of new money into defense would have set the economy on a wartime footing and that the uniformed services could not have used a sudden large increase in funds wisely.[11]

As concerns about inflation mounted, in September 1981 Reagan announced a reduction in the defense budget for FY1982-84 by $13B.[12] The specific cuts were submitted in October and included a cut in O&M funds, which was not well received by Congress. O&M funds had become a matter of great interest to the armed services committees in both houses, driven in part by the disastrous failure of the Iran hostage rescue operation that was blamed on poor training and lack of money for spare parts, in part by pressure from the Critics' congressional allies, but mainly by military leaders who had been agitating for more O&M funds for many years. For example, in FY1976 the Air Force asked for $8.1 billion in O&M and received $7.4 billion; in FY1977 the Air Force asked for $8.7 billion in O&M and received $8.1 billion; in FY1978 the Air Force asked for $9.9 billion in O&M and received $8.3 billion; in FY 1979 the Air Force asked for $9.9 billion in O&M and received $9.2 billion. The reductions in the requests came almost equally from the administration and from Congress.[13]

The attempted O&M cuts were mildly disturbing to the military, because the services had agreed that Reagan's FY1981 budget increases in O&M had finally allowed them to balance their budgets between procurement and combat readiness. In the end, Congress rejected the Reagan cuts in O&M funds, and both armed services committees voted to extend their authority over O&M funds so they could review the portions of future O&M budgets that would affect combat readiness of operational units.[14]

Reagan's formal defense budget request for FY 1982 was $208.2 billion, and in the end Congress accepted it basically in its entirety. There were attempts by liberal Democrats, notably Representative Pat Schroeder (D-CO), to sequester $8 billion because of "waste, fraud, and abuse," but these were stillborn.[15] However, the waste, fraud, and abuse issue was taken seriously. It was clear that, as the Congressional Research Service noted about this period, "higher defense levels could be justified only if longstanding problems are addressed seriously, and measures taken to reform the acquisition process."[16]

While Weinberger and the administration expressed confidence in the basic integrity of the process, they did believe a number of procedural changes were necessary in the system. In April 1981, Weinberger, in an attempt to preempt criticism and undercut the congressional foes of increasing defense budgets, announced the formation of the Defense Acquisition Improvement Program (DAIP), chaired by Deputy Secretary of Defense Frank Carlucci. Its charter was to look at virtually every facet of the acquisition process from weapons selection to final deployment. The group allowed Weinberger to accurately say he had already instituted programs to look at the acquisition problem, and that cuts such as Schroeder proposed were simply a disguised attempts to reduce the defense budget. [17]

THE RESURGENCE OF THE CRITICS

A major encounter between the Critics and DoD supporters of high-tech weapons occurred on 4 December 1980, just after Reagan was elected president, at a meeting of the Senate Armed Services Subcommittee on Manpower and Personnel Hearings chaired by Senator Sam Nunn (D-GA). It was clear that with Reagan's election increased defense

budgets with more high-tech weapons were on the way, and the hearings focused on the impact of technological sophistication and complexity in the new weapons systems. Though only two senators were present, two witnesses provided a classic description of the differences between the views of the Critics and DoD. The Critics' witness was Franklin "Chuck" Spinney, who gave a variation of his "Defense Facts of Life: The Plans/Reality Mismatch" briefing, focusing generally on the problems of TACAIR and specifically on the F-15. On the DoD side was Dr. William Perry, President Carter's Under Secretary of Defense for Defense, Research, and Engineering.

Nunn opened by stating that, in his judgment, America's high-tech weapons had not only fallen short of expectations but had also been plagued by cost increases, and he echoed the Critics' view that the low reliability of these systems might compromise operational effectiveness. Nunn also referenced a GAO report that concluded, "the sophistication of many weapons systems developed today is one of the contributing factors that has led to budget problems, inventory shortfalls, and a low state of readiness in certain categories," and that a better balance between performance and reliability had to be achieved.[18]

Spinney led off with his "Plans/Reality Mismatch" briefing, looking back over the history of military budgets and focusing mainly on the tactical air forces. Spinney said that the Air Force planners always expected defense budgets to increase, and expecting higher budgets the Air Force bought more high-tech airplanes. While higher technology made the Air Force assume the systems would be more reliable, Spinney said in fact high technology made the systems less reliable, because the interactions between unreliable high-tech parts increased failure rates for the entire system. High technology also meant

critical delays in integration and frequently unexpected technical problems, as well as delays between system acquisition and maturation. High-tech also affected readiness because it made the systems more difficult to maintain.

Finally, Spinney said, the Air Force "forgot" or "fooled themselves" about how much money they needed for O&M for high-tech systems. This was especially damaging because O&M costs increased for complex and thus expensive systems. The costs increased because, Spinney claimed, O&M costs were a constant percentage of a given system – his "fixed O&M percentage" theory. Not only were these costs a fixed percentage, but the cost of spare parts was as affected by price inflation as the weapons systems, and the result was that the more expensive the system, the greater the spare parts costs. As a result of these unanticipated O&M and spares costs, the Air Force had to cut the number of aircraft it bought to pay these higher costs, and aircraft maintenance relied increasingly on the cannibalization of usable pieces of high-tech equipment from other aircraft, eroding combat readiness.[19] The result was the weapons systems the Air Force was buying had too few spares to be useful in wartime.[20]

Spinney continued by pointing out that to pay for spare parts and O&M, the Air Force had to cut the number of aircraft it bought, thus increasing the unit cost per aircraft. When the Air Force realized O&M and spares costs were out of hand and the budgets would not increase, rather than buy more spares, the Air Force stopped funding its present systems and moved on to new, even more complex system with their promise of more reliability and less cost. This cycle was why the Air Force bought new high-tech aircraft, not to counter new threats.

Spinney said the overemphasis on high technology had driven the cost of modern weapons out of control, and even worse, the added operational performance from high technology rarely justified the cost. He used the F-15 as a prime example of his points, presenting a series of graphs that showed how the number of sorties and flying hours for the F-15 and its pilots had dropped from 1976 through 1979, and he also linked this lack of flying time to falling pilot retention rates, alluding to Keys' "Dear Boss" letter.[21] The period from 1976 to1979 was an especially rich one for Spinney's historical mining, because it covered the period of the F100 engines' main problems, as well as the limited funding for spare parts in the Carter defense budgets.

Spinney then moved to the F-16, which he noted had gone from an austere visual day fighter when first developed to a "lower performance, radar missile air-to-air fighter with avionics intended to attack ground forces at night or under adverse weather conditions." Spinney said the F-16's cost had grown substantially since the Air Force added these systems, and questioned whether the changes were buying increased combat capability or simply increasing technology for technology's sake. He disposed of the "force multiplier" argument by saying the Air Force said that it needed fewer "smart" weapons because it exchanged numbers for lethality, but then Spinney added, without providing evidence, that the "smart weapons" would not work in combat.[22] Spinney was to later say the Pentagon had brought on a "constitutional crisis" because military spending was so out of control it could be "putting the nation in peril. Many of the weapons we get are not designed for the threats we face, and some of them may not work at all."[23]

Spinney then moved into the larger area of grand strategy to use the "reinforcing experts" technique. He launched on a long discourse on how "mechanistic" American

military planning was, then contrasted this mechanistic method with John Boyd's "brilliant" strategy in Boyd's new "Patterns of Conflict" briefing, which debunked the current way the American military prepared for combat. Boyd's brilliant theories, Spinney noted, called for large numbers of reliable, low-tech weapons, just the kind of equipment the Air Force opposed.[24]

The following day Dr. Perry provided the senators with a rebuttal, mainly devoted to a defense of the F-15 because "Mr. Spinney chose the F-15 as his example of what he perceives as a general tendency to embrace overly complex solutions for our mission needs."[25] Perry's arguments focused on the requirement to meet the Soviet threat as the rationale for the high-tech weapons, not technology for technology's sake. He noted that over Europe in the winter it was either night or bad weather, on average, twenty hours a day, but the Critics' proposed simple aircraft did not have radar, radar-guided missiles, or any sort of all-weather capability. During those periods, simple fighters would be useless. Perry continued by pointing out that the Soviets recognized this reality and "the myth we are competing with an opponent who has a strategy of simple, cheap, reliable equipment is just not borne out by the facts." The Soviets were rapidly reequipping the Warsaw Pact forces with all-weather fighters with radar and radar-guided missiles, and the simple, air-to-air missile systems that Spinney advocated were much less capable than the new Soviet air-to-air missiles. Perry also noted that the new Soviet aircraft were more complex and expensive than their American counterparts, and their maintenance costs were increasing along with the cost of the aircraft.[26]

The main problem in the American tactical air forces, Perry said, was with Air Force equipment designed in the 1950s and 1960s and built in the 1960s and 1970s, a transition

period in aircraft and weapons development. To fix this problem, the United States was using technology to reduce cost and complexity and to increase reliability.[27] Using the most up-to-date numbers and not Spinney's outdated ones, Perry pointed out the F-15 and F-16 were requiring less maintenance because of built-in test systems, and new weapons such as the AMRAAM had simplicity and reliability built in from the start.

Turning specifically to the F-15, without mentioning the Israeli Air Force Perry pointed out that "every country that has evaluated the F-15 for its defense forces has declared its capabilities as unexcelled," and that the countries that bought the aircraft found that "this jump in capability was accompanied by a reduction in complexity." He also spun the Critics' argument that AIMVAL/ACEVAL had shown the superiority of small, cheap aircraft into an advantage for the F-15, saying that the results were, in fact, an argument for long-range radar missiles and beyond visual range combat capability. In other tests, he said, the F-15s had a kill ratio of 10:1 when they could use their long-range missiles, and this was borne out by combat experience with the aircraft.[28]

Perry attacked the GAO report Nunn had raised head on, empathically pointing out that the report was more than four years out of date (a point Nunn conceded) and that major changes in the procurement and development process had been implemented to solve these problems. The other problems were a carryover from the early years of the Carter administration, when low defense budgets had forced a choice between acquisition of weapons systems and spare parts. The services opted for acquisition, and the result was that high-tech weapons had been brought into the inventory before they had been fully tested and enough spares bought. This resulted in the current maintenance problems,

which were being corrected by modernization programs to improve reliability – not performance.[29]

Perry also exploited Creech's coup of sending the F-111F and F-15 squadrons to Europe just before the hearings, pointing out that the F-111 data that Spinney used was from the early model F-111. The modern F-111Fs that had been sent to Europe with a full set of spare parts flew for three weeks and completed 94 percent of their sorties. These figures also showed how technology could make older systems more reliable.[30] Because Spinney had made F-15 reliability an issue, Perry noted the squadron of F-15s sent to Europe with a normal kit of spare parts had flown for three weeks and completed 96 percent of their sorties, showing what the F-15 could do with enough spare parts. The problem was not the reliability of the aircraft; it was that there was not enough money for O&M and spare parts. Perry also responded to Spinney's straight-line future projections that more expensive systems left less money for systems and spare parts, saying Spinney's argument that O&M and spares' costs were a fixed percentage of a system's costs was "simply wrong." New systems would use technology to cut costs and improve reliability, resulting in the need for fewer spares.[31]

The hearings highlighted a point that was to haunt Spinney's briefing, that it was fatalistic. For Spinney's projections to work, he had to assume that budgets were not threat based and that defense budgets would be level or decreasing, no matter what the threat. If Spinney's predictions of decreasing spending levels were wrong, or if the budgets were in fact linked to the perception of an increasing Soviet threat, then his briefing was fatally flawed. By the time of the hearings, Reagan had been elected and it was clear that defense budgets were to increase dramatically, based on what the new

administration saw as the threat. Much of Spinney's thesis, which depended on level or decreasing real defense budgets and had seemed so powerful in Fallows' 1979 article, was breaking down.

THE LIBERALS' COUNTERATTACK

While it seems counterintuitive that liberal Democrats could realistically attempt to cut defense budgets after an election that seemed to turn on Reagan's greater commitment to improving America's defenses, some of the Critics, including Senator Hart's aide Gary Lind, saw an opportunity to attack the increases in the defense budget while claiming to be "strong on defense." Lind felt the defense budgets had been so publicly increased that they would draw more scrutiny, and the looming budget deficits made criticism of "wasteful" defense spending politically acceptable.

The liberal Democrats were able to credibly attack the budget increases in several ways. One was the argument Representative Schroeder had made against "fraud, waste, and abuse." The next was to use the Critics' well-honed argument that the large Reagan budgets were underfunding "readiness" and spending too little on ammunition and training time. Led by Hart, the Democrats were able to reclaim some of the pro-defense high ground by making a number of proposals to add money for ammunition and other readiness-related programs that had been rejected by the Republicans.[32] Fallows helped the Democrats by attacking the Reagan defense budgets as a major cause of inflation. In an article in August 1981 in *The Atlantic Monthly*, Fallows said, "defense spending is inherently more inflationary than other spending" and that "increased defense spending…provokes an important industrial sector to behave in precisely the [upward] inflationary way the government is trying to thwart."[33]

The Democrats also asserted that, like the Critics, they wanted more defense than the Reagan administration, but under their plan, it would cost less. Fallows and the media helped this argument along by pushing descriptions of weapons systems failures and wasted public money as part of the contention that the weapons systems purchased by the larger defense budgets were not strengthening America's defenses but actually weakening them, thus making Democrats' proposed solutions more appealing to the public.[34] The *Congressional Quarterly* pointed out that the Democrats were "jubilant that the party had evolved an approach that let nearly all Senate Democrats oppose the administration from 'pro-defense' positions."[35]

THE CRITICS' BRIEFINGS

To attack the Reagan budget, the Critics developed a formal set of arguments in unclassified briefings that they claimed showed causation between weapons complexity and low combat readiness. The Critics' *modus operandi* was to offer these unclassified briefings to interested, potentially supportive parties. The briefings were constantly updated, but copies were rarely provided to participants; they were also neither footnoted nor the sources of their data provided. This meant the briefings were a moving target, which proved very effective for the Critics but frustrating for DoD officials and Air Force officers who were assigned to counter them.[36]

The intellectual linchpin of the Critics' case was Boyd's four-to-five hour long briefing titled "Patterns of Conflict," which he constantly changed and updated as he gathered more information and as the whim struck him. The briefing proved a perfect vehicle for the glib, highly charismatic Boyd. Sprinkling about such terms as the "asymmetric fast transit conception of tactics and strategy idea" and using a combination

of widely scattered and unlinked historical references, strong personality, glittering glimpses of the obvious mixed with a strong dose of mysticism – Boyd said he "spent a lot of time bullshitting people" and "loved destroying mental worlds" -- his "Patterns of Conflict" became popular with the Critics' and their supporters.[37] In referencing military history, Boyd would call up the names of ancient commanders like Belisarius (whom he discovered in the writings of the great British military historian Basil Liddell Hart) and Humayun.[38] He would then ask his audience "have you ever heard of Humayun?" Given the inevitable "no," Boyd would then move on to explain that this "military genius" supported his theories.[39] For those who knew military history and might challenge him, Boyd threw in a variety of other references, including Kurt Gödel, the Heisenberg [Werner] Principle, and the Second Law of Thermodynamics, all of which he claimed supported his theories.[40] The briefing was so long, complex, disjointed, and broad, that anyone with questions hardly knew where to begin. Additionally, Boyd was an expert at keeping control of the audience; members of the audience who disagreed with any of Boyd's point were simply shouted down or insulted until the dissenter gave up.[41]

Despite the length and seeming breadth of the briefing, Boyd followed Fallows' example by giving the audience a simple theory that Boyd claimed to have invented, the "OODA" (Observation, Orientation, Decision, Action) loop. This "loop" involved a steady pattern of seeing an enemy first, observing his actions, then acting faster to counter them, what Boyd called "getting inside the loop." It was, in essence, simply doing the right thing faster than the enemy.[42] This was a platitude like "hit 'em where they ain't" – the real issue is not what to do, but rather how to do it – but Boyd's theory was acclaimed by the Critics and many in his audiences as "genius."[43] Even though most

of Boyd's thoughts were taken from truly original – if not always correct – military thinkers like Basil Liddell Hart and J.F.C. (John Fredrick Charles) Fuller, the Critics claimed the ideas were original to Boyd and called them "maneuver" warfare as opposed to what they asserted was the American strategy of "attrition" warfare.[44] The Critics claimed that "maneuver" war would provide much lower casualties than attrition warfare and would depend on less sophisticated and less expensive weapons with a premium on numbers, reliability, and simplicity.[45]

Pierre Sprey's briefing on tactical air warfare, "The Case for More Effective, Less Expensive Weapons Systems," used one of Sprey's – and indeed, the Critics' -- standard tactics in the title of the briefing, because the title made it seem that anyone who opposed Sprey's ideas was opposed to the more effective weapons at lower cost. Sprey first offered what he claimed were the most important considerations in air combat -- surprise, numbers, maneuverability, and firepower – then claimed that modern Air Force tactical air systems were not effective by these standards.[46] Sprey also claimed to have found a historical pattern of privately developed "cheap winners" while the American military developed "expensive losers," using the World War II North AmericanP-51 Mustang as an example of a "cheap winner" and the Lockheed P-38 Lightning as an "expensive loser."[47] The expensive and large P-38, Sprey said, had been developed by the Army Air Force but it had been a failure because its performance was inadequate, while the privately developed P-51 Mustang had been the "war winner" over Germany.[48]

Turning to the present day, Sprey characterized the F-16 that he and Boyd had championed in its simple air-to-air form as a "cheap winner" that cost half as much as the F-15 but was able to fly three times more sorties per dollar. More important, Sprey

claimed that the F-16 was more effective than the F-15 in three of his self-defined four categories critical in air combat. To make the F-16 more effective than the F-15 in three of the four categories, Sprey unhesitatingly made a series of assertions. First, he asserted that the F-15's radar would be useless in air combat because it was easily detected and jammed. Once Sprey had disposed of the F-15's radar detection capabilities, he could safely say that, since the F-16 was half the size of the F-15, it was much harder to see and would have the advantage of surprise – one of his three categories. Next, the F-16 was both cheaper, so more could be bought, and more reliable (though it used the F100 engine), so a larger number would be flyable. Thus, for the same money, there would be three times as many F-16s in the air as F-15s. Because numbers were another of Sprey's criteria for successful air combat, this was a second area where the F-16 was superior to the F-15. Sprey said that the F-16 was both more maneuverable and had longer range than the F-15 -- the first highly debatable and the range assertion simply false – but this allowed him to claim a third area where the F-16 was superior to the F-15. For the final issue, firepower, Sprey said the two were essentially equal in firepower with four heat-seeking missiles, since as part of his first assertion the F-15s four radar-guided missiles were useless because the radar would be jammed in combat.[49]

Sprey used the AIMVAL/ACEVAL tests to support his arguments, saying AIMVAL/ACEVAL showed that numerical superiority was the dominant factor in air combat and that radar missile-equipped fighters had no advantage over fighters equipped with advanced heat-seeking missiles. Sprey also used 1973 Middle East combat results to bolster his arguments, pointing out that the Israelis, though they had F-4s equipped with radar missiles, used the very simple French-built Mirage III to score virtually all their

kills with guns and heat-seeking air-to-air missiles. None of Sprey's arguments were footnoted nor the sources of his data provided.[50]

Franklin "Chuck" Spinney's briefing, "Defense Facts of Life: The Plans/Reality Mismatch," remained somewhat the same as the one he had given to the Senate Armed Services Committee in December 1980, though he continually updated the numbers. Spinney had recovered from his brief embarrassment when the Reagan defense budget increases destroyed his initial 1978 contention that defense budgets would gradually decline and this would eventually lead the Air Force to become ineffective, caught in a cycle of ever newer, more expensive aircraft with ever fewer spare parts. Now Spinney changed his thrust, conceding that budgets could rise, but now contending that the increased budgets would still give no more combat effectiveness because they were being used to buy the wrong weapons that would not work in combat. This was caused by an immoral alliance between defense contractors, congressmen who wanted money for their districts, and military officers who benefited both their careers and retirement job prospects by pushing for expensive weapons systems.[51] Spinney continually questioned the military's motives for the purchasing complex new weapons, saying "the people who are most optimistic about new and complex weapons are often the people with a stake in building or buying them," suggesting that there was a payoff for the military officers, either financial or in terms of promotion, at the end of the procurement process.[52] Fallows took up Spinney's moral cudgel, saying "DoD has all the symptoms of being corrupt, incompetent, and incestuous to an alarming degree," then going on to describe how contractors' "control DoD even more than [the administration's] political appointees" and

that "after the election of Ronald Reagan, the contractors announced that [their profits] were sure to soar."[53]

FALLOWS' *NATIONAL DEFENSE*

The Critics' briefings and arguments, presented in a longer, more coherent, and more unified form, became the core of Fallows' first book, *National Defense*. The book was published in May 1981, along with an article that summarized the arguments, "America's High-Tech Weapons," in *The Atlantic Monthly* that same month.[54] *National Defense* became a best seller and the Critics' bible, and was the high water mark of what had become known as the Defense Reform Movement (DRM). The book received adoring reviews from the liberal establishment and won the National Book Award, but the reviews were much less favorable from the defense and public policy *cognoscenti,* who considered Fallows' arguments well written but superficial.[55] One national security reviewer noted that Fallows was "weaving scattered facts and opinions into a coherent whole that barely touches the true complexity of the issues," and another said, "the Israeli air force, for which Fallows has nothing but praise, buys and uses F-15's -- should he not have asked himself why?"[56]

Much of the focus of *National Defense* was on a few carefully selected urban legends from AIMVAL/ACEVAL that were used to "prove" that a large numbers of small, cheap F-5s could defeat the larger and more expensive F-15s, and this became a metaphor for the "simple vs. complex" argument. Fallows probably expected the Rules of Engagement would be ignored by his audience as complicated "inside baseball," and he was correct. The selected portions of AIMVAL/ACEVAL Fallows highlighted in *National Defense* once again drove editors into a frenzy. The results were discussed, as mentioned earlier,

on the TV programs "20/20" and CBS "Defense of the United States" and in numerous newspaper articles; the *Chicago Tribune,* for example, in an article titled "High-Tech Jets are Low in Kills: Magic Planes That Failed," said "the proud air superiority fighters, the F-15 and F-14, costing upward of $30 million apiece, had been fought to all but a draw by a comparatively crude $4 million F-5 that Northrop built for export to small countries."[57]

But Fallows used the AIMVAL/ACEVAL results to suggest an entirely new idea, that a force of small, simple fighters could defeat an equal size force of complex fighters. The idea came from Everest Riccioni, now working for Northrop. In *National Defense* Riccioni clamed F-15s could fly very few sorties in combat, thus the Air Force had a "phantom fleet," the type of simple, easy-to-understand "buzz phrase" Fallows loved.[58] Riccioni said that the Air Force could buy 1,000 "advanced F-5s" (the F-20 was the advanced F-5) for the cost of 250 F-15s, and in wartime this F-5 force would generate 100 times more sorties (2,500 v. 250) than the F-15 force. To prove the Riccioni's "phantom fleet' argument, Fallows used the "circular experts" technique as Sprey and Spinney supported Riccioni's arguments and agreed that complex weapons systems produced a net loss in combat capability against the Soviets.[59]

To the Air Force, the "phantom fleet" argument marked a paradigm shift. If a force of simple aircraft could generate ten times the number of sorties as complex aircraft and cost only one quarter as much, a small force of simple aircraft – say 500 – could, according to Riccioni's numbers, still generate five times the sorties 250 F-15s could, or the same number of simple aircraft (250 v. 250) could generate two and a half times as many sorties. The "phantom fleet" argument meant the Critics were no longer arguing for a

larger number of simple weapons in place of the high-tech weapons. Now they were arguing for close to the same number of low-tech weapons as high-tech weapons because the low-tech weapons could be used more often, making them equally effective.[60] For those in Congress who wanted to cut the defense budget, the idea was compelling – replacing America's high-tech fighters with an equal number of fighters that were both more effective and much less expensive.

THE DEBATE BETWEEN THE AIR FORCE AND CRITICS I: THE BVR ARENA

Much of the dispute between the Air Force and the Critics centered on what was called the "beyond visual range" (BVR) air-to-air arena, that is, the range where the combatants cannot see each other. To fight the "BVR battle" at that time, a fighter had to be equipped with a long-range, radar-guided missile and a large, active radar -- one that sends out beams to locate enemy aircraft, similar to a flashlight -- to find its target and guide the missile, as well as the associated fire control systems. Radar missiles were larger, heavier, more complex, and more expensive than heat-seeking missiles, but radar missiles had a huge advantage because they had much longer range and were "all aspect" – they could be fired at an enemy from all angles, and were especially effective from the front quarter – while smaller, simpler heat-seeking missiles were only effective from behind, where engine heat was strongest. Radar missiles could also be used at night and in bad weather, while to use a heat-seeking missile one had to see the target, and at night and in bad weather, especially in clouds that dissipated heat, heat seekers were practically useless.[61]

THE CRITICS' POSITION**.** The Critics, in general, and Sprey, in particular, were very critical of the radar-guided missiles and wanted them replaced by the less expensive but,

they claimed, more effective heat-seeking missiles, which were "fire and forget" because they carried their own guidance systems. It was true the early AIM-7s had a very poor record in Vietnam, but Sprey was also critical of the AIM-7's replacement, the AMRAAM, which the Air Force claimed would correct most the AIM-7's problems. Sprey said the AMRAAM was too expensive to be bought in large quantities and too complex to function well in combat. Sprey also argued that radar would be jammed in wartime, and also claimed that the F-15 did not have a reliable method of identifying the radar target as enemy, and thus could not fire at targets beyond visual range for fear of fratricide.[62]

Sprey offered an even more extreme argument, that the radar required for BVR combat would endanger the fighter that used it. Sprey said that a fighter with an inexpensive, "passive" (non-emitting) radar detection receiver, called Radar Homing and Warning (RHAW), could follow the signal from a radar-equipped aircraft to attack by surprise with heat-seeking missiles or, even better, with anti-radiation missiles that would home in on the radar-equipped fighter's radar signal.[63] Overall, Sprey said the radar missile was illustrative of how "[the Air Force's] now-entrenched defense of high-cost, high-complexity programs [that] blocks us from using advanced, brilliant-simple technology to achieve the large increases in both quantity and quality of weapons that the nation needs desperately every year."[64]

THE AIR FORCE POSITION**.** On a macro scale, the argument over the need for radar in a fighter illustrated not only the Critics' techniques of argument but also the lengths the Air Force needed to go to provide a full explanation. The Air Force knew Sprey and the Critics were disregarding real world data. The latest model of the AIM-7, the AIM-7F,

was the Israeli Air Force's weapon of choice in the late 1970s and early 1980s and had a solid record of over 40 percent hits (many that did not hit missed because the target had already been destroyed) when fired by Israeli F-15s over Lebanon.[65]

They also knew that Sprey's seemingly logical, "common sense" argument that a simple fighter could use an inexpensive RHAW device to follow an enemy aircraft's radar to locate the enemy and fire a radar-homing missile was compelling to the uninformed, but completely wrong. This argument was based on "urban legends" passed on to Sprey from the AIMVAL/ACEVAL tests, where the F-5 Aggressors used simple RHAW systems, including "fuzz busters" from Radio Shack, to tell when F-15s detected them and were preparing to attack, a process called "locking on."[66] The Air Force knew "fuzz busters" worked during AIMVAL/ACEVAL because electronic emissions over the test area at Nellis were always limited and very tightly controlled to prevent them from being picked up by Soviet electronic surveillance. With no other radars emitting in the area, the simple "fuzz buster" type radar homing devices functioned well, but in a combat situation there are hundreds of radar and other electronic emitters, both friendly and enemy, broadcasting. In combat, as the Americans and Israelis had learned, a simple RHAW system like the one Sprey recommended would be overwhelmed and unable to tell which signal is guiding a missile or where it is coming from.[67] This was a well-known and acknowledged problem in electronic warfare circles, and one book on electronic warfare noted:

> [One limitation is] ambiguities in the radar frequency spectrum which cause friendly, enemy, and neutral radar emissions to appear similar [and] make accurate platform targeting and missile guidance difficult. These ambiguities will continue to worsen [in future wars] as the frequency spectrum becomes more dense and overcrowded.[68]

Additionally, a home-on-radar missile of the type Sprey recommended, called an Anti-Radiation Missile (ARM), while simple in concept, was very expensive and extraordinarily difficult to perfect. The first American anti-radiation missile used in Vietnam, the AGM-45 "Shrike," used an AIM-7 chassis with a different seeker head, but its hit rate – one confirmed hit in 678 firings -- made even the AIM-7 hit rate of about 5 percent look good.[69] The follow-on to the Shrike was the huge Standard ARM, which had longer range and somewhat greater capability but was 15 feet long and weighed about 1500 pounds (most air-to-air missiles weigh from 150-220 pounds and are about six feet long).[70] It was not until the late 1980s that the first really effective ARM, the High-speed Anti-Radiation missile (HARM) was perfected, but it too was large -- over 800 pounds and fourteen feet long -- expensive, and dependent on high technology. It also had a long, difficult, and expensive development history and, considered objectively, was exactly the kind of weapon the Critics abhorred.[71]

But the ultimate frustration for the Air Force was often the Critics simply did not tell the truth. The most prominent – but by no means only – example of this was when the Critics said that the AIM-7 was not useful in BVR combat because the Air Force did not have a system that could identify a radar target as an enemy aircraft. In fact, such long-range identification systems had been available since World War II, and an Air Force system, called "Combat Tree," had been used successfully in Vietnam from 1971-1973. Additionally, a newer and even more effective long-range identification system, called "Non-Cooperative Target Recognition" (NCTR) had been developed for the F-15 to use with the AMRAAM. [72] Sprey had worked on fighters in DoD since the mid-60s and

certainly knew that Combat Tree and its follow on systems existed, but to make his point against the AIM-7 he ignored it, as did Spinney, another DoD employee very familiar with weapons systems.[73] Because Combat Tree and the NCTR systems were classified, the Air Force could not publicly counter the Critics' false contention that Air Force fighters with radar missiles had no way to identify targets at long range. One is left to wonder if the Critics deliberately made this false argument knowing that, because of classification, the Air Force would not refute it.

THE DEBATE BETWEEN THE AIR FORCE AND THE CRITICS II: LONG-RANGE, ALL-WEATHER INTERDICTION

Interdiction, which the Air Force defines as "the employment of airpower to destroy enemy troops, supplies, and equipment before they reach the battlefield, or otherwise to hinder rear area movement so as to delay or prevent the arrival of troops and supply at the front," was the other area of conflict between the Critics and the Air Force.[74] Interdiction had been extremely effective in World War II, especially against German armored formations in Europe, and had been effective if not decisive in Korea and Vietnam.[75] Interestingly, because it was difficult to quantify how effective interdiction was until enemy records could be accessed, American analysts were more critical of the effects of interdiction in Korea and Vietnam than the enemy, who considered them very effective.[76] The main difficulty with interdiction efforts in Korea and Vietnam, as noted, was the enemy moved at night and bad weather when the Air Force had, at the time, only limited capability to locate them and attack.

THE CRITICS' ARGUMENT. The Critics' argument was a simple one: interdiction required expensive, complex, all-weather systems that would not work in combat and

diverted money from reliable systems. Because no simple, inexpensive system could be perform all-weather interdiction, the Critics' alternative was to simply to put interdiction into the "too hard to do" box and focus on close air support with large numbers of simple aircraft, like the A-10, that could fly high sortie rates. With large numbers of these simple, reliable systems, the Critics argued, the Soviet armored thrusts could be effectively countered at the front and the interdiction requirement would be unnecessary.[77]

THE AIR FORCE COUNTER. The Air Force had seen the problems with interdiction first hand in Korea and Vietnam and conceded that effective interdiction required all-weather navigation and attack systems that were complex and expensive. Nevertheless, these systems were necessary to carry out the mission the Air Force was required to perform in the national military strategy. The Air Force could not simply abrogate its assigned responsibility to perform the interdiction mission in a conflict in Europe, Korea, or the Persian Gulf. Instead, the answer was to develop the all-weather targeting systems and work on them until they were reliable and effective in meeting the interdiction requirement. It should be noted that interdiction was not just a mindless Air Force doctrinal requirement. The Army agreed interdiction was necessary and found the idea of switching all the interdiction resources to close air support foolish.[78] CAS was hard to control and, from World War I on, has been one of the most dangerous missions to perform. Based on the IAF experience in 1973, sending hundreds of cheap aircraft to the front to try and perform close air support would not only overwhelm the US command and control system but also guarantee huge Air Force casualties with few results.[79]

THE CONGRESSIONAL MILITARY REFORM CAUCUS

Fallows generated the results he wanted with the punditocracy, and as he had hoped his "lots of simple, reliable, cheap weapons" ideas were also influencing congressmen who had to deal with dual realities: the American people wanted Congress to fund real improvements in the American military, while at the same time dealing with a burgeoning deficit. Just after Reagan's inauguration in early 1981, Senator Gary Hart, aided by William Lind, wrote a widely read piece in the *Wall Street Journal*, "The Case For Military Reform," which called for simple, reliable weapons systems technology that would yield a larger, more effective force for the same or a lesser amount of money.[80] The piece was intriguing and proved to be the "tipping point" for a movement for change in Congress. In June and July 1981, some members of Congress, led by Hart and Representative G. William Whitehurst (R-VA), formed the Military Reform Caucus (MRC). The MRC claimed it would have no designated leaders, but it became one of the informal, adaptive groups that are often quite important in Congress. Its goal was the education of congressmen with the aim of reaching consensus on defense reform. Though some of the members had at least an ideological affiliation with the Critics, a study done by the National Defense University noted "the MRC as an institution does not appear to be anti-defense," and that "the diverse membership…has ensured a wide variety of views on every issue in the group."[81] The MRC was to give the Critics a congressional power base, but many MRC members were not Critics and some later bemoaned that fact that "reform" was included in the title of the group.[82]

The formation of the MRC was prominently featured in *Newsweek* magazine on 14 September 1981. The group quickly added five more members, most of whom had reputations for being interested in defense – Senators William Cohen (R-ME), Sam Nunn (D-GA), Republican Representatives Newt Gingrich (GA) and Dick Chaney (WY), and Democratic Representative Thomas Downey of New York. By the 1982 elections, the number totaled fifty-six.[83] Most of the founding congressmen were interested in being seen as fighting fraud, waste, and abuse, as well as sharing a common concern that money was "being wasted on the wrong new weapons: they also worried about undermining the current 'defense consensus' among Americans – and, by extension, the increase in military spending [the members of the MRC] think is necessary."[84] Whitehurst said later that the members were also interested in capitalizing on military history and working it into planning, considering low-tech, less expensive weapons, looking at the all-volunteer military and the adequacy of current planning and decision making in the national defense establishment.[85] The more aggressive members of the MRC wanted it to become an "alternative defense analysis institution" to offer critical analysis of the administration's policies and to act as a catalyst for public debate on defense, but later the MRC focused on readiness, which leant itself to simpler solutions like more funding, because many of the members were not interested in the more complicated questions of procurement and strategy.[86]

Some in the MRC believed that, in the post-Watergate era, there had been increasingly effective congressional oversight in every area of the government except one: the shaping of military force structure. Weapons systems selections were seen by many in the MRC as critical because they drove the defense budget and ultimately what

kinds of wars the armed forces would be able to fight. These members followed the Critics' arguments and were concerned that the Pentagon and DoD subordinated policy judgments to the bureaucratic or the career interests of defense officials and defense contractors.[87] As time passed, many of the ideas of the MRC would be supported by the Heritage Foundation, the Brookings Institution, and the New York-based public research Council on Economic Priorities. [88]

Those in the MRC who supported the Critics were helped by the fact that the organization had no staff, and congressional representatives who had a particular point of view could use their own staff to spearhead actions that were then presented to the entire MRC. This provided some staff members, notably Senator Hart's staffer William Lind, with an unusually high public profile and allowed them to set the agenda, or at least make sure their views reached the MRC and thus the public eye. During 1982 the MRC had eighteen meetings to discuss reform issues and receive formal briefings on subjects of interest, and Lind insured all Critics' briefings were included so the members were exposed to the Critics' views about the utility of high-tech weapons in modern war, the cost of such weapons, and their supportability and reliability.[89]

To sharpen the focus on these arguments and develop a policy for the group, the MRC created an "Options Committee" composed of staffers and defense analysts, mostly Critics, to suggest inputs for the FY1983 budget.[90] The Options Committee took inputs from Sprey, Boyd, Lind, and Canby, and eventually developed a list of inputs that mirrored the Critics' views. The proposal, called "Options for Action in the FY83 Defense Budget," included twenty-eight options, sixteen of them relating to military hardware, and included stopping production of the F-15.[91] Though the "Options for

Action" was never adopted as an MRC position -- and given the informal nature of the MRC, it is unclear what mechanism would have been used to formally adopt it -- it put the military on notice that parts of the MRC were willing to put forward firm proposals for change in line with the Critics' agenda.

The "Options for Action" raised the question of whether the MRC was using the Critics as simply one source among many to provide information and discussion topics, or whether the Critics were manipulating the MRC agenda to promote their own views. An impartial study raised this question to the members and found most were aware of the attempts to influence the group, but "thought the MRC leadership had the change-agent role in proper perspective."[92]

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1. Lew Allen, Gen. USAF, "USAF's Renewed Spirit," *Air Force Magazine*, November 1981, 54.
2. *Congressional Quarterly Almanac, 97th Congress, 1st Sess., 1980, Volume XXXVII,* 191.
3. Stephen Cimbala, *The Reagan Defense Program: An Interim Assessment* (Wilmington, DE: Scholarly Resources, 1986), 37-38.
4. Congressional Quarterly, *US Defense Policy: Weapons, Strategy and Commitments, Third Edition, April 1984*, 147-149.
5. *Congressional Quarterly Almanac, Volume XXVIII*, 92nd Congress, 2nd Session, 1972, 240; Cimbala, 42.
6. *US Defense Policy, Third Edition*, 154-156; *Congressional Quarterly Almanac XXXVII,* 193, 312.
7. *Congressional Quarterly XXXVII,* 242. On the disagreement if multi-year contracts were really effective, see *US Defense Policy, Third Edition,* 154-156.
8. *US Defense Policy, Third Edition,* 121-122.
9. *Congressional Quarterly XXXVII*, 219, 226.
10. Ibid., 227.
11. *US Defense Policy, Third Edition*, v.
12. $2 billion in 82, $5 billion in 83, $6 billion in 84. *Congressional Quarterly XXXVII,* 240-242.

13. USAF Comptroller chart, in Walter Kross, *Military Reform: The High-Tech Debate in the Tactical Air Forces* (Washington, DC: National Defense University Press, 1985), 32.

14. *Congressional Quarterly XXXVII*, 212, 220.

15. Ibid., 218-219.

16. David Lockwood, "Defense Acquisition Reform: Issues for the 100th Congress," Congressional Research Service, 2 December 1987, 2-3.

17. *Congressional Quarterly XXXVII*, 223.

18. Congress, Senate, Armed Services Committee, Manpower and Personnel Subcommittee, *Impact of Technology on Military Manpower, Requirements, Readiness, and Operations.* 96th Cong., 2d sess., 4-5 December 1980, 2051. The GAO report referred to is *Operating and Support Costs of New Weapons Systems Compared to Their Predecessors,* U.S. General Accounting Office Report to the Senate Committee on Appropriations, 1977.

19. Ibid., Spinney testimony, Dec 4, 2055-60.

20. Frank C. Spinney, and J. C. Thompson, *Defense Facts of Life: The Plans/Reality Mismatch* (Boulder, CO: Westview Press, 1985), 42, *passim.*

21. Ibid., 2068-2071.

22. Ibid., 2075-2079.

23. Spinney interview with Bill Moyers, February 2002. http://www.pbs.org/now/transcript/transcript_spinney.html (accessed September 2005).

24. Ibid., 2095-2100.

25. Ibid., 2108.

26. Ibid., 2111-12.

27. This is a variation of Moore's Law postulated by Gordon Moore, cofounder of Intel, in 1965. Moore's law says that the number of transistors per square inch on integrated circuits would double every year for the foreseeable future, (later changed to eighteen months). Built into this is the fact that computers performing at the same rate will become cheaper and more reliable. http://www.webopedia.com/TERM/M/Moores_Law.html (accessed October 2005). This is intuitively obvious to anyone who has owned computers over a period of years. In the 1970s and 80s computer crashes were common; today they are relatively rare. At the same time, prices are much lower and capability much greater. It is an example of the fundamental correctness of the high-tech argument the Air Force and DoD were making – technology can not only increase capability but lower costs and improve reliability.

28. Senate Armed Services Committee, *Impact of Technology,* 2201-2209.

29. Ibid., 2225-2229.

30. Ibid., 2243-44. There are a variety of reasons an aircraft might not complete a sortie (a single mission) besides an aircraft problem, including exercise area weather and airfield problems. From the author's experience, any sortie rate over 85 percent is very high.

31. Ibid., 2256-61.

32. *Congressional Quarterly XXXVIII*, 199.

33. James Fallows, “"Defense, Taxes, and the Budget,” *The Atlantic Monthly,* August 1981, 7-8.

34. See, for example, James Fallows, “M-16: A Bureaucratic Horror Story,” *The Atlantic Monthly,* 19 June 1981, 56-65. The M-16 was the standard Army rifle. For a compilation of the claims and a rebuttal analysis that formed the Air Force response, see John Correll, “Beyond the $916 Stool Cap,” *Air Force Magazine,* September 1983, 65-67.

35. *Congressional Quarterly XXXVIII,* 196-198.

36. Walter Kross, *Military Reform: The High-Tech Debate in Tactical Air Forces* (Washington, D.C.: National Defense University Press, 1985), 16-17.

37. John Boyd, Col. USAF, Corona Ace interview. #K239.0512-1066, 14 August 1976. AFHRA, 82-83, 128; also see Boyd’s briefing slides for “Patterns of Conflict,” John R. Boyd Papers, PC 2854, Personal Papers Collection, Archives and Special Collections Branch, Library of the Marine Corps, Quantico VA.

38. Flavius Belisarius (505-565) was a well regarded general of the Byzantine Empire. Richard Homes, *Oxford Companion to Military History* (US: Oxford University Press, 2003), 127-128. On the other hand, Nasiruddin Humayun (1508 – 1556), second Mughal Emperor of India, is unmentioned in Holmes’ long and comprehensive tome and seems to have had a mixed military record. http://www.islamicart.com/library/empires/india/humayun.html (accessed July 2005).

39. Boyd Oral History, 162.

40. Ibid., 135.

41. Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown and Company, 2002), 112.

42. John Boyd, “Patterns of Conflict” Briefing Slides, Slides 34-35, in John R. Boyd Papers, PC 2854, Personal Papers Collection, Archives and Special Collections Branch, Library of the Marine Corps, Quantico VA.

43. See, for example, Congress, House Committee on Armed Services, *The Impact of the Persian Gulf War and the Decline of the Soviet Union on How the United States Does its Defense Business,* Hearings Before the Committee on Armed Services, 102nd Congress, 1st sess., 22 April 1991, Pierre Sprey comments 545-546; Senator Gary Hart comments, 671.

44. This author believes that Boyd wanted to be considered another Fuller, who wrote the three volume *The Decisive Battles of the Western World and Their Influence Upon History,* (London: Eyre & Spottiswoode, 1954-6) as well as numerous books on a variety of subjects, including *The Star in The West: A Critical Essay Upon the Works of Aleister Crowley* (London: Walter Scott Publishing Co., 1907), *Yoga: A Study of the Mystical Philosophy of the Brahmins and Buddhists* (London: W. Rider, 1925), as well as several biographies of military figures. Boyd never wrote a published work.

45. This is a touchstone of the Critics’ argument and is repeated throughout the Critics’ work. A summary is found in Gary Hart, "What's Wrong with the Military?" *New York Times Magazine,* 12 February 1982, 12-28.

46. Pierre Sprey, "The Case for Better and Cheaper Weapons," in *The Defense Reform Debate: Issues and Analysis,* ed. Asa A Clark IV, Peter Chiarelli, Jeffery S. McKitrick and James Reed (Baltimore, MD: Johns Hopkins Press, 1984), 198-199; also see Sprey's input in *The Military Reform Debate: Directions for the Military Establishment for the Remainder of the Century,* Senior Conference XX (United States Military Academy, West Point, New York, 3-5 June 1982, 181.

47. Sprey's emphasis on the private development of the P-51 is important because at this time Sprey was working as a consultant to Northrop, who built the F-20 as a private project and was trying to sell it to the Air Force. The F-15, which Sprey violently opposed, was a Air Force program.

48. Sprey in *Defense Reform Debate,* 198.

49. Sprey in Clark, 202, *passim*; Senior Conference XX, 186-187, 191 (table).

50. Sprey in Clark, 201-205; Senior Conference XX, 204-206. As a point of fact, the reason for the F-4/Mirage disparity was that the Israelis used their F-4s for ground attack because the Mirage had no ground attack capabilities. In fact, the F-4 had about the same kill ratio as the Mirage, 20:1, but in a much smaller number of engagements. Peter Mersky, *Israeli Fighter Aces: The Definitive History* (North Branch, MN: Specialty Press, 1997), 13, 21, *passim.*

51. Franklin C Spinney and J. C. Thompson, *Defense Facts of Life: The Plans/Reality Mismatch* (Boulder, CO: Westview Press, 1985). The book covers these arguments it detail, though Spinney provides no footnotes or endnotes for his numbers.

52. Spinney, quoted by Fallows, "Public Perception, Political Actions, and Public Policy," in Clark, *The Defense Reform Debate,* 342.

53. James Fallows, "America's High Tech Weapons," *The Atlantic Monthly,* May 1981, 31-32.

54. Fallows, "High Tech Weapons," 31-33.

55. See, for example, Herbert Scoville, "Indefensible," *New York Review of Books,* 11 June 1981, 45-48; Christopher Lehmann-Haupt, "Books of the Times," review of *National Defense, New York Times,* 9 June 1981, C16. The latter review said that anyone who reads the book will be "better informed about military matters …than the military establishment itself," though Mr. Lehmann-Haupt adds "It isn't necessarily that Mr. Fallows is correct in what he says… it's just that he has pitched an emotional subject on such an unusually commonsensical level." Fallows received the National Book award for History (Paperback). http://www.nationalbook.org/nbawinners1980.html (accessed August 2005). In terms of writing, this author has found that Fallows does excellent work in cutting through much of the jargon that tends to permeate the military's arguments about weapons systems.

56. William Perry, review of *National Defense,* "Fallows Fallacies: A Review Essay," *International Security* 4, 4 (Spring 1982): 174-182; Thomas L. McNaugher of Brookings *Political Science Quarterly* (Fall 1981), 669-670; F-15 quote from Eliot Cohen review of *National Defense* in *Commentary* 72, 2 (August 1981), 34.

57. Fallows discussed AIMVAL/ACEVAL in several places, including *National Defense*, 47. ABC, "America's Fighter Aircraft" on "20/20," 1 May 1980; CBS,

"Defense of the United States," shown 14-18 June 1980; *Chicago Tribune,* 7 December 1981, A16.

58. Fallows, *National Defense,* 42-43.

59. Sprey, "The Case for Better Weapons" in Clark, 199-200.

60. Fallows, *National Defense,* 41, *passim.*

61. Peter Jarrett, *The Modern War Machine: Military Aviation Since 1945* (London: Putnam Aeronautical Books, 2000), 134-136 for missile characteristics and diagrams of performance envelopes.

62. Fallows, "High-tech Weapons," 26.

63. Ibid., 24-25.

64. All taken from Sprey in Clark, 201-205

65. Israeli doctrine at the time called for firing two AIM-7s at each target. Author's notes while air attaché to Israel, 1980.

66. "Locking on" occurs when a missile guidance radar singles out a particular target and switches to a narrow "guidance mode" to guide the missile. This switch is detectable on RHAW systems. Jarrett, 136.

67. Merav Halperin and Aharon Lapidot, *G-Suit: Combat Reports from Israel's Air Wars,* trans. Lawrence Rifkin, (London: Sphere Books, 1990), 125, 142, *passim*; Jack Broughton, Col. USAF, *Thud Ridge* (Philadelphia: Lippincott, 1969), 14, *passim.*

68. Alfred Price, *War in the Fourth Dimension: US Electronic Warfare From Vietnam to the Present* (London: Greenhill, 2005), 132, *passim.* There are many other examples of this as early as the Vietnam War, when RHAW sets were first used. See Jacob van Staaveren, *Gradual Failure: The Air War Over North Vietnam 1965-1966* (Washington, DC: Air Force History and Museums Program, 2002), 114-116, *passim;* Wayne Thompson, *To Hanoi and Back: The U.S. Air Force and North Vietnam, 1966-1973* (Washington, DC: Smithsonian Institution Press, 2000), 12-14, *passim.*

69. William A. Hewett, Maj. USAF, "Planting the Seeds of SEAD [Suppression of Enemy Air Defenses]: The Wild Weasel in Vietnam," (Thesis, School of Advanced Air Power Studies: Maxwell AFB, AL, 1993), 19.

70. Ibid., 20-21, 30.

71. Ibid, 54; author's interview with General Rudolf "Rudi" Peksens, commander of Coalition defense suppression air forces during Desert Shied/Desert Storm and long time Wild Weasel pilot, September 2005, Boston MA.

72. For Combat Tree, see Marshall L. Michel, *Clashes: Air Combat Over North Vietnam, 1965-972* (Annapolis, MD: Naval Institute Press, 1996) 88-89; NCTR is a highly classified system, but the existence of the program is acknowledged. Author's interview with Lt. General Tad Oelstron, head of AMRAAM program at TAC headquarters, 1977-1980. NCTR is part of at least one modern jet fighter PC flight simulator game, *Lock On: Modern Jet Combat.*

73. Spinney, *Defense Facts of Life,* 90-91.

74. Robert F. Futrell, *The United States Air Force in Korea* (Washington, DC: Office of Air Force History, 1964), 654.

75. See, for example, Hans Von Luck, *Panzer Commander: Memoirs of Colonel Hans von Luck* (New York, Preaeger, 1980), 180, passim, and the classic Franz von Mellenthin, Maj. Gen. OKH, *Panzer Battles: The Study of Employment of Armor in the Second World War* (Norman, OK: University of Oklahoma Press, 1956), 316, passim.

76. Brian C. Mossman, *The Effectiveness of Air Interdiction in the Korean War* (Washington, DC: Office of Military History, US Army, March 1966). For the enemy's views, see Xiaoming Zhang, "China and the Air War in Korea, 1950-1953," *Journal of Military History* 62 (April 1998), 335-370, and *Phong Khong Quan, Ky Su, Tap III* (*Air and Air Defense Forces, A Chronicle, Volume 3*), publisher and date unknown, acquired by the author in Hanoi in 1998 and translated from the Vietnamese by Roger Haine-Cole, Adelaide, Australia.

77. Gary Hart and William Lind. *America Can Win: The Case for Military Reform.* (Bethesda, MD: Adler and Adler, 1986), 14, 23, *passim.*

78. There was, however, a good deal of controversy before this was settled. See Slife, 33-39.

79. For the Air Force's view, see Kross, 132-160, with charts and diagrams.

80. Gary Hart, Senator, "The Case for Military Reform," *Wall Street Journal,* 23 January 1981, 8.

81. Salvatore Chidichimo, Lt. Col. USA, "The Military Reform Caucus and its Impact on National Defense" (Research Report: National War College, National Defense University, 1983), 8; Clark in Clark, 22.

82. Chidichimo, 3.

83. David M. Alpern and J. J. Lindsay, "Fighting to Win the War," *Newsweek,* 26-30, 14 September 1981.

84. Ibid , 27.

85. G. William Whitehurst, "Congressional Military Reform Caucus," Statement, 14 Dec 1981, quoted in Chidichimo, 5.

86. Reed in Clark, 348.

87. Congressional Quarterly, *US Defense Policy, April 1984*, 124-125.

88. Nancy J. Beard and Edwin A. Deagle, Jr., "Congress and the Defense Budget" in *American Defense Policy, 4th Edition.*, ed. John E. Endicott and Roy W. Stafford, Jr. (Baltimore, MD: Johns Hopkins Press, 1986), 337.

89. Michael Leahey, Commander, USN, "The History of Defense Reform Since 1970," (Student Thesis: Naval Postgraduate School, Monterey, CA, December 1989), 47.

90. Alton K. Marsh, "Military Reform Caucus Seeks Targets," *Aviation Week and Space Technology,* 29 March 1982, 16.

91. Ibid., 50.

92. Chidichimo, 9.

CHAPTER THIRTEEN: COUNTERATTACK

THE AIR FORCE'S FRUSTRATION

It seems fair to say the Air Force was stunned that the Critics were taken seriously, and the service was wrong-footed by the popular resonance of the Critics "simple systems" arguments. The Critics' arguments seemed clearly to be a recipe for disaster by giving up America's basic advantage over the Soviets, but with the success of *National Defense* and the formation of the Military Reform Caucus and its Options Committee, suddenly the debate was becoming important and the Air Force became very concerned. Up to this point, the Air Force and its Congressional allies had used the classic strategy of controlling and limiting the ways Congressmen could search out alternatives to the Air Force's proposals. Now the existence of the MRC provided a forum for a more open (and, in the Air Force's mind, less expert) discussion of defense issues, and there was fear that the Critics' simplistic arguments would gain traction, a fear stoked by press coverage of the MRC and the parts of its agenda dominated by the Critics.[1] A highly frustrated Air Force Chief of Staff, General Lew Allen, told supporters at the 1981 Air Force Association Convention:

> [Even though] the American public strongly supports our needs, a number of critics have alleged that we are incompetent and wasteful…that our forces are unwieldy and unreliable and that a different approach (generally unspecified) would give both economy and effectiveness. We are glad to respond to constructive criticism, and we hope to be the first to recognize our faults and the need for improvement. But this dialogue has ceased to be constructive. Many of you in this audience have responded effectively to these criticisms. We need your

> support. We need the thoughtful, intelligent analysis of the many of you who speak out on behalf of a truly strong national defense.[2]

Other Air Force leaders and supporters sounded the same theme. [3]

In Congress, the MRC had three mechanisms to exert some control over defense policy -- statutory, non-statutory, and informal. In the early 1970s, the establishment of the Congressional Budget Office, the Congressional Budget and Impoundment Control Act of 1974, and expanded committee and personal staffs had enhanced Congress' ability to scrutinize and "tinker" with defense programs.[4] The Air Force's fear seems to have been that the MRC would use the budget process to raise specific issues from weapons selection to general strategy, and bring these before Congress for debate. This was especially troubling because it would bring complex defense issues outside of what had been their traditional purview, the Armed Services and Appropriations committees.

The problem for the Air Force was that Fallows' theory -- simple, compelling arguments would win out over complex ones in the public forums and in the media -- seemed to be correct. While the Air Force resented the way the arguments were being made, they found that the Critics' simplistic arguments took long, detailed explanations to counter, the kind of arguments that were not of interest to the popular media and with many members of Congress. In a review of Fallows' *National Defense* for the Air Force's widely read *Air University Review*, the reviewer noted almost hysterically, "[The Critics] outmaneuver the services to undermine hard-won programs, usually in a forum where the services have little influence. As a result, a handful of critics are close to precipitating a fundamental change in U.S. military strategy and forces – not because [the Critics] are

right but because they make their case more persuasively in Congress and in the media than do the military services."[5]

Fallows' refusal to consider facts and his selective ignorance was also a frustration. In 1981, Fallows said "the costly and complicated systems make it too costly, or impractical, for soldiers to spend time in realistic training," despite five years of an ever-increasing number of Red Flags, more Aggressor squadrons in the TAF, and the Army's National Training Center.[6] In another example, Fallows constantly harped on the idea that the way to promotion was by being a procurement officer. What Fallows and the Critics did not understand or acknowledge was that there were in many ways two Air Forces, the "Operational Air Force" and the "Procurement Air Force."[7] Had Fallows done research on promotion patterns, he would have quickly found that the path to promotion was not in procurement but in flying operations, especially fighter operations, and that Air Force procurement officers were quite frustrated at their limited promotion opportunities.[8]

There was also a level of personal animus because the anti-military rhetoric of Fallows and the Critics. One Critic said that military leaders demonstrated a pattern of "persistent professional malpractice that in any other profession would constitute grounds for disbarment, denial of tenure, or legal action."[9] Fallows was notably hypocritical in this area, saying he "did not mean to imply military officers are negligent or corrupt," while not commenting on Spinney's suggestions of corruption or such Sprey assertions as, "The crazy generals down at TAC headquarters;" "the Secretary of Defense didn't have the guts to tell the Air Force to change the F-15;" "the Air Force Vice Chief of Staff was very, very weak and rarely showed much willingness…to do what was right;" and

"[General Bellis, director of the F-15 SPO] is not competent in air plane design, he's not competent in technical decision making."[10]

These *ad hominem* attacks and Critics' lack of respect for the military as a profession offers an explanation for the often-heated nature of the responses by the military participants in the debate. The rhetorical use of such indictments of military officers' performance, combined with Spinney's claims, repeated by Fallows, that officers were corrupt, was hardly conducive to open and reasoned communication. Fallows was to note later that he was taken aback by the military's strong response, and he saw in their response proof that the Critics were right.[11] In this, he followed a well-established theory that any real innovation spurs a backlash from those who have a stake in the status quo.[12] However, this theory is debatable and, even if valid, the resistance is separate from the merits of the innovation. Innovation has no automatic intrinsic merits – it may be good or bad, right or wrong. It is also worth noting that Fallows gives strong response to various challenges to his field, journalism, and apparently sees nothing unusual in the strength of his reponses.[13]

At the same time, the Critics' rhetoric helps explain why the reformers have had such a difficult time in gaining real support in DoD and in much of Congress. Reading congressional hearing transcripts and accounts by senior Air Force officers of numerous meetings with Congressmen leads one to the that most members of Congress, while they might have specific criticisms of military programs, did not like direct, personal, and public criticisms of military officers. Even among those who strongly opposed some programs and supported the Critics there seems generally to have been a "hate the sin, love the sinner" approach. This was especially true in the Armed Services and

Appropriations committees, where respect for the uniform was the norm, and it was these committees that would determine the influence of the Critics' arguments.

CREECH AND THE CRITICS

Because most of the Critics' focus was on the TAF's high-tech programs, Creech was especially frustrated. In Creech's mind, he "was" the Tactical Air Force, and he seems to have personalized Fallows' criticism.[14] In the fall of 1981, Creech invited Fallows to Tactical Air Command Headquarters at Langley Air Force Base to talk about TAC programs, much the same tactic that had worked with Ron Keys after his "Dear Boss" letter. Fallows met with Creech and took a flight in the F-15, which he duly recorded in an article in the November 1981 *Atlantic Monthly*, "I Fly With the Eagles." In the course of their meeting and discussion of the F-15 and other high-tech weapons Creech – who, unlike the Critics, had combat and leadership credentials -- made some headway. In the article Fallows admitted that if the basic national strategy argument was granted – that there was a plausible danger of a Russian invasion of Europe, and that such a war would not go nuclear – then the basic structure of American forces should reflect this and the concentration of resources on the F-15 made perfect sense. He also noted, "Air Force planners allude to cost, but their first instinct is to ask for what they think we need, regardless of the cost. It is proper for them to do so."[15] But in the end Fallows was not persuaded, perhaps because Creech was not "edgy" enough. As he told his escort officer, Dick Anderegg, "everything I know about air combat I learned from John Boyd, and he does not agree with Creech" -- though Boyd, unlike Creech, had no leadership experience and very little combat experience.[16]

In retrospect, Creech was probably wrong when he thought it would help his cause to bring Fallows to Langley to fly in the F-15. A more sophisticated reading of Fallows might have led Creech to understand that what Fallows was really challenging was not high-tech weapons, but the professional competence and intellectual honesty of the American officer corps. Boyd, Sprey, and the other Critics had convinced Fallows – though there are many indications he took very little convincing -- that military leaders were incompetent, that they were not leaders but managers, that they were ignorant of the demands of combat, and only interested in working for the arms industry after retirement. It was these flaws in the leadership that led the military to buy high-tech weapons, and it was of a piece with the idea that military officers were not true professionals.

Creech had an option. Instead of bringing Fallows to Langley, Creech could have sent him to Red Flag. There Fallows would have found the "edgy characters" he wanted in the pilots and commanders of the Aggressors and the units that deployed there. However, probably because Creech was confident of his powers of persuasion and because he seems to have been entirely focused on his high-technology weapons programs and the Critics' challenges to them, he seems not to have been aware of the larger issues Fallows raised. Creech perhaps missed an opportunity to truly influence the TAF's most important critic.

As the Critics' arguments seemed to become more and more part of the media's conventional wisdom, Creech became apprehensive that some of his programs would be cancelled. He told a sympathetic audience of his concern about the "modern 'Luddites' who say that we must turn our back on technology...our precision guided munitions…that will kill targets in multiples," and said that the Soviets had moved to high-tech aircraft, so

sending the Critics' low-tech fighters into combat would "result in appalling American losses." He continued, "I'm not sure I'm going to win on some of the things I'm trying to bring into TAC, like night capability through the LANTIRN program. We're winning more of these battles than we're losing, but it is absolutely open guerilla warfare. Day by day. I mean we just fight, fight, fight, fight. Tooth and claw."[17]

Creech's and the Air Force's fear was that the Critics would bring Congress to try to play an independent role in weapons systems selection. Creech knew – and was demonstrating – that doctrine drove systems, but he also knew that systems could drive doctrine. If the Military Reform Caucus was able to convince Congress to allocate funds for cheap, unsophisticated equipment at the expense of the systems the Air Force wanted, the service would be unable to fulfill its role in the national defense strategy. There had already been a chilling example of this in the 1979 "Enforcer" program. That year the Critics had persuaded Congress, notably Senator Strom Thurmond (D-SC), to add funds for the "Enforcer," a modified World War II P-51, as an inexpensive, simple ground-attack aircraft. Thurmond, one Air Force general remembers, "kept asking us why we didn't buy the 'En'fo'su' and kept adding money for the project to the defense budget."[18] The Enforcer ignored the threat of the Soviet's shoulder-fired SA-7, a small, single-round, throwaway heat-seeking SAM known as the "Saturday night special of the missile world." The SA-7 was cheap, easy to use, and widely supplied to Warsaw Pact field units. While it was useless against jets, it was deadly against propeller-driven aircraft and helicopters, and had literally run the South Vietnamese Air Force's propeller-driven ground attack aircraft out of the skies, even in the desperate days of 1975.[19] The Enforcer finally faded away when this point became clear, but the program was a cautionary tale

for the Air Force about how even an extraordinarily foolish idea might make its way into the defense budget, and that the Critics could be a real threat.

THE FY1983 BUDGET

In January 1982, Secretary of Defense Weinberger proposed a FY1983 defense budget of $263 billion, an increase of 13.1 percent in real terms, even though the federal budget deficit was expected to be higher than the Administration estimate of $91.5B.[20] The Critics and Congressional movement for defense reform were in full dudgeon, and the *Congressional Quarterly* noted "the air was thick with sweeping proposals to kill off expensive weapons programs and …radically alter US defense strategy."[21] Congress spent the first five months of 1982 debating the defense budget, but the only concrete action taken was to trim about 5 percent from the original proposal, and importantly Congress let the Pentagon allocate the reductions according to its own priorities.[22]

The 1982 congressional hearings on various tactical air programs showed the contrast between the views of the generally pro-military members of the relevant committees and the rhetoric of the Critics. In the Senate Armed Services Committee hearings on 26 February 1982, Senator Barry Goldwater (R-AZ) opened the testimony of General Creech by asking why the Air Force was continuing to buy more of the simple A-10, the Critics' favorite aircraft. Goldwater, an Air Force Reserve brigadier general, said, "I have talked to some of the guys in the A-10 outfits...they would much prefer to do ground support with the F-16." The problems the A-10 pilots identified to him were caused by the very things the Critics had insisted on – simple avionics and no sophisticated standoff weapons capability. The A-10 pilots complained to Goldwater that without navigation systems they had difficulty finding targets and thus were forced to loiter in high-threat

areas, that any sort of bad weather kept them from flying, and the that the lack of standoff weapons meant they had to get dangerously close to their targets. Additionally, to keep costs down, the A-10 did not have the "Hands on Throttle and Stick" (HOTAS) mechanism that allowed the pilot to change weapons without looking inside the cockpit, even though every other modern Air Force fighter had it, and even F-4s had been retrofitted with the system. The result was an A-10 pilot, while flying at low level and trying to attack a target and dodge SAMs and AAA, had to look inside the cockpit and change five switches to change from bombs to his cannon, while an F-16 pilot made the same weapons change with one movement of a "pinkie" switch on the throttle. All this vastly increased the vulnerability of the A-10, and the F-16 fighter-bomber seemed much more survivable. Goldwater concluded by saying, "I don't think it would break a lot of hearts in the Air Force if we don't authorize the purchase of any more A-10s."[23]

Creech, though he thought Goldwater correct, chose not to address the A-10 issue directly.[24] He did say the Air Force was committed to its high-technology weapons, that the service would continue to acquire F-15s and F-16s through the 1980s, and the F-15s and late model F-16s would receive radar modifications so they could use the AMRAAM missile.[25] The improvements in the radar Creech referred to included a non-cooperative target recognition (NCTR) mode that allowed these fighters to distinguish enemy from friendly aircraft at long ranges.[26] The NCTR was highly classified, but it seems likely Creech briefed the senators on the system and its capabilities in closed session. The awareness of NCTR and Combat Tree would have effectively, if not publicly, eliminated the Critics' contention that the AMRAAM was useless because enemy aircraft could not be positively identified beyond visual range.

Creech said the Air Force was also continuing work on the new long-range Dual Role Fighter (DRF) all-weather attack aircraft, which would either be a two-seat version of the F-16, the F-16E, or of the F-15, the F-15E, equipped with LANTIRN and IIR Maverick.[27] A week later, at another Senate Armed Services Committee meeting, General Robert D. Russ, Chief of Air Force Operational Requirements and one of Creech's "boys," summed up the Air Force argument against the Critics' concept of simple, air-to-air fighters. "I don't believe it is prudent to have a day, clear weather only fighter force and give the enemy the capability to fight around the clock....I think the increased capability that it gives us is worth the money."[28]

In the end, despite objections from the Critics and many in the Military Reform Caucus, Congress not only accepted production of LANTIRN but also full-scale production of AMRAAM to replace the AIM-7; probably the NCTR system calmed their fears about Abram's operational usefulness. Ironically, F-16 squadrons were the first to receive the AMRAAM, to give them the all-weather air-to-air capability the Critics abhorred.

COUNTERING THE MILITARY REFORM CAUCUS I: THE ARMED SERVICES COMMITTEES

Generally arrayed against the Military Reform Caucus were the House and Senate Armed Services committees. Senator John Tower (R-TX), who became chairman of the Senate Armed Services Committee in 1981, was especially supportive of Reagan and his defense buildup. Majorities of both committees agreed that it was essential to ensure the United States would not be "second best" in any conflict and to maintain armed forces to protect American interests throughout the world. They also agreed that the Reagan

defense buildup was affordable and accepted the basic "offset" strategy that American forces would be outnumbered and could not match the Soviets system for system. For this reason, the firepower of American weapons had to be greater than that of Soviet weapons and this inevitably led to the highly capable "force multiplier" weapons Creech advocated. Additionally, the congressmen on these committees were generally very knowledgeable about weapons systems and not swayed by simplistic arguments, and this helped the Air Force.[29]

In the past, there had been criticism of these committees because of their close ties to the military. During the Johnson administration, McGeorge Bundy said the Senate Armed Services Committee's position is that "the generals and admirals are right simply because they are professionals. The Committee does not demonstrate the military value of the course it urges; it simply tells us the generals and admirals are for it…. [But] nothing is less valuable, in hard choices, than the unsupported opinion of men who are urging the value of their own chosen instrument…."[30] This was a characterization Fallows and the Critics probably would have agreed with, but the last part of the quote could just as easily be used as an argument against the Critics.

The Air Force influenced its supporters in and out of Congress by a steady drumbeat of speeches to sympathetic groups, notably the Air Force Association (AFA), an "independent, nonprofit, civilian education organization promoting public understanding of aerospace power and the pivotal role it plays in the security of the nation."[31] The AFA not only offered a forum for Air Force generals and DoD officials to speak about current issues, but the organization's monthly *Air Force Magazine* gave these officers a chance to make their arguments in a long form – usually articles of several pages – that

specifically countered specific Critics' arguments as well as providing the "party line" on issues of interest to the corporate Air Force and its supporters. As the Critics' arguments became louder, the responses in *Air Force Magazine* increased. The Air Force provided many of the longer responses and, while the magazine's articles were not overly sophisticated, they were more nuanced and detailed than the Critics' work.[32]

COUNTERING THE MILITARY REFORM CAUCUS II: THE ISRAELI AIR FORCE

The Israeli Air Force and its commander, General David Ivry, were also strong supporters of the USAF's high-tech weapons, in direct opposition to the Critics. Creech and Ivry had picked up the TAC/IAF relationship where Generals Peled and Dixon had left off, and Ivry was a strong proponent of Creech's high-technology weapons to offset superior Arab numbers, just as Creech and the Air Force planned on using them to offset Warsaw Pact numbers. Creech and Ivry chose not to flaunt the close USAF/IAF relations because of sensitive base negotiations with Saudi Arabia and other Arab countries in the Persian Gulf region, but that did not diminish their friendship. At Creech's behest, Ivry, like his predecessor Bennie Peled, never passed up an opportunity to tell visiting congressmen and Jewish leaders about how important American high-technology weapons systems were to Israel's survival and how strong relations were between the IAF and the USAF.[33]

The IAF had no interest in the type of F-16 the Critics wanted, a single-role air-to-air fighter, but rather wanted the same type of F-16 the USAF wanted – a dual role fighter-bomber with a highly accurate delivery system for "dumb" bombs and an advanced radar system for air-to-air combat. The IAF made it clear to General Dynamics from the first

time the IAF visited the company that the IAF plan was to use the F-16 as a long-range strike aircraft to supplement and eventually replace the F-4, which it wanted to use solely for SAM suppression. [34]

The other area the IAF specifically disagreed with the Critics was on the need for long range in fighter aircraft. Sprey had said, "There's no faster way to kill the performance of a fighter than to ask for too much range," but the IAF found that range was not only useful for deep strikes, but it also gave the new fighters "persistence."[35] It was common for F-15s to have practice dogfights with one group of Mirages or F-4s then, when the Mirage/F-4 group ran out of fuel, another group replaced them, while the F-15s had enough fuel to stay and fight the second group.[36]

The IAF also demonstrated the effectiveness of the advanced US systems in combat. The F-15s had already had great success against Syrian MiGs, and when the IAF received its first F-16s on 2 July 1980, it soon put them to work. On 7 June 1981, less than a year later and just after the publication of Fallows' *National Defense* which criticized the dual-role F-16, a strike package of eight Israeli F-16 bombers with six F-15 escorts flew a round-trip mission of over 1,300 miles to destroy the Osirak nuclear reactor outside Baghdad.[37] It was a mission that, had the Critics had their way and made the F-16 a short-range air-to-air fighter, would have never taken place. Fallows and the rest of the Critics ignored the implications of the strike, and also ignored IAF's interest in the rest of America's high-technology air weapons.

A further demonstration of high-tech weapons' effectiveness came in June 1982, just after the Reagan/Weinberger FY1983 budget was approved by Congress, when Israeli ground forces pushed into Lebanon in Operation "Peace for Galilee." To protect its

ground forces from air attack, the Syrians deployed SAM units to Lebanon's Bekaa Valley, but left other SAM sites in Syria proper to protect the Bekaa Valley batteries. This modern IADS, with a combination of SA-2, SA-3, and SA-6 missiles, posed a strong challenge to the IAF, which still remembered the losses caused by SAMs in the 1973 war.

The Israeli government did not want to attack the missile sites in Syria for fear of sparking a wider conflict, but the dilemma vanished when, on 8 June, the Syrian SAMs moved from Syrian territory in the Golan Heights into the Bekaa Valley where the IAF could strike them without bombing Syria. On 9 June, the IAF executed a plan it had rehearsed in Red Flag type exercises in Israel's Negev desert for a month before the operation. In a "roll back" operation similar to the type Creech advocated, IAF F-4 Phantoms attacked the SAM batteries and air defense radars with anti-radiation missiles and precision-guided munitions, destroying seventeen of the nineteen Syrian SAM batteries within two hours without losing an airplane. They returned the next day and destroyed the last two.[38]

While the F-4s struck the missile sites, IAF F-15s and F-16s provided air cover against Syrian MiGs that tried to block the attacks on the SAM batteries. As the MiGs approached, a highly sophisticated IAF airborne communications jamming system, similar to a system Creech had ordered for TAC, blocked Syrian ground control radar stations trying to pass information to their fighters while American supplied airborne radar surveillance E-2C aircraft, called the "poor man's AWACS" and heavily criticized by Fallows, downlinked its radar pictures to the IAF command post in Tel Aviv to give Ivry a real-time picture of the air battle.[39] In the first half hour, IAF F-15s and F-16s shot

down twenty-six Syrian MiGs, and by noon the next day IAF pilots had shot down about eighty-two Syrian fighters without losing any aircraft in air combat. The kills were about evenly divided between F-15s and F-16s.[40]

The IAF's American-supplied high-tech systems dominated the Syrians' "inexpensive, reliable" Soviet systems, and IAF tactics were another blow to the Critics. Pierre Sprey had claimed that superiority in numbers was a critical factor in air combat, but the combat experienced pilots of the IAF knew that having a small number of fighters in an engagement against a large number of enemy aircraft was an advantage, because in essence almost every aircraft one sees is a target. The IAF preferred the enemy to have greater numbers in air combat engagements, and IAF headquarters fed flights of four aircraft, one flight at a time, into the fight, and then pulled each flight out after they scored kills and replaced them with another flight.[41]

The IAF also demolished another of Sprey's "theories of combat effectiveness," that fighter radar would be jammed and useless in combat. The leading IAF F-16 MiG killer, Colonel Amir Nahumi, said after the war (and six kills) that the reason the F-16 was so effective was because its look-down pulse Doppler radar allowed the F-16s to locate the Syrian MiGs trying to sneak in at low level, something that had been impossible with earlier radars.[42] This was the radar Sprey said would be useless and that Fallows and the Critics would have left out of the aircraft.

The Critics claimed their focus was on technologies that would meet the test of combat, so the successes of America's high-tech weapons in the Bekaa Valley were inconvenient for their arguments. To try to redeem themselves, the Critics said the IAF success "had very little to do with state of the art technology and a lot to do with tactical

insight," which presumably the American military was incapable of duplicating.[43] Unfortunately for the Critics, those who actually fought the battles disagreed. IAF commander David Ivry, who yielded to no man in his opinion of the IAF's intangibles, gave much of the credit to American technology.[44] Neither Fallows nor the Critics ever acknowledged Ivry's comments, and Canby's silence was especially noteworthy, since he had said for years that the IAF thought "roll back" was an invalid concept and believed in going in at low level to attack SAM sites.[45]

Creech received regular updates on the war from Ivry through the Israeli Defense Attaché in Washington, and he and his staff were elated. His biographer noted: "The stunning success served to reinforce Creech's vision that emerged at the 1978 Warfighter Conference and had been practiced regularly at Red Flag exercises."[46]

WINNING THE ENGINE WAR

President Reagan's resurrection of the B-1B program provided an immediate benefit to the TAF. The Air Force had already had F101 engines installed in several F-16s, and the engines were performing extremely well. When Reagan ordered the production of a force of 100 B-1Bs, each powered by four F101 engines, General Electric opened an F101 engine production line and the program became financially sound. Now the F101 was a viable alternative for Pratt's F100. With the blessing of Congress, in August 1981 the Air Force gave GE a contract for full-scale development of a slightly modified F101, designated the F110, similar in size to the F100 so it could fit in both F-15s and F-16s.[47] With these developments and a replacement for the F100 a real possibility, General Alton Slay at Systems Command ordered a competition for the next purchase of Air Force fighter engines. In April 1983, the Air Force issued a Request for Proposal (RFP) to GE

and Pratt for the purchase of 2,000 engines for the F-15 and F-16 during the fiscal years 1985-1990. [48]

The Air Force's push for an engine competition received a boost when a series of investigations in mid-1983 found that Pratt was making huge profits from spare parts for the F100, in some cases quadrupling their cost to the Air Force.[49] The prices Pratt charged for spare parts attracted the attention of the press and DoD, inspiring Secretary of Defense Weinberger to say, "These are terrible contracts. We are not going to pay these prices any more."[50] Pratt tried a variety of ways to sabotage the competition, including saying that it would increase acquisition costs and delay deliveries, but despite these contentions and active interventions by congressmen from the districts where Pratt was located Weinberger and the Air Force stood fast.[51]

The Air Force F100/F110 competition proposal had several possible production schemes the two companies were to examine, including dividing the engine buy into 25 percent/75 percent portions or "fifty-fifty." The proposal also demanded a warranty clause for the engines that guaranteed the engine would perform 3,000 cycles before the turbine blades malfunctioned, as well as a general "correction of deficiencies" clause.[52]

Pratt maintained an Inspector Clouseau-like imperviousness to what was taking place. When it came time to make its bid, Pratt's proposal said that if the company were awarded less than 100 percent of the contract, its costs for maintaining the smaller percentage of engines would be triple that of maintaining the entire buy. What Pratt bluntly offered the Air Force and DoD was essentially an "all or nothing, take it or leave it" proposal.[53]

It was a mistake. Weinberger and Secretary of the Air Force Vernon Orr were furious, and it took considerable work by their staffs, fearful of reestablishing another non-competitive situation with GE in control, to keep Weinberger from awarding 100 percent of the buy to GE.[54] In the end, GE got 75 percent of the order while Pratt got the minimum buy, 25 percent, and the Air Force announced that they were going to continue competitions for future engine purchases between Pratt & Whitney and General Electric. Beginning in FY1985, GE engines powered about 75 percent of the F-16s purchased by the USAF, with the remainder powered by the Pratt &Whitney engines.[55] Both new engines proved to be much more durable and virtually free from stall/stagnations.[56]

The decision received rave reviews from the news media, Congress, and the GAO, but Fallows and the Critics never acknowledged this accomplishment, perhaps because they had not suggested having a competition between manufactures for the engines.[57] Another possible reason was that idea for the F100/F101 competition and its implementation was entirely the work of General Alton Slay, a *bête noir* of the Critics because of his work in turning the F-16 into a multi-role fighter.

THE 1984 BUDGET

By early 1983, Congressional support for steady large increases in the defense budgets had waned, and Congress did not give a warm reception to Reagan's FY1984 $273 billion defense budget when it arrived on Capitol Hill.[58] The FY1984 defense budget played into the hands of the Critics and their congressional supporters, who claimed that the administration was still committed to procurement at the expense of O&M, spare parts, personnel, and the other elements of "readiness." This new budget, the Critics claimed, meant both higher costs and less combat capability. The Critics'

arguments continued to resonate, and the *Congressional Quarterly* noted, "major weapons procurement, long the target of liberal Pentagon critics, began to draw fire from a much larger span of the political spectrum."[59]

A few months later, the Critics scored a major coup when, on 7 March 1983, *Time* magazine's lead story was "US Defense Spending: Are Billions Being Wasted?" The issue featured Critic "Chuck" Spinney on the cover, described as a "Pentagon Maverick."[60] The article said that Spinney, "a quiet but dogged analyst," was the "unlikely hero of an intensifying reform movement that is changing the way the Pentagon establishment is doing business." Much of the story was a presentation of Fallows' and the Critics' positions, especially focusing on Spinney's corruption theme. The article noted "the symbiotic ties between the military and defense contractors, reflected in the revolving door that allows top officials of the Pentagon to go to work for the firms they dealt with, drives [weapons'] costs still higher. In addition, stars are awarded for pushing a major project to completion, whatever the price."[61] Endorsements of Spinney's work were in the standard Fallows form of "circular experts" and came from "defense experts" like Pierre Sprey and John Boyd.

At same time, the article perceptively highlighted the problems the Critics faced trying to bring defense reform to the American system, noting that the Military Reform Caucus members and liberal Democrats were "as susceptible as any member of Congress in seeking pork for their constituents" and "the scramble for goodies seems to be their overriding concern." The article pointed out that MRC founder William Whitehurst insisted that two more nuclear aircraft carriers were necessary (the Reagan administration wanted one), both to be built near his district in Norfolk, Virginia. Military Reform

Caucus member Senator Sam Nunn insisted on keeping the C-5 transport line open in his home state of Georgia, and Senator Richard Cohen of Maine forced the inefficient splitting of the building of several large Navy warships of the same class so some could be built in Maine shipyards. The article also noted that Democratic liberal "doves" were part of the process – House Speaker Tip O'Neill and Senator Edward Kennedy of Massachusetts supported the F-18 (a modified F-17) for the Navy, parts of which were built in their home state; Senator Alan Cranston (D-CA) energetically pushed the highly controversial B-1 bomber mainly built in California; and Senator William Proxmire (D-WI), who regularly handed out the "Golden Fleece" award to the military and its contractors, added $100 million, to the FY1983 defense budget for a minesweeper to be built in Wisconsin that would have to be moved to a coast. House Defense Appropriations Subcommittee Chairman Joseph Addabbo (D-NY), "usually eager to cut defense spending," insisted the Air Force triple its A-10 buy because the A-10 was built in his district.[62]

But while the article brought Spinney to the public eye, it also increased the scrutiny of his arguments. In the Air Force view, an analyst should not have been concerned with which side won the argument; the analyst's role was simply to provide impartial analysis. One Air Force general officer, himself a trained analyst, noted the Fallows' analysts were manipulating the data to support their own personal views. Referring specifically to Spinney, he said "an analyst and an analyst's packaging must never, repeat never, be designed as a vehicle by which the decision maker is asked to ratify the beliefs and conclusions of the analyst."[63] Others in DoD simply thought Spinney was a "lousy analyst," and Weinberger insisted that Spinney's work was "historical" and "things were

being changed."[64] Major General Jack Chain, the Air Force XO, said Spinney's report reflected "a very limited density of experience" and the chairman of the Senate Armed Services Committee, Senator John Tower, said Spinney's ideas were "ridiculous."[65]

More seriously, the Congressional Budget Office (CBO) prepared an in-depth study of Spinney's claims and methodology titled "Two Methods of Projecting Needs for Defense Operations and Support Funds." The study found that Spinney's method of projecting the proper amount of O&M funds was to look at historical data and assume, based on that data, that O&M readiness required a fixed share of the defense budget. If they did not reach that fixed share, using Spinney's method they were under funded. [66]

The study then compared Spinney's "fixed share" method with a more complex method used by analyst William Kauffman of the Brookings Institution. Kauffman said that the percentage of the budget allotted to O&M and readiness was not fixed but would vary from budget to budget and system to system. Two things caused the variation. First, as new systems came into the inventory, their O&M costs were low because there were few of them, especially new systems that had long development times and slow production rates. Typically, O&M funds for these systems lagged by two or three years. Additionally, newer systems had lower O&M costs later in their life because new facilities that were built before the systems came on line did much of the work. These new facilities were in the procurement budget, not the O&M budget, but once these facilities were complete they were no longer a cost item but still contributed to the basic O&M function.[67]

The CBO study also noted that the same military leaders who had criticized low military readiness in the late 1970s now said it was "high and improving," and that

"contrary to Spinney's hypothesis, these large improvements have been achieved [even though the O&M and spares' costs were] a declining share of the overall defense budget."[68] The study concluded, "[Spinney's] conclusion that O&M must maintain a constant share of the budget is not supported."[69]

THE END OF THE REAGAN DEFENSE BUDGET INCREASES

It was obvious in 1983 that Congress would only commit to a small real growth in defense, and in the end the FY1984 budget was cut by about $11 billion, leaving about a 4 percent real increase.[70] The final FY1984 budget spent more money on personnel, consumables, spare parts, ammunition (inventories of air-air missiles were especially increased), and training, providing for flying time increases that allowed the Air Force tactical crews to average 250 flying hours in FY1984, compared with 210 in FY1983.[71]

Though little noted, at this time the simplistic but seemingly logical idea that large, long-term buys produced savings began to fade. The Air Force stretched out a forty-eight plane F-15 buy because the F-15's manufacturer, McDonnell-Douglas, said it could achieve its most efficient rate of production at thirty per year, so there was no cost benefit in building at a faster rate. Capability was also an issue. The F-16 buy increased from 120 to 144, not because it was more economical but because the AMRAAM was coming on line, giving the F-16 the all-weather air-to-air capability it had lacked and making it more desirable to have in the inventory.[72]

At the same time, Congress agreed with the Critics on the need for more independent assessments of weapons, and -- with the support of Weinberger -- moved to take a more active role in the weapons acquisition process by setting up a new Inspector General's office for DoD, as well as an independent Operational Test and Evaluation office and a

Cost Analysis Independent Group (CAIG) in the Secretary of Defense's office.[73] Ironically, the first head of the independent Test and Evaluation office was Jack Krings, McDonnell Douglas chief test pilot for the F-15 program.[74]

THE CRITIC'S LAST STAND

In 1984, Senator Gary Hart published *America Can Win: The Case for Military Reform*. Written with his aide William Lind, Hart demanded congressional intervention on weapons' acquisitions and focused on the Critics' two main criticisms of American defense strategy, the plan to fight both the air-to-air and air-to-ground battles in all-weather conditions and at night, and the need for deep interdiction, both of which Hart and Lind opposed. In the book, Hart offered specific proposals for his ideal mix of Air Force tactical systems in the FY1985 and future defense budgets. The proposals included stopping production of the F-15 and replacing it in the air-to-air role with a new lightweight fighter -- the F-16 was now considered too heavy -- that would have no radar and would cost one-third less than the F-16. All work on the Air Force F-111 and F-15E deep interdiction aircraft would be stopped and the AMRAAM and LANTIRN would be cancelled, in part because Hart said that using LANTIRN puts "unreasonable operating stress on fighter pilots and subjects them to dangerous ground fire" (pilots using the LANTIRN, even in the single seat F-16, disagreed).[75] The TAF would focus solely on close air support, replacing the F-111 and F-15E with a new, very simple (even compared to the A-10) aircraft called the Combined Arms Fighter armed only with a heavy cannon. Thousands of these were to be produced, at a cost of less than five million dollars a copy.[76]

With the *Time* article and Hart's book, the Critics' arguments seemed to be taking over the debate. The Critics had the support of much of the Military Reform Caucus and, more important for Fallows, the newspaper editorial elites and the pundits were on their side. If Fallows' theory was correct, these elites and pundits could influence Congress enough to bring changes not only in the tactical air systems the Air Force bought but also in overall American military strategy. They would push Congress to exert civilian control over the military by forcing it to buy the Critics' simple weapons, and cut defense costs at the same time. Based on the seemingly popular acceptance of their ideas, the Critics seemed to be poised to have a major impact on the types of aircraft and systems the TAF purchased from the mid-1980s on.

But the proposals of the Critics, the Options Committee of the Military Reform Caucus, and *America Can Win* were never adopted. When General Wilbur Creech retired in September 1984 after six and a half years as commander of TAC, the issue of which weapons the tactical Air Force was going to fight with at the end of the decade was settled. The Air Force had won virtually all the arguments, not in the press, but where it counted, in the administration and in Congress. Because of the long lead times of development and production, these decisions, made in the early and mid-1980s when the Critics seemed at their zenith, reached full fruition only in the late 1980s. When the Air Force entered the Gulf War in late 1990, it had Creech's force -- 800 F-15s, including the first F-15Es, 800 A-10 attack aircraft with more sophisticated avionics and the IIR Maverick, and 1,600 F-16s, not the austere day air-to-air fighter the Critics had advocated but a fighter-bomber equipped with a wide variety of sophisticated avionics for the task.[77] The Air Force still had the long-range interdiction mission using the F-111F and the new

F-15E Strike Eagle. Both could perform this mission at night and in bad weather, the F-111F with the Pave Tack pod and the F-15E with LANTIRN, though in late 1990 most F-15Es carried only the navigation pod because there were delays in the laser target designation pod.[78] The AMRAAM radar-guided air-to-air missile was coming into operational service but not deployed. Despite the claims of the Critics that the Air Force would have fewer fighters because of their high cost, the service actually had more fighters at the end of the 1980s than it had at the end of the 1970s or 1960s, and of an exponentially higher quality. [79]

CREECH'S LEGACY

For much of his tenure as TAC commander, Creech had been the most powerful man in the Air Force, perhaps in the American military, and during this period the Air Force leadership completed its change from a SAC oriented bomber-centric force to a tactical fighter force. As early as 1982, there were no "bomber generals" in the top four-star general ranks of the Air Staff in the Pentagon, while there were eight "fighter generals." Outside Washington, there were nine "fighter generals" as major commanders but only five "bomber generals."[80]

Creech and the Reagan defense budgets received credit for the turnaround in TAC (though Creech claimed he deserved most of the credit).[81] From 1980 to 1984, TAC's pilot retention increased from 41 percent to 73 percent, the command's flying hours increased 20 percent and the fully mission capable rate for all TAC aircraft was up 40 percent. In 1984, its Class A accident rate was 3.2, down from 5 in 1980 and tied for the lowest in TAC history. The command increased its number of Dissimilar Air Combat

Training (DACT) sorties by 40 percent per year from 1980, and the number of crews flying Red Flag exercises also increased by 40 percent a year during this period.[82]

Like Dixon before him, Creech had his "boys," a group of young general officers who were completely loyal to him and whom Creech shepherded to higher ranks.[83] Twenty-one officers who served under Creech at TAC eventually became four-star generals, and every Air Force chief of staff from 1986 to 2005 either had been a TAC wing commander or on the TAC staff during Creech's tenure.[84]

Creech was determined that his "boys" carry on his programs, but when he retired in September 1984 he was replaced not by one of his "boys" but by General Jerome "Jerry" O'Malley, an energetic, outgoing, personable former SR-71 pilot and a close friend of Air Force Chief of Staff, Charles Gabriel, the first fighter pilot to hold that position. Both had graduated from West Point, had served together as training officers for the first classes at the Air Force Academy, and O'Malley had been Gabriel's vice commander at Udorn in 1971-1972 during the Lavelle bombing affair. Both had their promotions to brigadier general delayed by Congress while their role in the affair was examined (General Alton Slay's promotion was held up for the same reason), but all three were eventually exonerated. O'Malley's time at Udorn and his association with Gabriel, who had been a prime mover in Dixon's realistic training revolution, put him squarely on the side of realistic training. When O'Malley took over from Creech, he said, "I think that TAC's most important mission, and I think the one it has done best under General Creech, is training. I think TAC pilots are the best-trained pilots the tactical air forces have ever known – during World War II, Korea, Vietnam, or any time since Vietnam."[85] Whether or not this was an indication that O'Malley was going to move away from Creech's

commitment to high-tech weapons and shift the emphasis back to training is not known, but all indications are he and Gabriel intended to put their own stamp on the Air Force and on the TAF. [86]

It never happened. On 20 April 1985, before O'Malley had a chance to make a significant impact, he, his wife, and all three crewmembers were killed when the light transport jet he was flying ran off the end of the runway on the way to a Boy Scout fundraising banquet in Scranton, Pennsylvania.

Creech, even though retired, still exerted considerable influence in the Air Force and O'Malley was replaced by one of Creech's "boys," General Robert Russ. Russ had worked for Creech at TAC then moved to Air Force headquarters as Director of Operational Requirements, where he was responsible for validating the requirements for Creech's high-tech weapons. He returned to TAC as Creech's vice commander in 1982, then Creech arranged for him to move back to the Pentagon as Air Force Deputy Chief of Staff for Research, Development and Acquisition, where he continued to shepherd Creech's programs. While Russ was commander of TAC, he was in constant touch with Creech until May 1991, when Russ retired. Russ was replaced by General Michael Loh, who had been Creech's Deputy Chief of Staff for Requirements at TAC and then TAC's Deputy Chief of Staff for Operations. [87] Wags said that while Russ and Loh had the office, Creech continued to be commander of TAC.

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9. David C. Hendrickson, *Reforming Defense: The State of American Civil-Military Relations (*Baltimore, Johns Hopkins University Press, 1988), 99.

10. James Fallows, "Public Perception, Political Actions, and Public Policy," in *The Defense Reform Debate: Issues and Analysis*, ed. Asa Clark, Peter W. Chiarelli, Jeffery S. McKirtick, and James W. Reed (Baltimore, MD: Johns Hopkins Press, 1984), 345; Pierre Sprey, Oral History Interview by Jacob Neufield, 12 June 1971. K.239.0152-969, AFHRA, 3; 17; 29; 50.

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12. Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World War* (Ithaca, Cornell University Press, 1984), 8, *passim.*

13. Fallows, Batten Awards Keynote Address.

14. Creech, e-mail, March 18, 2000, provided to author by Keith Ferris.

15. Ibid. Creech says that Fallows agreed with him but could not say so publicly. This seems unlikely to the author. One can envision Fallows saying "the argument makes sense given the assumptions," which might lead Creech to believe Fallows agreed, since Creech agreed with the assumptions. Fallows, as the article shows, did not. James Fallows, "I Fly with Eagles," *The Atlantic Monthly*, November 1981, 76-77.

16. Author interview with Dick Anderegg, April 2005, Washington DC.

17. Wilbur Creech, Gen. USAF, Address to the Air Force Association/Aeronautical Systems Division Engineering Awards Dinner, Wright Patterson Air Force Base, Ohio, 22 October 1981, typed transcript, 1 [168.7739-749], Creech papers, AFHRA.

18. Creech, Oral History, 83; Benjamin F. Schemmer, "Congress Set to Fund USAF 'Enforcer' Tests," *Armed Forces Journal (*November 1979): 17.

19. Byron E. Huckee, *A-1 Combat Journal*, Chapter Seven, "Sandy Lead," http://skyraider.org/hook/journalset/jrnChap7.htm (accessed February 2006).

20. *Congressional Quarterly Almanac, 98th Congress, 1st Session, 1983, Volume XXXIX,* 205.

21. Congressional Quarterly, *US Defense Policy*, *Third Edition,* 5.

22. Ibid., 7.

23. Congress, Senate Armed Services Committee, *Preparedness,* 97th Congress, 2nd Session, 26 February 1982, 2102-4.

24. Creech, Oral History, 249-250.

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26. Author interview with Tad Oelstron, Lt. Gen. USAF, Cambridge, MA, October 2005.

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28. Congress, Senate Armed Services Committee, *Tactical Air Warfare,* 97th Congress, 2nd Session, 2 March 1982, 312.

29. Congressional Quarterly, *US Defense Policy*, *Third Edition* (Washington, DC: GPO, 1984), 125.

30. McGeorge Bundy testimony before Senate, 1967, quoted in Allan Enthoven and K. Wayne Smith, *How Much is Enough?* (Santa Monica, CA: Rand Corp. 2005), 310-311.

31. Air Force Association web site, http://www.afa.org/AboutUs/default.asp (accessed February 2006).

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33. Author's notes of meetings between General Creech and General Ivry while accompanying General Creech and members of the TAC staff on their visit to Israel, September 1979.

34. Author's notes from the first IAF F-16 team visit, led by General Peled, to look at the F-16, August 1976. Author was one of two USAF escort officers.

35. Sprey Oral History, 12.

36. Author's notes on his own flights in Israeli F-15s and conversations with Israeli F-15 pilots, Tel Nof AFB, Israel, 1978-1980.

37. Merav Halperin and Aharon Lapidot, *G-Suit: Combat Reports From Israel's Air Wars* (London: Time Warner Books UK, 1990), 140-148.

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41. Boyne, 27-28.

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43. Steven Canby, "Military Reform and the Art of War," *International Security Review* 11, 1 (Spring 1988), 263.

44. Creech, Oral History, 241; Boyne interview with Ivry, 28.

45. Stephen Canby, "Military Reform and the Art of War," in Clark, 143.

46. James C. Slife, Lt. Col. USAF, *Creech Blue: General Bill Creech and the Reformation of the Tactical Air Forces, 1978-1984* (Maxwell Air Force Base, AL: Air University Press 2005), 49.

47. Robert W. Drewes, R. W. *The Air Force and the Great Engine War* (Washington. DC: National Defense University Press, 1987), 113-114

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56.Hayes, 76.

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82. Point Papers prepared 17 January 1985 by TAC Staff for General Gerald O'Malley interview with *Air Force Magazine* (unpublished).

83. Slife, 90-93. Many of these officers were favorites of both Creech and Dixon.

84. Slife, 105.

85. Benjamin Schemmer, "Interview With New TAC Commander General Gerald O'Malley," *Armed Forces Journal*, 122 (January 1985): 71-79.

86. Sandra A. Gregory, Lt. Col., USAF, "A Man's Flight Through Life: A Leadership Profile of General Jerome F. O'Malley," Research Report, Industrial College

of the Armed Force, 1994. This work is quite hagiographic, but the biography is accurate and the interviews accurately portray the esteem felt for O'Malley.

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CHAPTEER FOURTEEN: THE GULF WAR

From 1979 until the mid-1980s, the Critics attempted to reduce the defense budget by reorienting American military strategy, and at the same time move from relatively small numbers of expensive, sophisticated, high-tech, "force multiplier" weapons systems to larger numbers of simpler, more robust, and less expensive systems. The Critics also attempted to change the "corrupt" procurement process they said was responsible for developing and purchasing these weapons. By any measure, they failed.

Still, through the 1980s and through August 1990, the Critics were in an enviable position. They had generated a vigorous subculture that criticized the defense establishment and brought them regular attention in the media, and life inside their subculture had many charms. The Critics' ideas required no burden of proof and were unassailable because, since they had never won a policy battle, their ideas were untested. Unencumbered by the need to appease interest groups and by the grind of running bureaucracies, they considered themselves smarter, bolder, more strategic minded, and more historically aware than those who were responsible for selecting weapons and training the forces to use them.

At the same time, almost unnoticed, during this period there occurred the first successes of post-Vietnam realistic training and the new high technology. On 19 August 1981, two Navy F-14s shot down two Soviet-made Libyan fighters over the Gulf of Sidra

in an engagement that lasted less than one minute. In early April 1986, a bomb killed or wounded sixty-three US service men in a Berlin disco. The attack was blamed on Libyan leader Muammar Qaddafi, and in response on the late evening of 15 April 1986, a force of eighteen F-111s took off from England and made a 6,400 mile, thirteen hour flight to strike targets around Tripoli in Operation El Dorado Canyon. The F-111s were carrying the latest high-tech systems, Pave Tack laser designator pods and new 2,000-pound GBU-10 laser guided bombs, as well as unguided 500-pound bombs specially designed for delivery at very low altitude. Only four of the F-111s dropped their bombs successfully, several missing their targets and the rest not dropping because they could not properly identify their targets. One F-111 was lost, but despite the small number of aircraft that hit their targets post-mission analysis indicated that difficulty in identifying the targets caused most of the problems, not systems malfunctions. But the videotapes of the F-111 bombs that did hit their targets were very clear and shown on national television and to Air Force units around the world. The positive reaction to the tapes made the Air Force aware that it now had a vivid way of displaying the combat results of its new, high-tech systems, and the video tapes of laser guided bomb strikes were soon to become a potent weapon in the Air Force's public relations arsenal. [1]

Then, in August 1990, what had been a theoretical argument between the Air Force and the Critics moved into the world of reality when Saadam Hussein's Iraqi army invaded Kuwait. The United States moved forces into the region in Operation Desert Shield and prepared to remove the Iraqis, and the forces the United States deployed were the type of high-technology systems that the Critics had deplored since the mid-1970s.

Not only did they include the Air Force's high-tech weapons – the F-111, F-15E, multi-role F-16, LANTIRN, and AWACS, to mention a few – but they also included the US Army's high-technology main battle tank, the M1A1 "Abrams." Fallows had specifically criticized the tank in *National Defense* because it had a smoothbore main gun, saying this was foolish since "everyone knows" that the rifled barrels on the Iraqis' Soviet tanks were more accurate and had longer range. The Abrams also had a complex fire control system and a night vision sight, both of which were anathema to Fallows and the Critics.[2]

Critic Chuck Spinney had written, "the acid test of war is the only unambiguous indicator of capability," and given their previous analysis the Critics believed the war would be a disaster.[3] The American military had the wrong leaders, the wrong doctrine, and the wrong equipment. American military commanders would be inadequate because "warriors" and "innovators" like Boyd were not promoted. American military strategy was committed to attrition warfare that would cause high American casualties. BVR air combat and the use of precision-guided munitions would be impossible because of radar jamming and target identification problems. Long-range, all-weather interdiction would be ineffective because of the high-tech systems' failure rate, and in general America's high-tech systems would have low in commission rates and fly very few sorties. Saadam Hussein shared the Critics' view of American air power, telling Dan Rather of CBS news in an interview "the United States depends on the Air Force. The Air Force has never decided a war in the history of war."[4]

Once the Air Force units arrived at their bases in the Persian Gulf, the "combat culture" mindset took over.[5] Unlike the units deployed to Linebacker in 1972, these

squadrons had participated in a variety of other realistic exercises with other Air Force units. The crews knew the capabilities of the other systems they would be flying with because they had flown with these systems at Red Flag, and the exercises had also given the crews and commanders a robust IPN. When they began to plan their attacks, they were working with people they knew or with whom they had only one or two degrees of separation. The wide reach of the Red Flag exercises gave the aircrews a *lingua franca* that was used not only by Air Force crews but also crews from the Navy and Marine Corps, as well as crews from the RAF. The leaders of the Coalition air forces also knew what would decide the battle, and once the crews were established they began a rigorous training and exercise program with the other units they would be operating with in combat. [6]

However, there were some problems. The force that deployed to the Gulf had over 95 percent of the Air Force's available guidance systems, but after being short of laser-guided bomb (LGB) designator systems during Linebacker, almost twenty years later the Air Force still only had few more than 100 systems.[7] Forty were in the F-117 Stealths, there were about sisty-four Pave Tack systems mounted on F-111Fs, and towards the end of the war a few LANTIN laser designator pods were available for the F-15Es.[8] The result was that the forces in the theater had tens of thousands of laser-guided bombs, but were short of guidance systems. The150-plus laser guided bomb Pave Spike designator systems that were in service in the TAF in the late 1970s had been dropped from the inventory for reasons that are unclear, but probably because Pave Spike was intended for use with the F-4, which was being phased out, and because it was a "clear weather only"

system. Ironically, the British brought eight Pave Spike systems to the theater given to them by the USAF as surplus, and they performed very well.[9]

The plan developed for the attacks on Iraq were a variation of Creech's "roll back" doctrine. Phase I was to begin with an attack on the Integrated Air Defense System headquarters in the Baghdad area by F-117 Stealth aircraft armed with laser-guided bombs, as well as strikes by F-111s and F-15Es on a variety of strategic targets, including chemical weapons facilities. The F-117 strikes were planned to wipe out the Iraqi air defense command and control centers, so the surface-to-air missile sites would be unable to protect or support each other and could be picked off one by one.

However, for the first few nights the F-111s and F-15Es still had to hit their targets, and the question of Dixon's "going low" doctrine as opposed to Creech's "medium altitude" doctrine became an issue. The commander of the Central Command Air Forces, USAF Lieutenant General Charles Horner, left the decision to the commanders of the deep interdiction wings, Colonel Hal Hornburg of the F-15E wing and Colonel Tom Lemmon of the F-111F wing. Both elected to attack at low level as they had done during several Red Flag exercises. It was a week before they felt comfortable flying some missions at medium level, "roll back" or not.[10] (Ironically, Hornburg was a Creech favorite and was to become commander of TAC in early 2000.)

America's high-tech weapons began Spinney's "acid test" on 17 January 1991 with the medium altitude F-117 strikes and the F-15Es and F-111s coming in low. The F-117 strikes, as planned, disabled the Iraqi IADS and few hours later, at dawn, two huge strike packages of Coalition aircraft, using tactics developed at Red Flag and honed in exercises

during the run up to the war, moved towards their targets in Iraq and Kuwait. The Iraqi radar and missile sites, unable to coordinate their actions, all come on the air at the same time to meet this massive attack, but the first aircraft in the packages were not strikers but anti-SAM F-4G "Wild Weasels," the second phase of the roll back operation. The Iraqi radars and missile sites dissolved in an avalanche of new, high-tech HARMs (High Speed Anti-Radiation Missiles), and then the missile attacks were followed up by the Wild Weasels dropping cluster bombs on the sites. For that point on, Iraqi radar-guided SAMS played a limited role in the war.[11]

The Air Force used the videotapes from the LGB designators to flood the media with images of precision guided weapons hitting their targets, and it seemed the initial air campaign was stunningly successful. Nevertheless, on 3 February 1991, James Fallows wrote in the *Washington Post* that the results so far proved "nothing about the Reagan defense budgets on high-tech weaponry." He noted that there were fewer high-tech weapons because they were so expensive and cautioned, "we do not know how effective our weapons will be in the unpredictable circumstances of real war" because the "procurement system has a bias against realistic testing." The war was especially dangerous, he continued, because the officer corps who had planned the raids and were flying the missions were "budget boosters instead of military leaders." The air war would be the test, he said, to see "if our [high-technology] weapons proved effective enough to forestall grisly land warfare, enough to justify their great cost."[12]

By the second week roll back was complete, and the Coalition aircraft begin to fly to their targets at medium altitude. With the relatively small number of laser designators,

most of the Coalition air strikes were old fashioned, dumb bomb strikes. The F-16s bombing system proved highly accurate, but the A-10s most effective weapon, its 30mm cannon, often brought it too close to Iraqi small arms fire, so the A-10s weapon of choice was the Maverick missile. A-10s fired 5,274 Mavericks during the war, and these missiles – which the Critics did not want in the inventory – accounted for most of the A-10s' vehicle kills.[13] In the event, after action reports gave Coalition air power credit for killing 1.700 Iraqi tanks (40 percent of their force), 900 armored personnel carriers (30 percent of their force), and over 1,450 artillery pieces (47 percent of the force).[14] The Coalition forces kill ratio over the Iraqis in all areas was about 1,000:1, and credit for the kill ratio went to the technological edge in weapons systems, a significant superiority in leadership, and superb training – exactly the opposite of what the Critics had predicted.[15] Thirty-six of the forty Iraqi aircraft shot down in air-to-air combat were destroyed by F-15s, twenty-six with the "easily jammed" radar-guided AIM-7s, with no F-15 losses. F-16s, armed with the Critics' favored heat-seeking missiles but not yet equipped with radar-guided AMRAAMs, scored no kills.[16] The Coalition forces suffered an extraordinarily low loss rate of one aircraft for every 2500 combat sorties (the USAF lost one aircraft every 4000 sorties), and the heaviest air losses were with the Critics' favorite A-10 – 1/3 of all air losses – and the RAF Tornados using the low-level tactics advocated by Critic Steven Canby. After losing four Tornados the first three days of low-level attacks, the RAF switched to USAF style medium-altitude attacks and suffered no further losses.[17] Former TAC commander Wilbur Creech noted that had the Air Force used Canby's tactics, based on the RAF experience the TAF would have lost 160 fighters

instead of the 13 fighters it actually lost. Creech also noted that, while the level of success might have not been the same in a war with the Soviets, the reliability of the weapons systems – the Critics main point -- would have been unaffected.[18]

The Air Force used deep, long-range interdiction strikes throughout the war, led by the F-111s and the stealthy F-117s.[19] Although the F-15E Strike Eagle's LANTIRN system was not fully combat-ready, the F-15Es played a vital role in the campaign. When the Iraqis began to launch Scud missiles at Israel, there was huge pressure on the Coalition from the Israeli government to find the missiles and their mobile launchers, combined with the threat that if the Coalition could not find them the IAF would. It was critical to Coalition interests that the Israelis not be involved in the war, and General Norman Schwarzkopf later told David Frost, "If Israel had entered the fray after the first Scud attacks I don't think we could have held the coalition together."[20] The F-15Es spent much of their time searching at night for and attacking the Scud missile launchers with their partial LANTIRN systems.[21] While the attacks had mixed results, the diversion of the F-15Es, which the IAF was very familiar with and had been trying to buy, let the Israeli government know that America was using its most sophisticated weapons to try and find the Scuds. This, combined with the deployment of Patriot missiles and a decrease in Scud launches, probably caused by F-15Es' standing patrols, gave the Israeli government the rationale it needed to resist public pressure to intervene.[22]

As far as the high-tech Air Force systems' maintainability in combat, the fully mission capable (FMC) rate for Air Force high-tech aircraft was 92 percent, much higher than its peacetime rate. The Air Force had 50 percent of the air assets in the region but its

high-tech fighters flew 59 percent of all sorties while incurring only 38 percent of the losses.[23] F-111s and F-15Es flew a large number of deep-interdiction strikes to cut off the front line from supplies, and later F-111s flew "tank plinking" missions every night. On these missions, flown at medium altitude, the F-111s used their high-tech, all-weather infrared and low-light television target location systems to find Iraqi tanks by the heat of their return and drop precision guided bombs, one at a time, on each tank. The F-111Fs were often able to destroy as many as ten Iraqi tanks on a single mission.[24]

The Air Force high-tech weapons had a huge impact on seasoned military journalists. After the war the *Washington Post's* military correspondent, Rick Atkinson, said that in the history of the 20th century up to that time, only one war had been decided in one day, the 1967 Six Day Middle East War by the first day of Israeli Air Force strikes. At the end of the first night of the Persian Gulf War Atkinson said there were now two wars decided by air power in a single day of fighting.[25] Williamson Murray, the well-known historian of air power and no friend of the Air Force, noted that "the squabbling about the numbers of tanks destroyed misses the point…death for a military force occurs, as in a human being, not when some fixed percentage of critical components fail but when the degrading synergies cause a complete collapse of the whole…the air attrition campaign caused this breakdown."[26]

The success of the high-tech weapons was not limited to the TAF. In "the ultimate test of combat," the M1A1 Abrams' smooth bore gun that Fallows disparaged outranged the Iraqis' Soviet tanks rifled guns by over 1,000 meters, while the Abrams' high-tech

sights let the tank gunners make numerous one-shot kills at ranges of one to two miles even in the sand and wind of the desert.[27]

But while the spectacular pictures of guided weapons demolishing target after target led many to rush to credit the high-tech weapons for the victory, the military leaders gave credit not only to the weapons but also to the well trained American forces who had developed the appropriate tactics for the technologies under realistic field conditions in exercises such as Red Flag.[28] Air Force crews that flew in the operation were also effusive in their praise of the training they had received. One said, "We'd seen it all before; we know exactly what to do…the reason we are doing so well in this war is because we are so well trained."[29] Another said, "We fought like we trained… [and] training saved our lives."[30]

The chief of Desert Storm air operations, Major General John Corder, had been one of the major proponents of realistic training and who, as one of the "iron majors," had given the disastrous written test to TAC crews in 1972 that led to the Aggressor Squadron. He told this author that, with the relatively small number of LGB guidance systems devoted early in the war to high-value point targets, most of the TAF missions were similar to Red Flag missions using coordinated strike packages and conventional weapons. The missions were highly successful, and he gave the credit to the culture of realistic training introduced by General Dixon, Moody Suter, and the iron majors in the 1970s, saying "Red Flag prepared pilots for the actual environment in which they would fight and gave them the capability to adapt to the conditions [of combat]."[31]

When he returned after the war, Corder called General Dixon, and remembers, "I told him that what happened in the Gulf was because of what he had done with training while he was commander of TAC. He got all choked up and I thought he was going to cry. Very un-Dixon…"[32]

Post war, a few of the Critics did acknowledge they might have been wrong. In mid-1991, Fallows admitted in *The Atlantic Monthly,* "I am beginning to think that the only way the national government can do anything worthwhile is to invent a security threat and turn the job over to the military."[33] Others conceded some points, but tried to offer alternate explanations for the victory. Dr. Stephen Biddle of Harvard said that "Iraqi errors allowed new Coalition technology to perform at training ground effectiveness…[and] without the Iraqis mistakes the outcome would have been would have been far different in spite of the Coalition's technology, and Coalition casualties would likely have reached or exceeded prewar expectations [as high as 45,000, including 10,000 killed]."[34] He added grudgingly "[nevertheless] many previous armies have displayed combat skills no better that the Iraqis, but without producing results anything like those of 1991; only a powerful interaction between skill imbalance and new technology can explain the difference."[35]

POST WAR ASSESSMENTS

In a series of congressional hearings in April 1991, the backers of high-tech weapons did not conceal their satisfaction. In a House Armed Services Committee hearing on the Persian Gulf, Former Reagan Navy secretary John Lehman said

> …high-tech, and the emphasis on high-tech to make our strategies work was validated in Desert Storm. The weapons systems

> worked. The very expensive and very high-tech training ranges worked…we have demonstrated that by using high-tech command and control, very high-tech training, high-tech precision weapons, high capability weapons systems, we can defeat huge armies of totalitarian regimes that have no compunction about providing cannon fodder.[36]

Jack Krings, the director of DoD's Operational Test and Evaluation unit that the Critics had pressed for so hard in the 1980s, said, "the high/low-tech debate is over…we designed and developed expensive and highly sophisticated weapons, invested heavily in training, then tested them operationally for effectiveness and suitability…important Congressional members and staffers supported the responsible advocates…now everybody knows high-tech works."[37] Krings also noted that investments in improved reliability and maintainability had sharply increased the cost of weapons but dramatically increased their value. His conclusion was that, as predicted, "very large differences in casualties appear to result from very large differentials in combat technology."[38]

Doctor William Perry, a true technologist and long-time advocate of high-tech weapons, agreed with Krings. Perry pointed out that the loss rate was one aircraft per 4000 sorties, whereas in the past a lost rate of from .5 to 1 percent – one to two aircraft per 200 hundred sorties – had been considered very low. He also pointed out that combat showed the Critics' contention that sophisticated weapons would be ineffective in the "fog of war" was entirely wrong.[39] He also noted that Stealth was "relatively invulnerable to [Soviet-type] air defenses."[40] Perry also paid a huge compliment to the realistic training programs begun in the late 1970s by saying

> I was surprised how effectively the systems were used….I couldn't believe that [the airmen] would get full effectiveness out of these new systems, and I was wrong in that estimate…the

> military planners not only used the new systems, but they built their tactical plans around them on the belief that the systems would work effectively, and they were right.[41]

The Critics, however, were unimpressed. Several appeared in front of the same House Armed Services Committee and continued to thunder that, despite their early insistence that combat was the ultimate test of weapons, not all combat was equal. Senator Gary Hart said, "The victory was not the victory it seemed to be" and that the "Persian Gulf War did not prove that high-tech is better than low-tech weaponry."[42] Pierre Sprey claimed that the results had been "shamefully doctored," that despite the fact that no F-117 Stealth aircraft had been lost over the most heavily defended area of Baghdad "the Stealth [F-117] is probably not stealthy…and [is] easy to track," that the M1A1 Abrams "had not been tested in combat," and that Iraqi antiaircraft guns "defeated a major portion of our air fleet… [and] dominated the air defense situation." A cynic might say all of this must have come as interesting news to the Iraqi military.

Sprey also said that there were huge problems with Senator Hart's favorite airplane, the Marines' Harrier attack aircraft, because of its short range (apparently Sprey had forgotten that he had earlier said, "The quickest way to destroy a fighter is to give it too much range"). Sprey also said the A-10 "success story" had been the single most important military effect of the war and "saved the air campaign," adding that Air Force General Chuck Horner, chief of the Gulf War air campaign, had not wanted the A-10 brought to the Gulf.[43] Horner denied this and called Sprey a liar in e-mails to the author. He added, "my son was an A-10 pilot in the war and so I had a pretty good idea about how the A-10 did."[44]

Les Aspin, the House Armed Services Committee chairman, seemed to express the sentiments of the entire committee when he said, "everybody would agree the military performed well, that the leadership was superb, that the quality of the troops was very, very good."[45]

Everybody, that is, except Critic John Boyd. Boyd made a brief statement to the committee claiming his ideas were responsible for the victory, that "air power was not decisive," then went on a long tirade about how, because one of his "acolytes" was not promoted to general, the "military suppresses brilliant and unconventional young officers." Boyd continued by saying military promotion system (the one that gave the American military Colin Powell, Norman Schwarzkopf, Charles Horner, and the other Gulf War generals) was flawed and urged Congress to "get involved with the issue of selection of people [to general]," suggesting that Congress take over all general officer promotions from the military.[46] The transcript of the hearing indicates the congressmen seemed appalled by the idea. Former Navy secretary Lehman, who was sitting on a panel with Boyd and was very familiar with military promotions, was horrified at the idea of Congress selecting flag officers. Responding to Boyd's proposal, he said "Congress should not get into the business of naming people and micro-managing."[47]

One notable aspect of the congressional hearings was that Hart, Sprey, and Boyd all gave credit for the victory to Boyd's "brilliance" and "genius," and said that the reason the Coalition won the war was because it adopted Boyd's maneuver warfare principles and got inside the Iraqi's observation-orientation decision-action (OODA) loop.[48] Inconveniently, Critics who were much more knowledgeable about maneuver warfare

disagreed. Well known military analyst and author Martin van Creveld joined Critic and maneuver warfare enthusiast Steven Canby in examining the results of the war, and after making the Critics' usual laments that "the facts are not all in…[but] many official pronouncements during and after the war were hyperbole…skewed to influence future budgetary battles on Capitol Hill" and that "unit cohesion and training proficiency were not high," the two took strong exception to the other Critics' comments before Congress.[49] Van Creveld and Canby said that, despite Hart's, Sprey's and Boyd's declarations, "the notion of entering into the enemy's OODA loop never came into play" and closed with the comment that "Desert Storm was not a good example of maneuver warfare."[50]

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1. Robert E Venkus, Col. USAF, *Raid on Qaddafi: The Untold Story of History's Longest Fighter Mission by the Pilot Who Directed It* (New York, St. Martin's Press, 1992), 178-181; also see Joseph T. Stanik, *El Dorado Canyon: Reagan's Undeclared War With Qaddafi* (Annapolis, MD: Naval Institute Press, 2002).

2. James Fallows, *National Defense* (New York: Random House, 1981), 86, *passim.*

3. Franklin C. Spinney and J. C. Thompson, *Defense Facts of Life: The Plans/Reality Mismatch* (Boulder, CO: Westview Press, 1985), 85.

4. CBS, Dan Rather interview with Saadam Hussien, 29 August 1999, transcript FBIS-NES-90-170.

5. Diane T. Putney, *Airpower Advantage: Planning the Gulf War Air Campaign 1989-1991* (Washington, DC: Air Force History and Museums Program, 2004), 259.

6. John Corder, Lt. Gen. USAF, phone interview with author, 13 April 2005.

7. The Navy had a number of laser designators but only a few laser guided bombs, and the distance from the carriers to the target areas made it practically impossible for Air Force aircraft to use Navy designators. Putney, 124, *passim.*

8. *1993 Gulf War Air Power Survey, Volume Four*, (Washington, DC: Department of the Air Force, 1993), 119-121.

9. Andrew Vallance, Group Captain RAF, "RAF Operations," part of "Air Power in Desert Shield/Desert Storm: Part I," *Air Power Historian* 38, 3 (Fall 1991): 38.

10. Ibid., 261.

11. *1993 Gulf War Air Power Survey, (GWAPS), Volume I* (Washington, DC: Department of the Air Force, 1993), 11-13; Putney, 259-260; Davis, 36.

12. *Washington Post*, 3 February 1991, A16.

13. Stewart M. Powell, "Scud War, Round Two," *Air Force Magazine,* April 1992 26-30.

14. *GWAPS, Volume II,* Section II, Effects and Effectiveness, 34-36.

15. See, for example, William Perry, "Desert Storm and Deterrence," *Foreign Affairs*, 70 (Fall 1991): 67-68.

16. Williamson Murray, *Air War in the Persian Gulf* (Baltimore, MD: Nautical & Aviation Publishing, 1995), 326; Vallance, 36.

17. Perry, 75; Murray, 330.

18. Creech, Oral History, 228.

19. The F-117s carried two bombs, the F-111 twelve, but the "stealthy" F-117s were more useful against heavily defended targets.

20. General Norman Schwarzkopf, television interview with David Frost, 27 March 1991, available on PBS VHS tape, Air University Library, Maxwell AFB, AL.

21. David E. Snodgrass, Maj. USAF, "Attacking the Theater Mobile Ballistic Missile Threat." (Thesis: School of Advanced Air Power Studies, Maxwell Air Force Base, AL, 1993), 3-6.

22. Murray, *Air War Persian Gulf*, 168-174; for the Israeli view, author interview with Yiftach Spector, IAF Director of Operations in 1991, 17 September 2004 in Tel Aviv, Israel.

23. Murray, *Air War Persian Gulf*, 310.

24. "F-111 Operations Desert Storm," Appendix 21 to Annex C to 1730.13.7/S-078/92, 20 February 1992. Maxwell AFB: AFHRA; Michael J. Bodner and William W. Bruner III, Majors, USAF, "Tank Plinking," *Air Force Magazine*, October 1993, 10-14.

25. Rick Atkinson, "Frontline" interview, http://www.pbs.org/wgbh/pages/frontline/gulf/ (accessed February 2006).

26. Murray, *Air War Persian Gulf*, 321-322.

27. Norman Friedman, *Desert Victory: The War For Kuwait* (Annapolis, MD: Naval Institute Press, 1991), 15, *passim.*

28. Perry, "Desert Storm," 77-78.

29. Special Study, "History of the 35th Tactical Fighter Wing (Provisional): Operation Desert Shield and Desert Storm," AFHRA, 77.

30. "F-111 Operations Desert Storm," Appendix 21 to Annex C to 1730.13.7/S-078/92, 20 February 1992, AFHRA, 225-226.

31. Author phone interview with John Corder, Lt. Gen. USAF, 23 March 2006.

32. Ibid.

33. James Fallows, "Military Efficiency," *The Atlantic Monthly*, August 1991, 18.

34 Prewar estimates of casualties for US/Coalition forces ranged as high as 45,000, 10,000 of which would be fatalities. Most estimates ranged from 9,000 to 30,000. See, for instance, Michael K. Frisby, "US Isn't Set for Casualties, Doctors Say," *The Boston Globe*, 15 January 1991, 4; and *Reuters North American Wire*, 9 January 1991 www.reuters.com. (April 2006).

35. Stephen Biddle, "Victory Misunderstood: What the Gulf War Tells Us About the Future of Conflict," *International Security* 21, 2 (Fall 1996). http://www.comw.org/rma/fulltext/victory.html (accessed March 2004).

36. Congress, House Committee on Armed Services, *The Impact of the Persian Gulf War and the Decline of the Soviet Union on How the United States Does its Defense Business,* 102nd Congress, 1st sess., 22 April 1991, 676.

37. Ibid., 536-537.

38. Ibid., 540-541.

39. Ibid.,563-565.

40. Ibid., 570.

41. Ibid., 571.

42. Ibid., 672.

43. Ibid., 543-548; 572-573; for Sprey's comment on range, see Pierre Sprey, Oral History Interview with Jacob Neufield, 12 June 1971. K.239.0152-969, AFHRA, 9.

44. Horner e-mail to author 12 February 2006.

45. Congress, *The Impact of the Persian Gulf War,* 567.

46. Ibid., 696; 668-669, 695-698, *passim.*

47. Ibid., 701-704; 698

48. Ibid. For Sprey's comments see 543-544, *passim;* Hart's comments 672.

49. Martin van Creveld and Steven Canby, *Air Power and Maneuver Warfare* (Air University Press: Maxwell Air Force Base, AL, 1994), 231. Van Creveld is a well known military historian who teaches at Hebrew University and the author of a number of books on military history, notably the classic *Supplying War: Logistics From Wallenstein to Patton* (Cambridge, UK: Cambridge University Press, 1977).

50. Ibid., 214, 220.

CHAPTER FIFTEEN: CONCLUSIONS

WHY THE "IRON MAJORS' REALISTIC TRAINING INNOVATIONS SUCCEEDED

Innovation is not just incremental improvement but a revolutionary change in the way existing tasks are performed, accompanied by the associated changes needed to accomplish the task.[1] When Dixon and the iron majors pushed the Air Force from "fly safe, around the flagpole" training to "realistic training" with Red Flag, it was at least innovative, but could more properly be called revolutionary. The change took less than a year, a remarkably short time for a complete change of direction for such a large organization in a critical area. Equally remarkable was the change to "train the man"; this was completely out of character for the Air Force, which traditionally embraced technological innovation but not innovation in non-technical areas. Because true innovation is so difficult and, in this case, counter-intuitive, the changes in Air Force training beg the question of how and why the innovation was so successful.

ORGANIZATIONAL STRUCTURE, LEADERSHIP, AND FOCUS**.** Dixon, and later Creech, was the sole head of a well-disciplined, hierarchal organization. They were able to decide unilaterally on a direction the organization would move and be sure the members of the organization would follow their guidance. In the case of Red Flag, Dixon was able to implement the exercise easily since it required almost no cooperation from

other organizations.[2] It was the same for the other realistic training innovations, whether done by Dixon or Creech. Later Creech was the single person in charge of TAF requirements and had a free hand in selection of new systems.

Strong, consistent leadership was also key, and the two TAC commanders complemented each other as they implemented the realistic training regime. Dixon, the system builder, had the strength of personality to push Red Flag through and resist the pressure from Chief of Staff General David Jones to lower the level of realism to bring down the accident rate. While it is questionable if Red Flag would have come about if Creech had been commander of TAC when Suter appeared in 1975, Creech, the "Bricklayer," certainly was willing to take Dixon's realistic training programs and make major improvements. The difference was that Creech did not do this in a confrontational way but by using the trust his superiors – Air Force Chiefs of Staff Jones and Allen – had in him.

Dixon and Creech constantly kept the TAF focused on the requirement to be able to fight a major war and, while their priorities were different, they were not mutually exclusive. Dixon put his first priority on training but still actively pursued improved weapons systems, while Creech put his first priority on systems but still actively improved TAC's exercise programs. The leadership's tight focus on these areas meant that the staff, despite frequent, regular turnover, was always sure of the way ahead.
WILLINGNESS TO ACCEPT OUTSIDE IDEAS. MIT's Owen Cote believes that interservice competition and rivalry can often be the source of innovation, and it certainly appears to be true in this case, but expanded to an international level. Suter and the iron

majors did not have the "NIH" (Not Invented Here) syndrome, an aversion to ideas that they did not develop themselves. As instructors at the Fighter Weapons School and veterans of SEA combat operations, the iron majors were more inclined to improvement by training than by new high technology weapons systems, which they had seen fail too often in combat. To these officers, the simplest and best way to improve combat capability was to adopt the ideas of the two programs that they knew worked, the Navy's Top Gun program and the Israeli Air Force selection and training program. The iron majors borrowed liberally from each, but they found that the theoretical willingness to accept new ideas was one thing; real changes were often painful and involved some serious soul searching. In one case, when the Fighter Weapons School instructors began flying regularly with the Navy Top Gun instructors, one Weapons School instructor noted ruefully "we were badly outflown for two reasons, lack of proficiency and outmoded tactics….The Navy used superior tactics associated with Loose Deuce [two ship]… [and] were almost always able to defeat our numerically larger but less optimum four-ship fighting wing tactic. It was a bitter pill to swallow." But swallow it they did; the duels with Top Gun finally, in late 1975, led the Air Force to slowly change to two-ship formations.[3]

While the iron majors identified their problems from Linebacker and took the improvements from both Top Gun and the Israelis, the Israeli experience seemed to have more influence on Dixon, probably because as a high-ranking Air Force officer it would have been politically impossible for him to acknowledge the Navy's superiority in air combat training.[4] Nevertheless, Dixon's contacts with IAF commander Bennie Peled led

him to the same conclusions the iron majors had reached, so the path he followed to the conclusions seems unimportant. In fact, because Moody Suter had been the Israelis' instructor in the Fighter Weapons School, it gave Suter another level where he was able to relate to Dixon, and probably increased Dixon's comfort level with Suter's concepts.

A PROGRAM TO DEVELOP BROAD SUPPORT AT ALL LEVELS. Suter and the iron majors developed the Red Flag exercise in the Pentagon using a carefully managed political process. By systematically taking the plan through all the levels of the Air Staff and aggressively looking for problems with the program, they were able to resolve any potential difficulties and were prepared to answer any question that might come up. By the time Suter gave the Red Flag briefing to Dixon, it had been carefully scrutinized by interested officers throughout the Air Force and had the approval of most of the general officers on the Air Staff, as well as the Chief of Staff.

At the same time, Suter and his cohorts knew while many in the higher echelons focused on resources, the lower levels of the TAF were hungry for realistic training that would truly prepare them for the next war. From their time at Nellis and their informal IPNs, they were confident that the aircrews and support personnel would enthusiastically implement Red Flag, and they were right.

LACK OF RESISTANCE. Experts on military innovation – in fact, all types of innovation -- often identify one of its defining characteristics as "meeting resistance." The resistance arises because innovation generally seems to be a zero-sum game, where changes and improvements in one area tend to deemphasize another area.[5] However, in the case of realistic training, there was virtually no resistance. While Dixon's power is a

partial explanation, the real reason seemed to be flying safety did not have a constituency that depended on the flying safety for its status in the organization. The idea of "flying safety over everything," of flying safety as an end in itself instead of a means to greater combat capability, proved to be a house of cards. But it is important to note that the idea of flying safety was redefined, not dropped, and in some ways it became more important. Dixon and the iron majors shifted the emphasis from safety to realistic training, but they realized that accidents would jeopardize the realistic training program, so flying safety remained an important aspect of TAF operations. After Red Flag and the other realistic training programs began, Air Force flying safety programs began to focus more on concrete suggestions on how to fly realistic combat training missions safely, rather than mere exhortations and "nannying."[6]

LOW COST. The fact that the initial realistic training innovations -- Top Gun, the Aggressors, Red Flag -- began as low cost programs helped. Their low cost limited the "down side" of implementing them, and once they began and were obviously successful cost became much less of an issue. At first glance, it might seem surprising that the realistic training programs came at a time of low budgets and a general lack of regard for the military, but this is not surprising to the military innovation *cognoscenti.* Steven Rosen of Harvard noted that "*initiating* an innovation and bringing it to the point where it proved a strategically useful option has [often] been accomplished when money was tight…Rather than money, talented military personnel, time, and information have been the key resources for innovation."[7]

THE DISAPPEARANCE OF THE "UNIVERSAL PILOT" PROBLEM. Lack of realistic training was only one of the Vietnam-era problems the iron majors saw. The other was the Air Force "universal pilot," the unqualified pilot who was sent to fly fighters and who absorbed a huge amount of training time, drove the entire program to a low level, and often proved inadequate in combat. The "universal pilot" issue affected the entire Air Force, and an attempt to change the concept of the "universal pilot" to suit TAC's ideas might have brought strong institutional resistance from the other commands, but the problem seems to have simply gone away. From 1978 on, there is virtually no mention of problems with the "universal pilot" either in the literature, in oral histories or in anecdotes.

The problem seems to have disappeared for a variety of subtle, complex, and unrecorded reasons. With the end of the Vietnam War, the fighter force stabilized. There was no longer a need for a rapid turnover of fighter pilots to replace those who had finished a combat tour, so only a relatively small number of new fighter pilots were required to keep fighter cockpits filled. These new fighter pilots came almost entirely directly from flying school, not from other aircraft. Anecdotal evidence suggests they were from in the top part of their flying school class, because flying fighters was clearly the way to promotion in the Air Force and, in addition, was fun. Also, the end of the war eliminated the pressure on TAC to rush out a certain number of fighter pilots by a fixed time, so training could take longer. After graduating from flying school, the new pilots were now sent to a "fighter lead-in" course where those who lacked the skills were eliminated quickly and inexpensively, while others were given basic skills so they were

prepared to transition into operational fighters.[8] The longer training time, plus the new "building block" training methods, led to operational squadrons being manned, in the main, by highly qualified pilots.

WHY THE CRITICS' ATTEMPT AT INNOVATION FAILED

Both the Air Force and the Critics presented views of the future and theories of how to make America's defenses stronger, but both supporters and those who disagreed with the Critics generally agree that they had little effect on American defense policy. Why the Critics failed is a complex question. The question of an idea being "right" or "wrong" has little to do with the idea being accepted in the American system; the question is why the Critics' theories were not acted upon, irregardless of whether they were correct or not. The following seem to be the most compelling reasons.

THE CRITICS LACKED LEADERSHIP, FOCUS, AND A UNIFIED PROGRAM FOR REFORM.

Without a single leader or a unified, agreed program, the Critics' arguments were unfocused and incoherent. One scholar of military affairs, Samuel Huntington of Harvard, noted, "[The Critics'] overriding goal is, obviously, to reform. But to reform what? Answer would appear to be almost everything." Huntington went on to say he was unable to find a single coherent, overarching purpose in the Critics' arguments. He noted their major proposals were a shift from attrition warfare to maneuver warfare and to buy more, cheaper weapons, and then continued, "But what is the relationship between the two? It is hard to see."[9]

A result of the lack of focus was that the Critics were unable to agree on specific remedies. While TAC under Creech was able to forge ahead with its weapons systems

developments, the Critics did not offer many realistic alternatives. They were not willing, as one of their opponents noted, "to set aside the solitary grandeur and arrogance of radical chic in favor of the practical struggle to communicate and persuade."[10]

Additionally, in contrast to the Air Force leadership who focused on better training and weapons systems, Fallows and the other Critics focused on a cult of the personality, the result of Fallows' deliberate and continuing attempt to push his experts as "kookie but expert individual characters" to keep the interest of the media. Many supporters cautioned against focusing on individuals instead of ideas, but this advice went unheeded. A supporter of the Critics noted they were "a gaggle of individualist prima donnas who use 'reform' for their own particular and widely varying nostrums, rather than seeking a broad based coherent approach to the larger issues of national defense."[11]

The cult of personality was also a handicap in the mid-1980s when the Critics, notably Fallows and Sprey, lost interest in defense policy and moved to other areas, while the TAF leaders continued on their steady course of realistic training and acquiring high-tech weapons. The gradual fading away of the leadership opened the Critics to the argument that they were simply gadflies and dilettantes. The one senator who continued to press for changes, Gary Hart, faltered because of personal indiscretions in 1988, leaving the Critics leaderless. Adding to the lack of focus was the liberal political establishment's embrace of the Critics. Having lost the 1980 election to Reagan and the conservatives, liberals seemed intent on using the Critics and their allies to win more money for social programs by the stealthy arguments for more defense for fewer dollars.

This further diffused and limited the Critics' arguments, since they ideas had to fit into a political context to continue to generate support.

UNWILLINGNESS TO COMPROMISE OR "WORK WITHIN THE SYSTEM." Even though many in the Air Force accepted some of the Critics' ideas for replacing complex and expensive systems with less complex systems -- Moody Suter, for one, was constantly pushing for "weapons that worked" -- the Critics did not attempt to form alliances, and even the Critics' strongest supporters recognized this problem.[12] This unwillingness to try to solve problems supports the argument that the Critics were not reformers, but rather individuals who were only interested in argument.[13]

THE CRITICS REFUSED TO CRITIQUE THEIR OWN IDEAS. While the Critics challenged the military and DoD's "articles of faith," they had their own theology, their own revealed truths -- that there was a need for a fundamental change in the American military mindset, that the American military was led by incompetents totally committed to expensive, overly complex weapons, that the procurement process was probably corrupt and ill-suited for acquiring weapons that would be effective in combat. All of these propositions were taken as "givens" that required no proof, when they were actually arguments and points of disagreement.

Part of Fallows' push for "simple ideas, simply put" to keep the attention of his target audience meant the Critics arguments stopped at the first level of cursory facts needed for Op-Ed pieces. This made the arguments attractive because they were simple and clear, but the simplicity that made the ideas attractive to editorial writers and the general public acted against the same arguments in serious debates when precise details and in-depth

knowledge were required. [14] Additionally, Fallows' "circular experts" technique meant that the Critics had consistently to support each other, limiting their willingness and ability to scrutinize each other's arguments closely. Even their supporters noted the inaccuracies in their arguments, but the Critics never devoted any effort answering these disagreements, nor did they dispassionately examine their assumptions.[15] This was in sharp contrast to Moody Suter and the iron majors, who spent more than a year aggressively picking over and shoring up the weak points in their arguments in preparing the Red Flag briefing.

The problem this posed for the Critics was that their opponents easily demolished many of their arguments in serious forums. One specific example was the Critics' constant allegation that "gold plating" increased weapons systems' costs increase far beyond similar projects in the public and private sector. This was factually incorrect. Packard's second commission, formally titled the "President's Blue Ribbon Commission on Defense Management," in its April 1986 briefing "A Formula for Action," noted that DoD weapons systems cost overruns were generally below cost overruns in other public sector projects.[16] The Critics never acknowledged this or reconsidered their argument, and this had consequences for their position. When asked about the Critics' claims about cost overruns, DoD officials could simply say, "that is not true," quote the Packard Commission Report, thus both winning the argument and damaging the Critics' credibility.

In another example, one of Franklin Spinney's main points was his comparisons between aircraft that showed how more complex aircraft were less reliable, but he used

different aircraft with different missions for his comparisons so they were "apples to oranges." The Air Force used the evolution of a single aircraft, the F-16 to counter this argument. As noted despairingly by the Critics, the latest version of the F-16, the F-16C, had the final full panoply of high-tech systems, including LANTIRN and AMRAAM. Nevertheless, a variety of data showed the more complex F-16C had fewer malfunctions and its subsystems were more reliable than the "simple" F-16A. [17]

Another result of the lack of rigorous analysis was evident when the full effects of the Critics' proposals were considered. To keep the costs of their reforms low, the Critics did not include the costs of support systems, maintenance, spares and personnel, and training. The savings the Critics promised become less dramatic or nonexistent because larger numbers of aircraft meant more spare parts, more bases, more pilots and maintenance personnel -- critical in the all-volunteer force -- more flying schools, more support systems, and much more flying space for training.[18]

Jimmy Carter's Secretary of Defense, Dr. Harold Brown, was especially pointed in his criticism of the Critics in this area. In his 1983 book, *Thinking About National Security*, he took the Critics to task, saying that accepting the Critics' proposals would result in doubling the number of members of the military, increasing procurement budgets by 50 percent, and buying foreign weapons instead of American made weapons, "none of which would be acceptable to the American public."[19] Fallows might have been helpful for the Critics as a "devil's advocate" to sharpen their arguments as he brought them together in books and articles, but Fallows had early on released himself from this burden by claming ignorance of military matters.

THE CRITICS COULD NOT MOVE CONGRESS. Unlike Dixon and Creech, who controlled a hierarchal organization and could easily make changes, the only chance the Critics had for making real changes rested in an outside organization, Congress. The part of Congress that was most responsive to the Critics' views, the Military Reform Caucus, in the end proved ineffective in the weapons systems and procurement areas where the Critics focused.[20] While the MRC did provide a forum for the Critics and had the effect of burnishing Fallows' "experts," it was splintered from the beginning by different agendas. Many of the members joined the MRC because it made political send to press for more defense at a lower price, but they did not embrace the Critics' objective of overturning Reagan's national defense policy.[21]

Additionally, on a practical, structural level, the MRC was not organized to develop a specific reform agenda. It needed its own internal staff to allow it to focus on specific issues and become influential in the debates, but this staff never materialized. Whether the lack of a permanent staff or of a lack of consensus was the cause of the MRC's lack of influence is, in the end, unimportant. Senator John Tower offered another reason for the MRC's impotence when he dismissed the group with the comment, "[When] you get the reform group together and start going through specific programs, you wouldn't get them to agree on any of them."[22] He seems to have been correct.

THE CRITICS FACED STRONG RESISTANCE. Unlike the Air Force's move to realistic training, the Critics faced heavy opposition from the Air Force and DoD, and the effectiveness of their responses hurt the Critics in Congress.

The Air Force leadership kept repeating to Congress that the rationale for its high-tech weapons was the requirement for systems that fit the national defense strategy. Unless the strategy was changed, the Air Force argued, the systems flowed logically from it. Real world military developments also helped the Air Force case. There was the impact of Israeli successes with US high-tech weapons in Middle East combat, and the Soviets also unintentionally helped the Air Force when they began to build new fighters with radar, radar-guided missiles, and other sophisticated systems that mirrored American developments. The Israeli combat successes and their desire for high-tech American weapons, as well as the Soviets' efforts to develop the same type of high-tech weapons as the United States supported the idea that the USAF was on the right track and had to keep developing such weapons to keep the advantage.

The Air Force also vigorously fought back with public statements, but used a different technique to counter the Critics' arguments. The Air Force, deliberately or not, seemed to view the debate about high-tech weapons as not a political campaign, as Fallows viewed it, but as a series of trials where solid evidence was required and verdicts delivered by those who had heard all the evidence – Congress and the administration. In refuting the Critics, the Air Force took advantage of the fact that many of the Critics had not vetted their arguments and the bulk of their arguments proved easy to counter, given sufficient time for detailed explanations. In practice, most of the Critics' arguments were destroyed by a simple, inconvenient fact – the weather during the winter in Europe and along the Soviet/Iran border was generally bad during the winter, and the winter nights were long. The Critics' systems were only usable in day and clear weather, and the

logical extension of the Critics' simple systems argument would have required a American administration to commit to a defense strategy that was some variation of "we are only going to fight if the weather is good" – an unlikely national defense policy declaration.

The Air Force also took advantage of its credibility. Editorial writers could use Sprey or Spinney as "experts" in an op-ed piece, but in front of Congress, the non-flying, generally non-military "expert" Critics with no combat experience were not as credible as a string of uniformed Air Force generals with real combat experience and deep expertise. Senator Gary Hart might say publicly that the LANTIRN was unsafe to fly at low level in an F-16, but an Air Force general who testified before Congress, "I've flown an F-16 with LANTIRN at low level at night and it is not unsafe" probably carried more weight.[23] Additionally, Air Force leaders could – and did – sit in front of often skeptical Senate and House committees for hours going over not only the "big picture" but also the details of the systems, the requirement for the systems based on a specific Soviet threat, and all the nuances and details of their plans.

In line with its "trial" approach, the Air Force publicly promulgated detailed arguments in articles in the Air Force Association's *Air Force Magazine* intended to help Air Force supporters and congressional staffs. The Critics played into the Air Force's hands by not responding the articles – presumably, they felt this was "inside baseball" and involved a level of detail that was unnecessary to address – but these articles gave supporters of Air Force programs a huge amount of information to use in the programs' defense.

The Air Force further helped its credibility with programs that showed real, not rhetorical, improvement. The Air Force could explain to knowledgeable Congressmen and their staffs that the Critics misrepresented the AIMVAL/ACEVAL tests to show high-tech fighters had no advantage over low-tech fighters, when in fact AIMVAL/ACEVAL was an innovative, combat-oriented way for the US military to determine new missile requirements. The Critics ignored General Slay's forcing of the Pratt & Whitney-GE engine competition, but Slay's actions showed Congress the Air Force was serious about changing the procurement process, much as the constant complaining from Air Force leaders about cuts in O&M funds that showed the service was serious about readiness and programs like Red Flag showed the service was serious about preparing for the next war.

Finally, the images Congress had of the Air Force and DoD officials were at odds with the ones painted by the Critics. While the military leaders did not meet Fallows' idea of "edgy," the members of Congress on the military committees regularly saw generals like Wilbur Creech, Norman Schwarzkopf, Colin Powell, and Charles Horner, and the congressmen had an entirely different view of them than the Critics -- and it was the view of the congressmen that counted.

THE CRITICS IGNORED THE REALITIES OF THE PROCUREMENT PROCESS.

The Critics also hurt themselves by a lack of understanding of the procurement process. They only offered one solution, one that provided them with the moral high ground – simpler systems by eliminating the "gold plating" that led to both high costs and to incentives for military officers to push for their programs.[24] The money saved by

eliminating "gold plating" would provide money for more simple systems and their spare parts. But this "gold plating" argument was based on a particularly pervasive inaccuracy, the Critics' "revolving door" argument that contractors hired military officers to work for their companies after the officers retired so the officers could influence the awarding of future contracts. The Critics claimed that there was causation between the number of former military officers on a company's payroll and the number of defense contracts awarded to the company. While this seems logical on its face, in-depth studies showed that this was not true. There was no correlation, and certainly no causation, between the number of former military officers a company employed and the military contracts it received.[25]

Additionally, the Critics ignored the fundamental question about the American systems of weapons procurement: are procurement problems curable or, more basically, are they really problems? Where the Critics saw collusion between the military and the contractors to "gold plate" weapons systems in order to make more money for the contractors, others, especially politicians, saw the system simply working as it should. Former Secretary of Defense Harold Brown addressed this point after he left office:

> I want to note the basic limitation of any attempt to manage the Defense Department in an idealized textbook fashion. The pull of the need to be able to fight a war, if necessary, will always limit the peacetime efficiency of the defense establishment ….The pull of conflicting domestic interests represents democratic government….To manage defense efficiently and at the lowest possible cost along presumed business lines of management and organization is a useful standard. But there are prices we cannot afford to pay for meeting it exactly. One is the abandonment of democratic control. Another is the loss of a war. Defense cannot be "managed" like a business.[26]

The Critics also could not suggest ways to change the "domestic process," the critical role of Congress in weapons system selection. Military contractors and the jobs they provide are a powerful constituency in many districts, and in the process of developing a new system many contractors try to sub-contract parts of the project around the country to build a political constituency for the system. Thus – as noted in the *Time* magazine article – even congressmen who are highly critical of military programs support programs that benefit their districts.

Congressional influence on the procurement of weapons systems is part of the American system and, in a broad sense, the process is a part of "civilian control of the military." The elected Congress brings in money by passing tax laws, and has the right to dispense the money to contractors building weapons systems. The fact that a congressman may want some of his constituents' money to go back to his area is normal, and not inherently bad, and many strong supporters of national defense programs, notably those in the rural South, reap relatively small rewards for their districts.[27] It should also be noted the success or failure of a system is not linked to whether or not it is produced in a powerful member of Congress' district. The Critics' favorite model for a program and aircraft was the F-16 from General Dynamics in Texas, even though it was the home of the very powerful Republican Senator John Tower, a strong supporter of high-tech weapons. This was also the same General Dynamics that produced the F-111, one of the Critics' favorite targets.

While this may seem to make the military acquisition process the slave of Congress, two characteristics of the process should be considered. First, simply because a project

has subcontractors around the country and the concomitant high degree of congressional support does not mean the project is not a worthwhile project. A weapons system comes into existence first because of a requirement, and congressional support or the number and distribution of subcontractors do not influence the requirement – it is threat driven.

The full procurement process begins with the military determining requirements and then contractors estimating the costs of filling the military requirement. The problems arise after the requirement is established and the process of developing the system begins. In any system, not just a military one, most of the cost is concentrated early in the program when uncertainty is the highest. The uncertainty of the costs and problems in a complex system are compounded because of the need to integrate various subsystems. A problem in any one of these areas will slow the process down and increase costs. Additionally, an improvement that will increase capability will usually slow the process as well as increase the costs, and requires a decision as to whether or not to add it. Building any complex system is thus a constant but inevitable balancing act in solving problems, deciding on the cost benefits of improvements, and trying to keep costs under control for the entire development period. It is messy, and every change is an opportunity for a new problem, but this is endemic to the system.

The Critics were correct in saying that once the process begins, the Air Force program mangers and the contractor acquired an interest in seeing it succeed, but they were wrong in their analysis of the cause. Because the Critics did not understand the procurement process, they focused only on the costs and made the mistake of assuming making money was the primary motivation for the development of a weapons system,

once again ignoring the most important part of the process, the requirement. The primary motivation for Air Force program managers and the contractors was to provide a system that filled a military requirement. They wanted their system to work because if it failed the money would have been wasted, but the requirement still had to be addressed.[28]

FALLOWS' THEORY THAT EDITORIAL ELITES COULD CHANGE AMERICAN DEFENSE POLICY WAS WRONG. From the beginning, Fallows believed the editorial elites could change public opinion, so he supported an election-style political campaign to influence these elites. In an election campaign, the majority of the voters have little knowledge of the details of the issues, but only a general feeling, and Fallows believed it would be the same in his target audience of editorial writers.[29] He was correct; they followed his lead and fulfilled Fallows' prediction that once simple, compelling ideas were in the public eye, whether they were right or wrong, they would resound for six months and reach many in Congress. Nevertheless, while the Critics' case was not trivial, neither the Critics nor their editorial writer supporters could influence Congress, probably because they offered no useful framework for change, nor they could counter the Air Force's detailed explanations of the rationale for their programs. Ultimately, even with the support of the media, the Critics' arguments did not show there was such a severe failure of American military and security doctrine – notably the "offset strategy" of weapons procurement -- that the United States should adopt an entirely new defense policy with the concomitant risks and unintended consequences.

WHAT DID THE CRITICS ACCOMPLISH?

Probably the Critics' most lasting impact was the F-16. The Critics' idea of a lightweight fighter blended nicely with Laird's and Packard's desire to test their ideas of aircraft acquisition through prototyping, as well as for the Air Force's need for force structure based on the expectation of a long period of limited defense budgets. Once the Air Force accepted the F-16 and changed it into a fighter-bomber, it gradually became the most important military aircraft in the world. Today more than 4300 have been produced, and it is still in production.[30]

One can argue that the Light Weight Fighter/F-16 was not the right choice for the Air Force. The F-15 offered considerably more potential as a fighter-bomber. A normal F-15 could carry eighteen 500-pound bombs to the F-16's four, as well as having much more room for internal growth for improved weapons systems. The FAST Packs, which added 6000 pounds of fuel, gave it a range of 3500 miles, more than twice the range of the F-16. Had the Air Force opted to buy more F-15s for use as fighter-bombers, it would have had an aircraft with much greater range and load carrying capability than the F-16 and would have avoided the delays involved in the AMRAAM and LANTIRN programs caused by having to make the systems small enough to fit on the F-16. An F-15 fighter-bomber could also have used the Pave Tack all-weather targeting device immediately, rather than waiting for LANTIRN.

However, the F-15 versus F-16 arguments only apply to the USAF. Arguably, the main impact of the F-16 was in its acquisition not only by America's allies but also by

the Air Force's National Guard and Reserve forces. While the Israelis provided the combat experience, the F-16s gave the NATO allies, the National Guard, and the Reserves a modern, credible fighter, and one that was completely compatible with first-line USAF equipment. The result was that throughout the 1980s western air forces were far more capable than those of the Warsaw Pact.

The Critics also claim credit for the A-10, even though it came into existence as an Air Force requirement to replace the A-7 and keep the close air support mission. The utility of the A-10 is a complex question and closely linked to the question of who should do the close air support mission, the Air Force or the Army. While the A-10 was useful in the Gulf War, after the war Air Force Chief of Staff Merrill McPeak offered to give the A-10s to the Army in exchange for its Patriot surface-to-air missiles and long-range surface-to-surface missiles.[31] The offer came to nothing, and today the Air Force still owns the A-10s and the mission, but today, like the F-16, the A-10 is not the simple system the Critics wanted. Before it was sent to the field, the A-10 had numerous avionics improvements, notably the capability to fire the IIR Maverick, and its usefulness today is directly tied to improved high-tech avionics and other systems.[32]

In the end, if the Critics had not appeared on the scene, the result would have been felt mainly in force structure. While they stimulated many arguments, the questions of the utility of increased defense budgets would have been an ongoing debate between liberals and conservatives even without the Critics. The Critics may have shaped the form of the argument, but did not influence the outcome.

THE CRITICS' MODERN RESURRECTION

While one might expect that the Critics would have faded away after the success of the weapons they opposed in the Gulf War and in American military ventures since that time, in fact they still maintain considerable cachet in the popular press. The dichotomy Fallows set up between the uniformed military, the DoD and the defense *cognoscenti* on one side and "kooky" characters who preferred simple, cheap weapons systems has continued, and Fallows' theory that simple ideas, correct or not, that fit into ideological predispositions – in this case, that defense budgets are too high -- will continue to resonate proved to be correct. The Critics' ideas still have their followers and today the "corruption" of the procurement process and the need for simple weapons has become part of many of the elite editorial writers' conventional wisdom.[33]

Bizarrely, many of these pundits claim that the Critics were "visionaries" who were responsible for the success in Gulf War I. Fallows, who freely admits he owes much of his fame to the Critics, led the way. He gave the Critics credit for bringing the Air Force out of the "trough of wastefulness, unpreparedness, and low self esteem" and argues that the (unnamed) reforms the Critics pushed in the early 1980s "seemed subversive, unreasonable, and beyond the pale of serious consideration were, by the early 1990s, simple common sense."[34]

Spinney continued to work for the Department of Defense, never really answering the question of how he could justify working for such a corrupt organization. He has become an occasional darling of the liberal media who share his moral indignation about military

spending at the expense of social programs, and in January 2002, he was awarded the Project for Government Oversight (POGO) "Good Government" award. POGO, originally known as the Project on Military Procurement, "works to expose outrageously overpriced military spending" and believes that "representation and accountability…are under attack as our federal government is more vulnerable than ever to the influence of money in politics and powerful special interests." It judges its success by "whether or not policy reforms or spending cuts have been implemented…by a Congress that is beholden to monied interests."[35]

Liberal journalist Bill Moyers interviewed Spinney after he received the award, and both agreed the Pentagon was a "moral sewer on the Potomac." Spinney continued his old arguments, saying that military budgets were intended to "keep money flowing into [congressional] districts" and that the budget was a "scandal" that "won't fix our [defense weapons system] problems." To Moyers' seeming disappointment, Spinney admitted DoD had taken no disciplinary action against him for his views and writings.[36]

Pierre Sprey moved from cleaning water to making compact disks as owner of Mapleshade Records, but still continues relentlessly to self-aggrandize his years in the Pentagon. In news stories in 2000 he claims to have been a "principal designer of the F-16 and A-10 fighter jets." In fact, Sprey had nothing to do with designing either, and today betrays an amazing ignorance of aircraft design. In 2005 he said that the radar reflecting shape of the high-tech "Stealth" aircraft would decrease stability and performance, when in fact the highest performing fighters in the world today, the

American Lockheed F-22 and F-35, are both "stealthy," and their flight control system is basically the same one used on the F-16 Sprey "designed."[37]

But of all the Critics, the one who has received the greatest attention is John Boyd or, as he preferred to be called, "THE John Boyd."[38] When the Critics temporarily vanished after the Gulf War, Boyd, who had preached against high-tech weapons but wisely put little in writing, became their only link to notoriety. Because Boyd was the only Critic who had any claim to military credibility, the rest of the Critics constantly deferred to him as their leader and at some point, they deified him and began calling themselves his "acolytes."[39]

After he retired, Boyd became less and less involved with the Air Force but continued to push his briefing "Patterns of Conflict" on anyone who would listen. He received a huge boost in 1979 when he began a relationship with the United States Marine Corps, which was having difficulty convincing Congress that the Corps' unique mission of making contested amphibious landings was viable. The Marines began looking for a new doctrine that would allow them to fight a conventional land war, but a doctrine that would be possible with the Corps' traditionally limited resources. The head of the Marine Corps Amphibious Warfare School, Colonel Mike Wyly, knew Critic William Lind, and Lind suggested that Wyly push "maneuver warfare" to allow the Corps to "fight smarter" using cheap weapons. Lind also persuaded Wyly to use Boyd's name for credibility, because Boyd had given his "Patterns of Conflict" briefing to senior Marine leaders at the Amphibious Warfare School.

Wyly worked Boyd's ideas into a doctrinal theory of maneuver warfare "on the cheap," and to support him Lind wrote an article in the *Marine Corps Gazette* in March 1980, "Defining Maneuver Warfare for the Marine Corps," using Boyd's name and the concept of the OODA loop. From 1979 until 1993, there were more than fifty articles in the *Marine Corps Gazette* on maneuver warfare, and the concept was gradually adopted by the Marine Corps, notably by one of the commandants, General Al Grey. [40]

Boyd died in 1997, but in 2002 he was resurrected in Robert Coram's book, *Boyd: The Fighter Pilot Who Changed the Art of War.* Coram got much of his information from Fallows (to whom he pays tribute to in the book) and not surprisingly, his book was a hymn to Boyd. It was adoringly and uncritically received and was highly recommended in the *Air Force Times.*[41] The *Air Force Times* review of Coram's book outraged many in the Air Force, especially retired former TAC commander Wilbur Creech. Creech had been Boyd's boss early in his career and had many run-ins with Boyd from 1979 on, and Creech blamed Boyd for the problems he had selling the high-tech weapons that proved so successful in the Gulf War and later. Creech said that Boyd and the rest of the Critics did "their most energetic best to shoot down every single program that we had to provide the aircraft and weapons that we used so successfully in the Gulf…the systems that allowed the Air Force to have only three pilots killed in the war," and that Boyd made "many, many bad contributions to the Air Force." [42] This went unnoticed in the press.

The consecration of Boyd shows that, while Fallows' theory about simple ideas adopted by editorial writers could influence national policy was wrong, he was able to turn at least one of his "kookie" characters into a celebrity and, to an extent, "keep the

dream [of reducing military budgets] alive." Boyd's wide-ranging "Patterns of Conflict" briefing has become a Bible to modern opponents of defense spending, because like the Bible it offers infinite possibilities for interpretation. Today critics of high defense budgets can get a hearing in the media if they simply say that American weapons are too expensive, too complex and will not work in combat, then link this to Boyd's ideas. Boyd's name has become the mainstay of antimilitary groups like the *Defense and National Interest*, whose web site that gives a forum for Spinney, Sprey and other groups such as Federation of American Scientists to continue to criticize military procurement and weapons selection. Articles on the website in mid-November 2005 include "The F-22 Program: Fact Vs. Fiction," written by retired colonel and long time Critic Everest E. Riccioni, who now characterizes himself as a "retired USAF fighter designer, and tactician," and Spinney's "Three Reasons Why the ATF [now F-22] Should Not Be Approved for Engineering and Manufacturing Development."[43]

THE ONCE AND FUTURE…

Despite the issues raised by the Critics, the critical area of American defense policy and weapons acquisition remains the purview of professionals in the Department of Defense and uniformed military, the people who do the day-to-day analysis to make the weapons choices they believe fulfill national policy, and who then implement their work in a cooperative fashion. The success of American forces in combat seems to guarantee the decisions about weapons procurement will remain in the hands of these professionals and the congressional specialist committees until American forces and/or weapons are

found wanting in combat or, in specific cases, the cost of the systems leads them to collapse under their own weight.

For the Air Force, its future course seems to have been set after the Gulf War. It would follow the path laid out by the iron majors and Generals Dixon and Creech, very highly trained crews using the highest technology weapons available. At the same time, it will not depend on the latest technology for its success; whatever the fate of its high-cost programs, the Air Force will continue to control its training, and the realistic training "combat culture" introduced post-Vietnam War continues to thrive and has become the Air Force's culture -- "the values, norms, institutions, and modes of thinking to which successive generations attach primary importance."[44]

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1. James Q. Wilson, *Bureaucracy: What Government Agencies Do and Why They Do It* (New York: Basic Books: 1989), 22, *passim*.

2. These requirements are also discussed in Harvey M. Sapolsky's, "On the Theory of Military Innovation," *MIT Breakthroughs*, MIT Center for International Studies (CSIS), Spring 2000, 274.

3. David "Catfish" Gish, Capt. USAF, "F-4 Air-to-Air Training," *Fighter Weapons Review*, Fall 1975, 2-5.

4. Dixon, Oral History, 258-260.

5. Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, NY: Cornell University Press, 1984), 7, *passim;* Murray and Millett, 4-5, *passim;* Steven P. Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1991), 10, *passim.*

6. See, for example, "F-15 Aerodynamics: Good Reading for F-15 Flyers" and "An Ace Looks At Flying Safety: A Top Gun Speaks From Experience," *United States Air Force Flying Safety Magazine*, January 1981, 8-13, 15-18. Today the title of the safety magazine of the Air Combat Command (ACC) -- formed by combining TAC and SAC and now primarily a fighter command – is *Combat Edge*, which speaks volumes. http://www.mondotimes.com/2/topics/5/society/74/6212 (accessed Sept 2005); for Air Combat Command, see http://www.acc.af.mil/ (accessed February 2006).

7 Rosen, 252.

8. Lawrence R. Benson, Maj. USAF, "The New USAF Fighter Lead-in Program." *Air University Review*, March-April 1975.

http://www.airpower.maxwell.af.mil/airchronicles/aureview/1975/mar-apr/benson.html (accessed September 2005); Dave Smith, Capt. USAF, "Baby Steps: The New Fighter Lead-In Course," *Fighter Weapons Review*, Spring 1980, 4-7.

9. Samuel Huntington, "Introduction," in *The Defense Reform Debate: Issues and Analysis*, ed. Asa Clark, Peter W. Chiarelli, Jeffery S. McKirtick, and James W. Reed (Baltimore, MD: Johns Hopkins Press, 1984), xiii.

10. John M. Oseth, "An Overview of the Reform Debate," in Clark, 45, 51.

11. Comer in Clark, 14.

12. Richard M. "Moody" Suter, Col. USAF, "Corona Ace" interview by Lt. Cols. Gordon Nelson and John Dick, 26 January 1977, 12, passim; Fallows in Clark, 335.

13. Timothy Lupfer, "The Challenge of Military Reform," in Clark, 28.

14. Richard K. Betts, "Dubious Reform: Strategism Versus Mangerialism," in Clark, 223.

15. Oseth in Clark, 45, 47.

16. Harry Calcutt, Colonel USAF. "Cost Growth in DoD Major Programs: A Historical Perspective," (Executive Research Project: Industrial College of the Armed Forces, National Defense University, 1993), Slide #7, 14. This is an excellent, nuanced work on large project cost growth.

17. Herzog, 12-13.

18. Huntington in Clark, xi; Asa Clark in *The Defense Reform Debate*, 223; McKirtick in Clark, 316; William Perry also regularly made this argument, especially after the Gulf War; see Perry, "Desert Storm and Deterrence," *Foreign Affairs* 70 (Fall 1991): 66-67, *passim*, and his comments to Congress, *The Impact of the Persian Gulf War*, 563.

19. Harold Brown, *Thinking about National Security: Defense and Foreign Policy in a Dangerous World* (New York: Westview Press, 1983), 243.

20. In the author's judgment, the MRC did have some notable successes. It succeeded in getting an independent central office of weapons testing and evaluation, more modern weapons for the National Guard, warranties for certain systems, and a program of cost estimating for weapons systems, though all of these were supported by the Reagan administration. It had its major and very significant impact in one area, "jointness," the ability of the services to fight together. The Military Reform Caucus was the catalyst behind the Goldwater-Nichols Act of 1986, a far-reaching organizational change that completely reorganized the United States military command structure. After Goldwater-Nichols, the President's military advice by law came from the Chairman of the Joint Chiefs of Staff alone, and the power of the "warfighting CINCs," commanders-in-chief of the geographic region of the globe (Europe, Middle East, and Pacific) was vastly enhanced. http://www.jcs.mil/goldwater_nichol_act1986.html (accessed February 2005).

21. D. C. Hendrickson, *Reforming Defense: The State of American Civil-Military Relations* (Baltimore: Johns Hopkins University Press, 1988), 97.

22. Walter Issacson, “US Defense Spending: Are Billions Being Wasted?” *Time,* March 7 1983, 27.

23. The author attended a briefing of Brigadier General Harley Hughes, Air Force Operations Deputy, for Congressional testimony in February 1984 on tactical air systems. General Hughes, an F-16 pilot, said he would say to Congress that flying with LANTIRN, low level at night, was safe if the issue came up; it did, according to his aide, and his response was as noted.

24.While the Critics would give occasional examples of “gold plating,” they never defined it; it seems to have been any system they did not like/understand. For Sprey, for example, radar was “gold plating.” Sprey, Oral History, 17. The Air Force insisted that what the Critics called “gold plating” was simply fitting the system to a requirement.

25. Adam Yarmolinsky, *The Military Establishment: Its Impacts on American Society (*New York: Harper & Row, 1971), 62-68.

26. Harold Brown, Secretary of Defense, “ ‘Managing' the Defense Department-Why It Can't Be Done," speech at the University of Michigan in March 1981, author’s collection.

27. Salvatore Chidichimo, Lt. Col. USA, “The Military Reform Caucus and its Impact on National Defense” (Research Report: National War College, National Defense University 1983), Appendix D and E.

28. Walter Kross, *Military Reform: The High-Tech Debate in the Tactical Air Forces* (Washington, DC: National Defense University Press, 1985), 132-160, with charts and diagrams.

29. James Fallows, “Rhetoric and Presidential Leadership,” Speech at the Miller Creative Research Project, University of Virginia, 1 March 1979.

30. http://www.af.mil/factsheets/factsheet.asp?fsID=103 (accessed January 2006)

31. Vernon Loeb and Dana Priest, “National Defense,” *Washington Post* May 28, 2003 http://discuss.washingtonpost.com/zforum/03/r_nation_loebpriest052803.htm (accessed May 2005).

32. “The A-10s New Teeth,” *Air Force Times,* 3 June 2006, 1-2.

33. See “Still Shortchanging the Troops,” *New York Times,* 10 February 2006, A26. For “conventional wisdom” I use the definition “a handy way to ‘know’ something about which we have not invested the time and trouble to study closely and understand fully.” This definition and a fuller explanation of “conventional wisdom” in “Introducing the Series,” *Audit of the Conventional Wisdom,* MIT Center for International Studies, 2005, 1, 3.

34. Fallows, Batten lecture. Fallows never mentioned what these reforms are.

35. http://pogo.org/p/x/impact.html (accessed October 2005).

36. For the transcript the Spinney/Moyers interview see http://www.pbs.org/now/transcript/transcript_spinney.html (accessed September 2005).

37. Ken Silverstein and Jeff Moag, “The Pentagon's 300-Billion-Dollar Bomb,” *Mother Jones,* January/February 2000 Issue. Also

http://www.motherjones.com/news/feature/2000/01/stealth.html (accessed September 2005). Press Release, Oberlin College, 2 November 2005. http://www.oberlin.edu/newserv/stories/sprey_release.html (accessed January 2006).

38. John Boyd, Col. USAF, Corona Ace interview. #K239.0512-1066, 14 August 1976. AFHRA, 83.

39. Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown and Company, 2002), 9, *passim.*

40. Jeffrey L Cowan, Maj. USAF, From "Air Force Fighter Pilot to Marine Corps Warfighting: Colonel John Boyd, His Theories on War, and their Unexpected Legacy," (Thesis for Master of Military Studies: United States Marine Corps Command and Staff College, Marine Corps University, Quantico, Virginia, 2000), 3-4, *passim.*

41. Bradley Peniston, "The Fighter Jock Who Changed the Way You Fight," *Army Times, Navy Times, Air Force Times, Marine Corps Times,* January 27, 2003, 16.

42. E-mail from Creech, 18 March 2000, provided to the author by Keith Ferris.

43. http://www.d-n-i.net/; September 2005. http://www.d-n-i.net-fcs-pdf-3_reasons_why_atf_not_into_emd.pdf (accessed February 2006).

44. Samuel P Huntington, *The Clash of Civilizations and the Remaking of the World Order* (New York, Simon and Schuster, 1996), 41.

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