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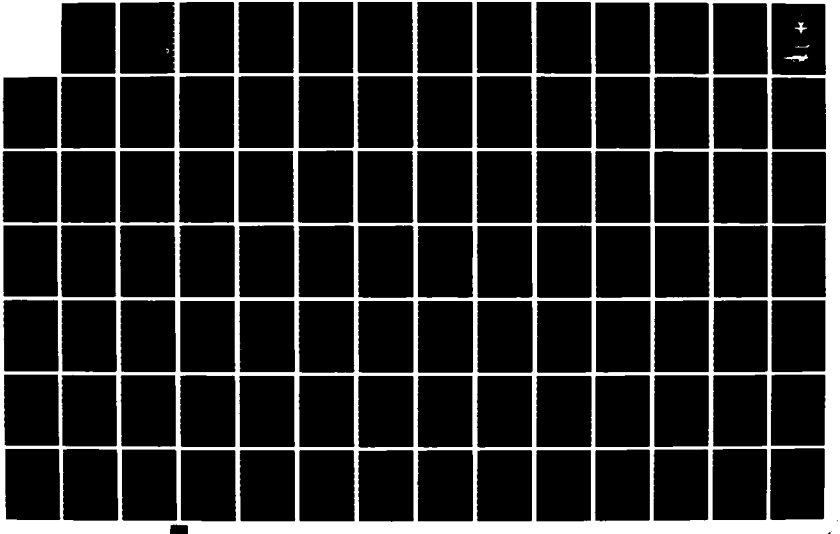

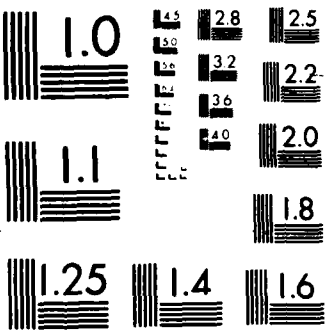
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THE F-111D RETENTION ISSUE

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

MICHAEL G. HUB, MAJ, USAF
B.S., United States Air Force Academy, 1973

Fort Leavenworth, Kansas
1986

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ABSTRACT

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This study provides historical information on the F-111D in 1979 and 1980, the time period critical to the retention of the aircraft in the Air Force inventory. It serves as a case study focusing on those responsible for the management of the F-111 system and how they retained an aircraft that appeared ready for retirement. Three research questions were addressed: 1) What maintenance and logistics factors contributed to the retention of the F-111D? 2) What management actions and operational accomplishments contributed to the retention of the F-111D? and 3) Did the F-111D fit the "traditional" mission role of the F-111 during this period, and did this play a role in the retention issue?

Research on this topic centered on the Histories of the 27th Tactical Fighter Wing, the only wing equipped with the F-111D. The historical data indicated that a supply deficit was the principle logistics factor effecting the retention of the F-111D. Management initiatives by the Air Staff and the Tactical Air Command helped pin-point the reasons for the supply deficit. Following reorganization in January 1980 the 27th Tactical Fighter Wing demonstrated its maintainability and combat capability during a deployment to England in May and June 1980 which closed the retention issue. Finally, the study showed that the F-111D did not fit the traditional role of the F-111 during this time frame.

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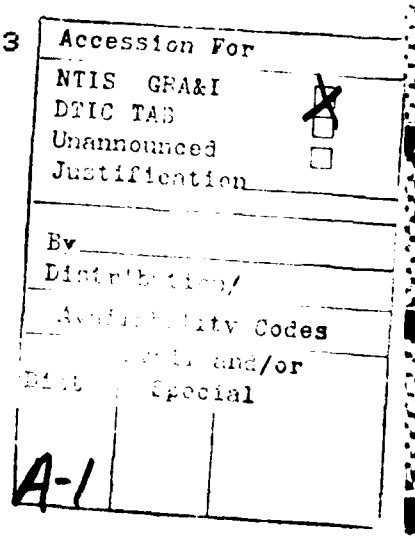

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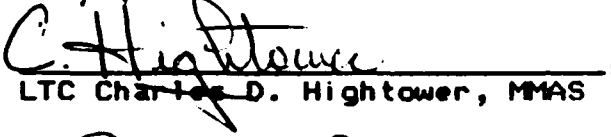
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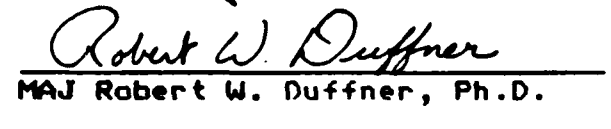
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THE F-111D RETENTION ISSUE, by Major Michael G. Hub, USAF, 166 pages.

This study provides historical information on the F-111D in 1979 and 1980, the time period critical to the retention of the aircraft in the Air Force inventory. It serves as a case study focusing on those responsible for the management of the F-111 system and how they retained an aircraft that appeared ready for retirement. Three research questions were addressed: 1) What maintenance and logistics factors contributed to the retention of the F-111D? 2) What management actions and operational accomplishments contributed to the retention of the F-111D? and 3) Did the F-111D fit the "traditional" mission role of the F-111 during this period, and did this play a role in the retention issue?

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CHAPTER 1

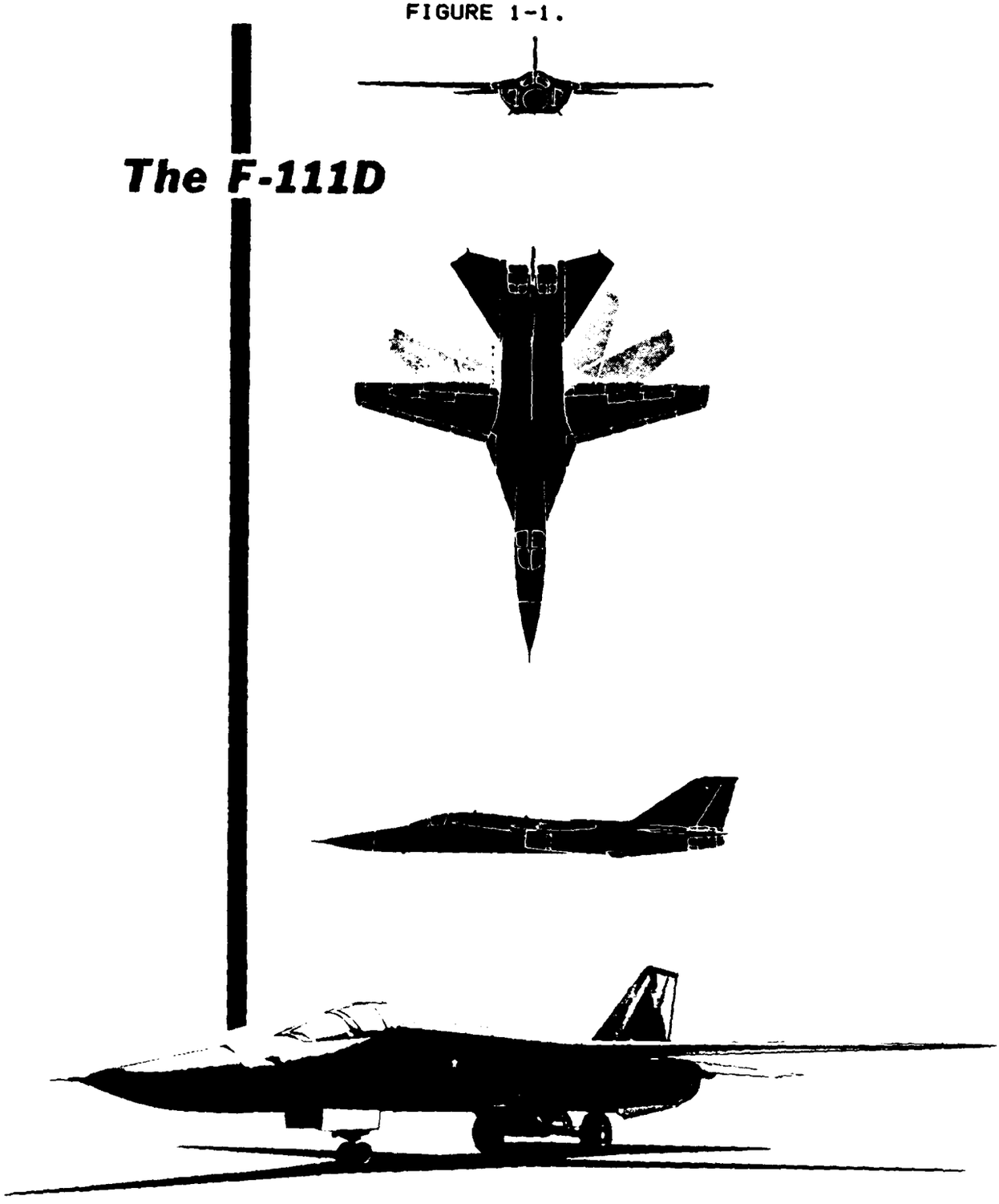
Purpose

The purpose of this thesis is to provide a historical account of the events that led to the retention of the F-111D. The Department of Defense (DOD) proposed the retirement of the F-111D in 1979. The efforts of Headquarters, United States Air Force, located at the Pentagon, the Tactical Air Command (TAC), headquartered at Langley AFB, Virginia, and the 27th Tactical Fighter Wing (TFW), located at Cannon AFB, New Mexico, resulted in the continuance of the F-111D by the Department of Defense as a weapon system capable of meeting the worldwide mission requirements of the 27th TFW, and the United States Air Force.

Introduction

Controversy has surrounded the F-111 since its initial development in the early 1960's. The F-111 was the first tactical aircraft designed with variable geometry wing sweep. In other words, the main wings move on two pivot points, thus changing the appearance and flight performance of the aircraft. The F-111D is 75 feet 6.5 inches long, 17 feet 1.4 inches high, has a wing span from 32 feet with the wings fully swept aft to 63 feet with the wings full forward, and weighs 81,700 pounds with a full internal fuel load of 32,000 pounds. (FIGURE 1-1.) When the F-111 entered

FIGURE 1-1.



SOURCE: U.S. Air Force, T.O. 1F-111D-1, Flight Manual F-111D, (Sacramento: ALC/MMEDPD, McClellen AFB, 1984), p. vii.

the Air Force inventory in 1967, it recorded three other "firsts" in military aviation history. The F-111 was the first aircraft designed with analog computers at the heart of its avionics package; the first aircraft equipped with afterburning turbofan engines; and the first aircraft designed with a special Terrain Following Radar (TFR) system. These systems enable the aircraft, with its crew of two, a pilot and a weapon systems officer, to attack a ground target while flying at 200 feet above the ground at supersonic airspeed, day or night, good weather or bad. Since 1967 the F-111 has provided the most effective night and all-weather ground attack capability in the United States Air Force (USAF). The F-111D makes up 25% of that combat capability.1

The F-111D, the fourth of seven F-111 models developed, was to be the principal F-111 model for the United States Air Force. The aircraft is not an air superiority fighter, designed to engage and shoot down other aircraft. It is a fighter-bomber, designed to destroy ground targets with conventional or nuclear weapons. The 27th TFW was, and is, the only wing in the Air Force equipped with the F-111D. The Air Force accepted the last of 96 aircraft from the primary contractor, General Dynamics Corporation, on 28 February 1973.2

The F-111 series aircraft cost an average of 12.7 million dollars each. When compared with other tactical

fighters of the day, such as the F-100, F-105, and F-4, which averaged under three million dollars per aircraft, the F-111 represented a major increase in aircraft cost. The final cost of each F-111D was 13.5 million dollars.3

Significance of the Study

Little has been written about the F-111 since the late 1970's, and even less has been written about the F-111D. This study provides unclassified information on the F-111D in 1979 and 1980, the time period which was critical to the retention of the aircraft in the Air Force inventory. It serves as a case study focusing on those responsible for the management of the F-111 weapon system and how they retained an aircraft that appeared ready for retirement.

Research Questions

This study of the F-111D retention issue explored the following research questions:

1) What maintenance and logistics factors contributed to the retention of the F-111D?

2) What management actions and operational accomplishments contributed to the retention of the F-111D?

3) Did the F-111D fit the "traditional" mission role of the F-111 during this period, and did this play a role in the retention issue?

Limitations

The thesis concentrates on the years 1979 and 1980, which cover the most significant events surrounding the retention issue. The F-111D has continued to demonstrate its capabilities since 1980. Through modernization programs the Air Force has improved and continues to improve F-111D combat capabilities. These programs will not be addressed but they could serve as the basis of additional study on the F-111D.

Assumptions

In evaluating maintainability, it was assumed that the basic measure of maintainability was the Mission Capable rate (MC rate) of the aircraft, and that this MC rate could be compared to established standards.

Methodology

Historical methodology was followed in completing this thesis, and information in each chapter is presented chronologically as much as possible. Appendix D contains a review of literature. It describes the sources used, and should assist other reseachers interested in this topic.

Chapter two presents a general history of the F-111. It explains how the F-111D fit into the evolution of the F-111 family of aircraft. This chapter is particularly important in establishing the relative importance of the F-111D to the other F-111 aircraft and the importance of the

F-111 series as a weapon system in the Department of Defense. A history of the combat experience of the F-111A during the Vietnam war is presented to establish the "traditional" mission role of the F-111. Chapter three presents the events that occurred during 1979 and 1980 that resulted in the retention of the F-111D. Chapter four summarizes the information presented in chapters two and three and answers the research questions.

Chapter 1 - Endnotes

1 Bill Gunston, F-111, (New York: Charles Scribner's Sons, 1978), p. 6.

Robert F. Coulam, Illusions of Choice: The F-111 and the Problem of Weapons Reform, (Princeton, New Jersey: Princeton University Press, 1977), p. 175.

Gunston, F-111, p. 11.

U.S. Air Force, T.O. 1F-111D-1, Flight Manual F-111D, (Sacramento: ALC/MMEDPD, McClellen AFB, 1984), p. 1-2.

Gunston, F-111, p. 94.

Ibid., p. 13.

2 Gunston, F-111, p. 95.

Marcelle S. Knaack, Encyclopedia of U.S. Air Force Aircraft and Missile Systems, vol. 1: Post-World War II Fighters (Washington D.C.: Office of Air Force History, 1978), pp. 234, 241, 254, 259.

3 Knaack, Post-World War II Fighters, p. 254.

CHAPTER 2

HISTORICAL BACKROUND

The Tactical Air Command in the mid to late 1950's consisted of fighter aircraft called, Super Saber, Voodoo, and Thunderchief. These aircraft delivered either conventional or nuclear weapons, and when no ordnance was carried externally, they could reach supersonic speeds. Super Saber, Voodoo, and Thunderchief reflected the technology of the early 1950's. These aircraft had excellent speed, but due to their aerodynamic design they performed poorly during takeoff and landing or long range cruise. Aircraft designers had to accept these limitations to obtain the speed desired. Pilots had to accept the fact that their aircraft required up to 10,000 feet of runway to operate.1

The Swing Wing Proposal

Early in 1959, General Frank F. Everest assumed command of the Tactical Air Command. General Everest was well aware of the problems TAC would face in the 1960's. The critical problems centered on the length of runways required by current tactical fighter aircraft and advancements in computer technology which could make his fighter aircraft outdated.2

Most experts considered the F-105 Thunderchief, or "Thud" as it was called by the pilots, as the best

fighter-bomber in TAC. The Thud, however, had accumulated a distressing record of runway overrun and barrier accidents while operating at Bitburg Air Base, Germany; the runway at Bitburg measured 8,000 feet. General Everest expressed concern that, if war broke out in Europe, no one could count on even 1,000 feet of runway being available due to expected runway damage from enemy attack. He, therefore, looked for a tactical strike fighter to replace the F-105.3

General Everest had three basic requirements for the new aircraft: 1) operate independent of concrete runways; 2) carry nuclear bombs at tree top level and supersonic speeds to avoid enemy radar detection; and 3) have inter-continental ferry range without inflight refueling. Engineers faced substantial design problems to meet these varied requirements.[4]

The engineer who supplied the answer to the design problem was John Stack, Deputy Director of the NASA Langley Laboratory. Stack, who had designed the first wind tunnel to work through the transonic regime, had an excellent reputation for solving difficult technical problems. So when Stack visited General Everest in August 1959, the General eagerly listened to what he had to say.[5]

Stack proposed an aircraft with swing wings. Swing wing technology, experimented with in the early 1950s, had achieved disappointing results. Stack, however, believed he had solved the engineering problems of the swing wing. He

convinced General Everest a swing wing aircraft would meet his demanding fighter requirements. General Everest then initiated the administrative procedures that resulted in Specific Operational Requirement (SOR) - 183. This official Air Force document specified the requirements of the new aircraft.[6]

The SOR, issued on 14 June 1960, called for a tactical strike fighter; the aircraft program was popularly named Tactical Fighter Experimental or TFX. The principal requirements of SOR - 183 were as follows: a high altitude speed of Mach 2.5 (two and a half times the speed of sound); a combat mission radius of 800 nautical miles (nm) with the final 200 nm to the target flown below 1000 feet at Mach 1.2; an unrefuelled ferry range of 3,300 nm; and the ability to takeoff and land on an unpaved runway 3,000 feet long. A nautical mile, at 6076 feet, is somewhat longer than a statute mile which measures 5280 feet.[7]

While the Air Force worked on their advanced fighter, the Navy also considered its needs for the future. The Navy, however, did not need a low level tactical strike fighter. Their fleet air defense requirements called for an aircraft that could stay airborne for long periods of time and circle the fleet at high altitude. The Navy aircraft needed a powerful air-to-air radar to detect approaching hostile aircraft and a high-performance air-to-air missile to shoot them down. They felt they had these capabilities

in the F-6D Missileer, their new aircraft on the drawing board.8

The Air Force and the Navy might have procured the aircraft they each wanted had it not been for the fact that 1960 was a presidential election year. Following the election, the Eisenhower administration did not want to pass on any major new weapons development programs to the new Kennedy administration. Therefore, in December 1960, the Air Force and the Navy both received directives from outgoing Secretary of Defense, Thomas S. Gates Jr., to stop further work on their respective projects. The ultimate fate of each program then rested with the new Secretary of Defense, Robert S. McNamara.9

McNamara's Stand

Secretary McNamara came to his new job with impressive credentials. He had taught management at the Harvard Business School, and as the president of the Ford Motor Company, he had straightened out their complicated administrative structure. A man accustomed to making hard decisions, he did not shy away from his new duties. The Pentagon had a reputation for inefficiency and excessive bureaucracy. Secretary McNamara felt, as did many Americans, that the Department of Defense needed a radical shake-up. With the support of the new president, Secretary McNamara began implementing a bold new reorganization plan

which affected the fate of a number of expensive weapons programs.[10]

As a first step, Secretary McNamara began reviewing DOD procurement programs. He approached these programs by exploring alternative ways to meet their objectives and evaluating each alternative's cost before he made a decision. This, he felt, would result in the most cost effective system.[11]

Another concept he brought to DOD was commonality. Secretary McNamara felt that common weapon systems, developed for all the services, would result in tremendous fiscal savings. Two programs that immediately came to his attention were the TFX and the Navy's fleet air defense aircraft. He believed, after reviewing the proposed capabilities of the Air Force TFX, that modifications to the proposed aircraft would also meet the Navy's requirements. The Air Force disagreed. The Navy disagreed vehemently.[12]

Dr. James H. Wakelin Jr., Assistant Secretary of the Navy for Research and Development, presented the Navy's position that the Navy F-4H and the proposed Missileer were much better than the TFX for the Navy's air superiority and fleet air defense missions. Ultimately, Secretary McNamara remained convinced that commonality would work; he directed the Air Force and Navy to combine their efforts and agree upon common requirements for the TFX. Although begrudgingly accepted by the Air Force and Navy, the two services sent

their request for proposals on the TFX to industry on 1 October 1961. This started the process to determine the contractor who would build the TFX.13

The history of the process that resulted in the final contract award was wrought with controversy. Secretary McNamara requested four different competitions to select the final design, and even after the fourth competition, he overruled the unanimous recommendation of one colonel, four major generals, six lieutenant generals, five generals, five rear admirals, and one admiral. On 24 November 1962, the Pentagon awarded the initial contract to the General Dynamics - Grumman team. General Dynamics would build the Air Force aircraft, designated the F-111A, and Grumman provided assistance with the Navy "B" model.14

The F-111A

During the next two years the two contractors worked furiously to meet program deadlines. The design team encountered the following serious problems during development of the aircraft: excessive aerodynamic drag, which affected the acceleration and speed of the aircraft; poor maneuverability; poor stability; and excessive weight. Nonetheless, on 21 December 1964, ten days ahead of schedule, General Dynamic's chief test pilot, Dick Johnson, completed the first flight of an F-111A aircraft at Carswell Air Force Base (AFB), Fort Worth, Texas.15

The first flight went very well. The second flight, on 6 January 1965, was 24 days ahead of schedule and Johnson demonstrated the swing wing capability of the aircraft. The wings worked flawlessly traversing their full sweep from 16 degrees (full forward sweep) to 72.5 degrees (full aft sweep) in 20 seconds; however, not all went according to plan during this second flight. Pleased with the aircraft's performance, Johnson attempted supersonic speed with the wings swept at 72.5 degrees, a performance capability not scheduled for demonstration until the third flight. He did not succeed. As Johnson advanced power on the two Pratt & Whitney TF30-P-1 engines, both experienced compressor stall, a condition that occurs when the smooth flow of air entering the engines is disrupted.[16]

To overcome the engine stall problem, Pratt & Whitney modified the TF30 engine, and General Dynamics redesigned the aircraft engine inlet. The F-111A successfully completed supersonic flight on 5 March 1965. The modified TF30-P-3 engine and new Triple Plow I inlet did not eliminate the engine stall problem on the F-111A, but stalls were avoided over most of the flight envelope. General Dynamics subsequently redesigned the engine inlet again for the follow-on models of the F-111, which further improved engine performance and enabled the introduction of more powerful engines in these aircraft.[17]

The F-111A entered operational service with 474th TFW, located at Cannon AFB, New Mexico, on 16 October 1967. The wing moved to Nellis AFB, Nevada, in January 1968. The F-111A remained stationed at Nellis AFB with the 474th TFW, until June 1977, when the aircraft transferred to the 366th TFW, located at Mountain Home AFB, Idaho. General Dynamics built 141 production F-111A aircraft, with the last aircraft delivered on 30 August 1969.18

The F-111A in Southeast Asia

First Deployment

On 2 August 1964, North Vietnamese torpedo boats attacked the United States destoyer Maddox operating in the Gulf of Tonkin off the coast of North Vietnam. On 4 August, the North Vietnamese attacked the Maddox and another destroyer, the C. Turner Joy. On 5 August 1964, United States naval aircraft attacked the torpedo boat anchorages located in North Vietnam. These air strikes, the first in North Vietnam, opened a new chapter in the Vietnam war.19

Between 1964 and 1968 the air war over North Vietnam escalated slowly. As the United States expanded its attacks, the Air Force attempted tactical air strikes at night and in bad weather to keep continuous air pressure on the North Vietnamese. These attacks, conducted by F-105 and F-4 aircraft, experienced limited success. There were two main problems. The first problem was the requirement for

weapon accuracy, to limit collateral damage, and the poor radar capability of the aircraft. The second problem was increased exposure to the more sophisticated and integrated air defenses around targets in North Vietnam. This was particularly true for F-4 aircraft which had virtually no night low altitude capability. Their missions, flown between 6000 and 7000 feet, made them especially vulnerable to Surface-to-Air Missiles (SAMs). This was because the F-4 pilots could not use their best SAM defensive maneuver at night - a step dive toward the ground. The solution to these problems called for a night / all-weather aircraft which could evade SAMs and accurately radar bomb.[20]

In April and May 1967 the F-111 completed an operational test called Combat Bullseye I. This test compared the bombing accuracy of the F-111 with the F-105 and the F-4. The results of Combat Bullseye I convinced the Air Force that the F-111 possessed the accuracy required for night / all-weather missions in North Vietnam. The Air Force subsequently decided to deploy a detachment of six F-111 aircraft to Thailand on a combat evaluation called Combat Lancer.[21]

Before the Combat Lancer deployment, the Air Force initiated two programs to prepare the F-111 and its aircrews for combat. The first program, Harvest Reaper, started in June 1967. Harvest Reaper modified production F-111s, improving the aircraft's survivability by adding equipment

that would assist the crew in detecting and countering the North Vietnamese SAM and Anti-Aircraft Artillery (AAA). The second program was Combat Trident. Few aircrews had any substantial experience in the F-111. Combat Trident provided concentrated combat training for the Combat Lancer aircrews. They flew 2000 hours during 500 training sorties. The aircrews completed Combat Trident training on 6 March 1968, only days before the F-111s deployed. On 15 March 1968, six aircraft from the 428th Tactical Fighter Squadron (TFS) departed Nellis AFB, Nevada. The F-111s arrived at Takhli AB, Thailand, on 17 March 1968. Combat missions began within a few days after arrival.22

F-111 aircrews flew fifty-five combat sorties during Combat Lancer. Eighty percent of these sorties occurred at night or in bad weather. Typical targets attacked were the marshalling and storage areas around the North Vietnamese city of Dong Hoi. The Air Force had hoped to use the F-111 against targets around Hanoi, but on 31 March 1968, President Johnson excluded the Hanoi area by limiting bombing in North Vietnam to targets south of the 20th parallel, a line that cut North Vietnam in half.23

Reconnaissance photographs of target areas attacked by F-111s showed that a single F-111 sortie, attacking at night or in bad weather, achieved the same target destruction results as 5.91 F-4 sorties or 5.04 F-105 sorties attacking during the day in clear weather.

Employing the Terrain Following Radar (TFR) system to fly low level, F-111 crews penetrated enemy defenses, attacked their target, and returned to base virtually undetected by the enemy. Only 42% of the crews reported ever seeing enemy AAA fire or SAMs. No F-111 ever sustained a hit by enemy fire.[24]

The 428th TFS encountered problems during Combat Lancer. On 28 March, an F-111 took off and did not return. On 30 March, a second F-111 was lost. On 27 April, a third F-111 did not return from its mission. Following the loss of the third aircraft, the Air Force halted Combat Lancer operations. The Air Force never determined the cause of the first two losses since the aircraft were never located. The crew from the third aircraft ejected to safety. An accident investigation team determined this mishap resulted from fatigue failure of a part in the flight control system. This resulted in fleet wide inspection and replacement of the defective part and operational restrictions on the use of the F-111. Additionally, technicians discovered a problem with the TFR system. The TFR improperly identified heavy monsoon rains as steep mountains causing the F-111 to unexpectedly begin a steep climb. Texas Instruments, the subcontractor for the TFR, eventually corrected this problem by adding circular polarization to each TFR system.[25]

The 428th TFS remained ready for combat operations; but the unit saw little action following the third accident.

On 27 August 1968, General Dynamics discovered another structural defect in the F-111 during fatigue testing in the United States. Cracks were found in the critical wing carry through box that held the F-111 swing wings. With the structual problems that had been discovered and the restricted use of the F-111, the Air Force cancelled Combat Lancer and the F-111s returned to the United States in November 1968. Combat Lancer was an operational test of the F-111, and in that regard it was successful. The aircraft had demonstrated its ability to conduct night / all-weather operations, and technicians learned more about the systems unique to the aircraft, such as the TFR. On the other hand, the structural defects discovered in Thailand and the United States cast a shaddow of doubt on the F-111 program.26

The F-111A in Southeast Asia

Second Deployment

By September 1972, the situation in Southeast Asia had changed considerably from August 1968. On 8 May 1972, President Nixon removed the four year restriction on bombing north of the 20th parallel and United States forces once again attacked targets throughout all of North Vietnam. The North Vietnamese, assisted by China and the Soviet Union, had built the most dense and sophisticated air defense network in the world around Hanoi and the port city of Haiphong. With the resumed bombing "up north", the Air

Force once again needed a good night / all-weather attack aircraft.27

In the United States, the F-111 had completed the most stringent structural test program ever conducted on a military aircraft. Called Recovery, the Air Force initiated this program following the crash of an F-111 on 22 December 1969. This crash resulted from the failure of the left swing wing at its pivot point in the wing carry through box. The Air Force grounded all F-111 aircraft until 31 July 1970 and refused to accept any new F-111s from General Dynamics until each aircraft completed Recovery testing. Additionally, Texas Instruments had completed their modifications to the TFR; therefore, the Air Force decided to send the F-111 back to Southeast Asia. This deployment was no test; 48 F-111s of the 429th TFS and the 430th TFS replaced three squadrons equipped with 72 F-4s at Takhli AB, Thailand.28

The first two F-111s arrived at Takhli AB on 27 September 1972. These aircraft began flying combat missions, 55 miles northwest of Hanoi, three hours after their arrival at Takhli. Only one aircraft returned, and it looked like the Air Force had made a mistake. Nothing was further from the truth. Between September 1972 and March 1973, F-111s flew over 3,500 combat sorties over North Vietnam and Laos with only six losses. This represented a combat loss ratio of one sixth of one percent. No other

aircraft in Southeast Asia proved so survivable. For example, the B-52 loss rate was 1.5 times that of the F-111.29

The mission role of the F-111 expanded during the this deployment. F-111s continued to fly interdiction missions, attacking targets such as electrical power plants, petroleum storage areas, and railroad marshalling yards. But during an extensive bombing operation called Linebacker II, the Air Force used F-111s in an offensive counter air role attacking enemy airfields and in suppression of enemy air defenses attacking SAMs and AAA sites minutes before massive B-52 bombings. Air Force commanders credited Linebacker II for bringing the North Vietnamese to the bargaining table that resulted in the release of United States Prisoners of War. In the less heavily defended areas of North Vietnam and Laos, F-111s flew pathfinder missions. On these missions the F-111s, because of their superior navigation and bombing accuracy, lead other aircraft such as F-4s to a target and directed the release of the bombs. Finally, F-111s flew beacon bombing missions supporting army units on the ground. During these missions the army unit placed a special beacon on the ground which the F-111 could "see" with its attack radar. The F-111s then attacked targets, such as a dispersed enemy troop position that the radar could not see, by their relative position to the beacon.30

There is one final point to make about the F-111A's performance in Southeast Asia. F-111's flew their missions without any support from other aircraft. If other aircraft from the Air Force, Navy or Marines attacked Hanoi, there was an equal number of planes supporting them. These support planes included air refueling tankers, electronic countermeasures aircraft, fighter support to protect the other support aircraft, and command and control aircraft to manage the whole operation. The F-111 did not need this support; armed and fueled at its home base, the F-111 flew its mission low level at high speed avoiding enemy defenses, without requiring inflight refueling. By the end of the second deployment the Air Force acknowledged the combat capabilities of the F-111.[31]

The F-111B

The Navy never wanted the F-111B. From the start of the program, the Navy felt forced to accept the aircraft and resented their subordinate role to the Air Force in the development / production program. When the inevitable development problems occurred, especially the additional weight of the aircraft and a cost overrun of five million dollars per copy, the Navy quickly pointed out the deficiencies compared to the stated design requirements, (TABLE 2-1).[32]

TABLE 2-1.

F-111B Specified Performance vs Actual Capability

Category	Specified Performance	Actual Performance
Weight Empty	38,804 lbs.	46,112 lbs.
Take off Weight	62,788 lbs.	79,000 lbs.
Loiter Altitude	35,000 ft.	30,000 ft.
Loiter time @ 150 miles from Carrier	3.5 hrs.	3.0 hrs.

SOURCE: Robert F. Coulam, Illusions of Choice: The F-111 and the Problem of Weapons Acquisition Reform (Princeton, New Jersey: Princeton University Press, 1977): 244, Table II.

Late in 1967, as formal commitment to the F-111B approached, the Navy stepped up its criticism of the aircraft and recommended cancellation. In early 1968, Secretary McNamara announced his resignation as Secretary of Defense. He had been the one with the most at stake in the bi-service program. With his departure, other DOD officials began to agree with the Navy. The end of the F-111B was near. On 10 April 1968, a Senate Armed Services Committee Report stated:

> The committee has decided to disapprove further authorization for the F-111B program and to recommend the beginning of development of a replacement. ...
>
> Because of a design objective of having a common airframe for the Navy and the Air

> Force, the F-111B has extra weight that was needed to meet Air Force structural requirements. This extra weight has adversely affected the performance characteristics desired by the Navy. ...
>
> After testimony by aviation specialists within the Department of the Navy, the committee was convinced that development of a replacement aircraft should begin.

On 9 July 1968, the Air Force stopped work on the F-111B when the House Armed Services Committee joined the Senate in disapproving $460 million for the procurement of thirty aircraft.[33]

The Navy immediately proposed development of its own air superiority fighter following the cancellation of the F-111B. This aircraft, initially referred to as the VFX and later designated the F-14, experienced many of the same problems as the F-111B, especially cost overruns. The F-14 eventually cost between 18 and 21 million dollars per copy, making it the most expensive fighter in the world in 1975. The Navy accepted these deficiencies in the F-14 because it was the Navy's aircraft. Robert F. Coulam, author of Illusions of Choice: The F-111 and the Problem of Weapons Acquisition Reform, presented an interesting perspective on this situation when he wrote:

> Deficiencies that had been unacceptable on the F-111B in such areas as cost and loiter time suddenly became acceptable, indeed became the object of strenuous Navy defenses. In other words, there is a powerful organizational difference between an option whose acceptability is taken for granted - because it originated with the organization - and an option whose

> acceptability is doubted - because it originated with a competing organization. For an option whose acceptability is taken for granted, deficiencies represent problems only at the margin of a fundamentally acceptable capability. But for an option whose acceptability is doubted, deficiencies represent confirmation that the option itself is fundamentally unsuitable.[34]

This quote summed up the story of the F-111B.

The F-111C

In October 1963, the Royal Australian Air Force (RAAF) became the only foreign country to order and eventually accept delivery of the F-111. Designated the F-111C, General Dynamics slightly modified the basic "A" model to meet Australian requirements. Longer wings and a heavier main landing gear assembly comprised the main modifications. Problems in development and operational testing of the F-111A eventually delayed the RAAF from obtaining their aircraft until 1 June 1973.[35]

The F-111D

In the early 1960's, the development and use of microelectronics expanded rapidly in the aerospace industry. Several companies already produced some units for DOD use, such as the missile guidance package for the Minuteman I system. Between 1961 and 1963, engineers from North American Autonetics (now Rockwell International) discussed a proposed TFX "MK II" avionics package using state of the art

digital computers from IBM and a new attack radar, the APQ-130, from Autonetics.[36]

From the beginning of the TFX program, the Air Force had planned an avionics update for the F-111A. Initially the F-111A retrofit was to begin in 1968, but Autonetics encountered a series of problems developing the MK II system resulting in delays and increased cost. Reluctantly, the Air Force decided not to retrofit existing "A" models. The MK II system was held for a future production aircraft, designated F-111D. The Vietnam War deployments of the F-111A had also revealed a need for more powerful engines when the F-111 carried heavy conventional bomb loads; therefore, the "D" model was also to receive engines with greater thrust than those of the "A".[37]

The first F-111D, a rebuilt "A", did not fly until 2 December 1968, well past the scheduled aircraft production date. Production aircraft eventually appeared in the autumn of 1970. By this time the initial R&D cost of $60 million had soared to $280 million, with the installation of each MK II system costing $2.2 million. The Air Force could not afford the projected cost of the F-111D, touted as the ultimate F-111. Consequently, the Air Force cut the procurement of the F-111D from 315 to 96 aircraft, enough to equip one tactical fighter wing, the 27th, located at Cannon AFB, New Mexico.[38]

The 27th TFW accepted its first F-111D on 1 November 1971. From the beginning, the 27th TFW experienced difficulties with the F-111D. The first aircraft landed and went straight into a maintenance hangar. During the flight to Cannon AFB some of the sophisticated avionics failed and Cannon AFB did not have spare parts. When the second aircraft arrived, maintenance personnel began swapping avionics parts from the two aircraft to build one plane that would fly. Thus began a long history of cannibalization of aircraft to keep other aircraft in the air.[39]

The concept of commonality that Secretary McNamara had hoped would save millions of dollars failed. In the case of the F-111D, the Air Force was left with an expensive, complex, highly integrated, and one-of-a-kind avionics system. The MK II avionics system consisted of seven main components. These components included essential pilot instruments for flight at night or in weather and the entire weapons delivery subsystem. Through the middle of 1972, problems in the MK II system, particularly the pilot's and weapon systems officer's primary instruments, crippled flying operations at Cannon AFB. Lack of key avionics spares, late delivery of ground support equipment, poor depot support, and inexperienced maintenance personnel added to the wing's problems. In the meantime, the wing slowly increased its strength to 79 aircraft by mid 1973.[40]

Maintenance and logistic support for the F-111D did improve, but tight DOD budgets following the Vietnam war hampered the procurement of needed parts and equipment. Additionally, fuel leaks around the fuel tank seals and a flaw in the environmental system reduced the mission capable rate of the F-111D below that of other F-111's. By the end of 1972, only one of the three fighter squadrons assigned to the 27th TFW was operationally capable.41

Between 1973 and 1977, conditions at Cannon AFB did not improve substantially. The DOD budget declined between 1968 and 1976 and rose only slightly in 1977. The Air Force committed some money to purchase spares for the F-111D in 1975, 1976, and 1977. Because of the time between commitment of money and having the parts in supply, the 27th TFW did not expect to receive these parts until 1979. The beginning of modernization programs in the Department of Defense during the 1970s also reduced spare part purchases. Both the Air Force and Navy proposed new aircraft to counter the Soviet threat. The Air Force bought the F-15, F-16, and A-10, and continued development on a new electronic warfare aircraft, the EF-111A. The Navy finally introduced the F-14 and began development of an inexpensive "lightweight" fighter due to the high cost of the F-14. High procurement costs for the new aircraft reduced the money available to purchase spare parts for all Air Force aircraft. In testimony before the Senate Armed Services Committee on 18

February 1981, General Wilbur L. Creech, Commander of Tactical Air Command, responded to questions from Senator Gordon J. Humphrey of New Hampshire on the purchase of new aircraft and aircraft spares.

> Mr. Humphery. General Creech, not necessarily as commander of TAC but as a senior officer who's been around for a while, have you ever seen a situation like this regarding spare parts, one of this magnitude? Is this a recurrent thing? Is it a cycle we see?
>
> General Creech. It is cyclic, I believe. It is cyclic particularly when you get into modernization periods which are inevitable. We have a tendency again to block obsolescence, and then when modernization competes with spares, there is an inevitable conflict in a constrained funding environment.
>
> I must say that some of the people who make those funding tradeoffs are very well intentioned. For example, you have heard the arguments, let's buy the airplanes, the new airplanes in an economic quantity and pick up the spares later; and that has a great deal of logic except that then you end up with airplanes you can't take to war.
>
> Senator Humphery. But I suppose if you have to choose between the two, the rational has been it's better to get the airplane while you can. Spare parts are a less difficult problem certainly.
>
> General Creech. Yes. You cannot expect it to play like a symphony orchestra. There will be some imbalances, but the gross imbalances we have in the force today are, in my judgment, inexcusable.42

Compounding F-111D problems with spare parts, the Air Force discovered, in 1977, a major problem with the Pratt & Whitney engines that powered F-111 aircraft. The engine problem dealt with a weld around an ignitor that went into

the combustion section of the engine. When the weld failed, the combustion casing around the engine would also fail catastrophically. In some cases, this failure caused the pilot to lose control of the aircraft. To identify and correct this fault, a special maintenance inspection program, called PACER CAN, began on 19 December 1977, at the Oklahoma Air Logistics Center (OK-ALC). Before the engine specialists at OK-ALC could conduct the inspection, maintenance personnel at Cannon AFB had to remove engines from aircraft and ship them to OK-ALC. An expensive program in terms of time and labor, PACER CAN required 86 manhours just to complete the inspection and maintenane actions on each engine. Moreover, 192 F-111D engines required the inspection. The shortage of available engines due to PACER CAN limited flight operations at Cannon AFB and impacted negatively on the maintenance status of the wing. PACER CAN significantly affected the F-111D until August 1979.[43]

The F-111E

In early 1968, research and development on the F-111D was significantly behind schedule, due mainly to design problems with the MK II avionics system. The United States Air Forces in Europe (USAFE) needed F-111 aircraft to support NATO night / all-weather operations, a mission poorly suited to the F-4 as demonstrated in Vietnam. On 27 February 1968 the Air Force decided to produce the F-111E

model to equip the F-111 wing for USAFE. The "E" closely resembled the "A" with minor modifications to the avionics to improve management of weapons carried and with a new engine inlet to improve engine performance at high speed and high altitude.[44]

The F-111E entered operational service with the 27th TFW at Cannon AFB in September 1969. By December of that year, the wing consisted of 29 aircraft. The F-111E program slipped six months following the 22 December 1969 F-111A crash and the initiation of the Recovery program. (ref. p. 20) Despite program slips, the first two of 79 F-111Es arrived at Royal Air Force (RAF) Station Upper Heyford, England, on 11 September 1970, to equip the 20th TFW. General Dynamics built a total of 94 F-111E's. The 20th TFW accepted the last F-111E on 28 May 1971.[45]

With F-111E aircraft stationed at RAF Upper Heyford, NATO had for the first time an aircraft capable of day or night, all-weather interdiction deep into Warsaw Pact countries. Furthermore, the F-111E could accomplish this mission with either conventional or nuclear weapons. For the first time since 1959, when General Everest began his search for a tactical strike fighter, the F-111 had the mission General Dynamics designed the aircraft to accomplish.[46]

The F-111E became an important part of NATO's deterrent posture. To accomplish the NATO nuclear strike

mission, new weapons delivery techniques evolved. In addition to level deliveries, aircrews trained to perform radar and visual low-altitude drogue deliveries (LADDs). This delivery required the crew to pull the nose of the F-111E up into a steep climb. At the appropriate point the weapons delivery computer released the nuclear weapon which then deployed a parachute causing it to fall virtually straight down toward the target. After weapons release, the F-111E pilot rolled the aircraft over on its back and pulled its nose back towards the ground. Returning to low altitude, the F-111E departed the target area. The mission role of the F-111E also expanded. With its excellent long range air-to-ground radar that could detect ships at sea, the F-111E began training in Tactical Air Support of Maritime Operations (TASMO). During a TASMO mission, one or more F-111s joined with other aircraft to attack a naval target. The F-111s located the target with their radar and then led the rest of the attacking aircraft to the doomed ship.47

Since TAC F-111s augmented NATO forces if war broke out in Western Europe, TAC began training stateside F-111s in these new deliveries and missions in the early 1970s. This led to a general review of how TAC planned to use the F-111. In the mid 1970s, TAC F-111 pilots and weapon systems officers entered an expanded weapons delivery training program. Aircrews learned how to dive bomb with

the F-111 and how to toss a bomb, a delivery similiar to a LADD. With the expanded weapons delivery program, TAC F-111s began flying two and three aircraft formation missions. TAC mission training for F-111s expanded to include: (1) composite force missions, attack formations with different types of aircraft; (2) close air support missions using the beacon bombing techniques learned in Vietnam; and (3) TASMO missions. As the F-111 approached the end of the 1970s, TAC F-111s trained for a variety of missions and weapon deliveries.48

The F-111F

With the F-111D and E still in production, the Air Force decided on 12 September 1969 to produce a final F-111 model, the "F". The F-111F had digital avionics like the "D" but not the entire MK II package. This proved to be a more cost effective aircraft than the F-111D with very little loss in capability. General Dynamics equipped the F-111F with the most powerful engines installed in F-111 aircraft, the TF30-P-100. The two F-111F engines produced over 50,000 pounds of thrust at full power and significantly improved the aircraft's acceleration and maneuverability. The maximum power of the F-111A and E was 37,000 pounds; F-111D engines produced 39,200 pounds. The 347th TFW accepted the first F-111F in February 1972, at Mountain Home AFB, Idaho. The Air Force redesignated the wing as the

366th TFW in 1973. General Dynamics built a total of 106 F-111F aircraft.[49]

The F-111F achieved full operational status in October 1972, one month ahead of schedule. In 1976, the F-111F demonstrated the rapid deployability of the F-111. On 18 August 1976, North Korean Army personnel murdered two United States Army officers while they supervised the trimming of a tree located near the "bridge of no return" in the Joint Security Area between North and South Korea. The Joint Chiefs of Staff alerted the 366th TFW that same day. On 19 August 1976, the 390th TFS deployed to Korea with 20 F-111F aircraft. The F-111Fs flew nonstop from Mountain Home AFB, Idaho, to Taegu AB, Korea, a flight lasting 10.5 hours. The F-111F's night / all-weather capability enhanced the combat power of existing Korean forces. Half of the F-111Fs redeployed to Mountain Home AFB on 19 September 1976. The remaining aircraft redeployed to Mountain Home on 6 October 1976.[50]

In 1977, the F-111F was reassigned to the 48th TFW, located at RAF Lakenheath, England. This move, part of an operation called Ready Switch, dedicated 50% of existing F-111 assets to NATO. During the early 1980s, the F-111F completed modifications which enabled the aircraft to carry a new system called Pave Tack. Pave Tack consisted of a special pod mounted in the weapons bay of the aircraft which provided the F-111F with the capability to direct laser

guided bombs precisely to a target. The 48th TFW used this system in combat for the first time on 15 April 1986. On this date, 13 F-111F aircraft participated in the United States attack against terrorist targets in Libya. The F-111F aircraft successfully attacked the Sidi Bilal commando training camp, Bab al Aziziya barracks, and the Tripoli military airfield. One of the F-111F aircraft, with its crew of two, failed to return from this mission. The pilot of the aircraft, Captain Fernando L. Ribas and the weapon systems officer, Captain Paul F. Lorence were declared killed in action.[51]

The EF-111A

In 1975, the Air Force decided to modify 42 F-111As as electronic warfare (EW) aircraft. Designated the EF-111A, this EW aircraft carries powerful electronic jammers that blind or deceive enemy radars as to the location of the EF-111A and the other aircraft within its electronic coverage. The EF-111A does not carry bombs, and the right seat crewmember is a specially trained Electronic Warfare Officer.[52]

Flight testing of the EF-111A began in May 1977 with Grumman Corporation as the primary contractor. The EF-111A achieved operational status in December 1983, equipping the 390th Electronic Combat Squadron (ECS) located at Mountain Home AFB, Idaho. A second squadron of EF-111As, the 42nd

ECS, is located at RAF Upper Heyford, England. This squadron received its first aircraft in February 1984.[53]

On 15 April 1986, four EF-111As participated in the United States attack against terrorist targets in Libya. The EF-111As provided electronic support for the attacking aircraft. This marked the first use of EF-111A aircraft in combat.[54]

TABLE 2-2. SUMMARY OF F-111 DEVELOPMENT

	PRINCIPAL MODELS				
	A	D	E	F	EF
Decision to Build	Sep 61	Jan 66	Feb 68	Sep 69	Jan 75
First Flight	Dec 64	Dec 68	Aug 69	Oct 71	May 77
First Acft Accepted	Oct 67	Nov 71	Sep 69	Feb 72	Nov 81
Last Acft Accepted	Aug 69	Feb 73	May 71	Mar 76	Dec 85
# Built	141	96	94	106	42

SOURCE: Marcelle S. Knaack, Encyclopedia of U.S. Air Force Aircraft and Missile Systems vol. 1: Post-World War II Fighters 1945-1973 (Washington D.C.: Office of Air Force History, 1978): 223 - 260.

John W.R. Taylor, ed. Jane's All the World's Aircraft: 1958-1986 (New York: Jane's Publishing Inc., 1985): 419.

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1978 - Delete the "D"

In late 1977, the Office of The Secretary of Defense (OSD) proposed the retirement of all F-111 aircraft following the introduction of the Ground Launched Cruise Missile (GLCM) into the Air Force inventory. OSD had included the proposal in a draft of the 1978 Consolidated Guidance. The Consolidated Guidance (CG) was one of the documents that began the DOD Planning, Programming, and Budgeting System (PPBS). The PPBS, DOD's resource management system, resulted in the DOD budget input to the president's budget presented to Congress each January. The 1978 CG provided guidance for fiscal year 1980. The Air Force successfully defended the F-111, and the proposal was withdrawn from the CG in February 1978.[55]

Using the Consolidated Guidance, each service prepared a Program Objective Memorandum (POM). The POM presented detailed information on the equipment and manpower needed by the service to meet the objectives of the CG within set fiscal limits. The Air Staff Board (ASB) prepared the Air Force POM. Major General James B. Currie, Director of Programs for the Deputy Chief of Staff, Programs and Analysis, Lieutenant General Abbott C. Greenleaf, chaired the Air Staff Board.[56]

After reviewing all Air Force programs, the ASB expressed concern about the expense and poor readiness of the F-111D. Subsequently, in May 1978, the ASB deleted the

F-111D from the 1978 POM. This action projected retirement of the F-111D for 1981. The Air Force Council (AFC), Chaired by Vice Chief of Staff, General Lew Allen Jr., then reviewed the POM prior to its submission to the Chief of Staff and the Secretary of the Air Force. The F-111D's status in the 1978 POM remained unchanged and the F-111D went unfunded for fiscal year 1980.57

Not all of the Air Staff supported the decision of the Air Staff Board. Lieutenant General Andrew B. Anderson Jr., Deputy Chief of Staff, Operations, Plans and Readiness, favored retention of the F-111D. He unsuccessfully attempted to have the aircraft reinstated in September 1978 as part of the budget review process. He continued his efforts and sent a memorandum to the new Vice Chief of Staff, General James A. Hill, in November 1978. In his memorandum General Anderson wrote:

> We are deeply concerned with the possible phase-out of the F-111D from our force structure. This concern has also been articulated in recent messages from General Huyser, Deputy CINCEUR, and General Pauly, CINCUSAFE.58

General Anderson's staff had evaluated the F-111D based on mission requirements and not just expense. The results of this evaluation showed that the F-111D played an important augmentation role in USAFE and the Pacific in times of crisis. Also, retirement of the F-111D would require the F-111A at Mountain Home AFB to conduct all F-111

training or a squadron from USAFE would have to return to the United States. Finally, a manning imbalance would develop between USAFE based units and those in the United States which would require crew retraining for a majority of USAFE F-111 returnees.59

The Air Force Council, chaired by General Hill, reconsidered the retention issue in February 1979 and directed retention of the F-111D. The Air Force subsequently included the F-111D in the May 1979 Air Force POM. From this point on, the Air Force supported retention of the F-111D. The Program Analysis and Evaluation (PA&E) Staff of the Office of the Secretary of Defense and the Office of Management and Budget (OMB) of the Executive Office of the President subsequently became the main antagonists of the F-111D. The PA&E and OMB staffs contended the F-111D cost too much to maintain, could not deploy and sustain operations, and lacked combat effectiveness.60

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CHAPTER 3

THE F-111D RETENTION STORY

In January 1979 the mission of the 27th Tactical Fighter Wing, located at Cannon Air Force Base, New Mexico, was to maintain three Tactical Fighter Squadrons in mission capable status prepared to deploy worldwide and conduct combat operations during all weather and lighting conditions. The 522nd, 523rd, and 524th made up the three Tactical Fighter Squadrons. The wing also had a subordinate mission to train the pilots and weapon systems officers who flew the F-111D of the 27th TFW and the F-111F of the 48th TFW, located at RAF Lakenheath, England. The 481st Tactical Fighter Training Squadron (TFTS) and the 523rd Tactical Fighter Squadron (TFS) carried out this mission.[1]

Supporting each TFS was an Aircraft Maintenance Unit (AMU) with a corresponding numerical designation. Thus the 522nd TFS flew the aircraft maintained by the 522nd AMU. TAC assigned 84 F-111D aircraft to the 27th TFW and directed the distribution of the aircraft to the AMUs as unit equipment. The abbreviation UE stands for Unit Equipped and determines the basic number of aircraft allocated to the AMU and the manning required in both the TFS and the AMU. The standard size of a TFS/AMU was 18 UE or 24 UE. The 522nd TFS/AMU, 524th TFS/AMU and 481st TFTS/AMU were 18 UE organizations. The 523rd TFS/AMU was a 24 UE organization.

This accounted for 78 of the wing's 84 aircraft. The wing divided the six remaining aircraft equally among the 522nd, 524th, and 481st AMUs. These aircraft were officially "not operationally assigned" and were essentially spare aircraft.2

27th TFW Reorganization

Colonel Joseph D. Moore became the commander of the 27th TFW on 18 November 1977. In early 1979, he knew of OSD's desire to retire the F-111D and the opposing efforts of the Air Staff and the Secretary of the Air Force, John C. Stetson, to retain the aircraft. The ability of the 27th TFW to carry out its wartime mission also concerned Colonel Moore. Colonel Moore conducted a Local Operational Readiness Inspection Exercise from 31 January to 8 February 1979 designed to test the wing's ability to perform its wartime mission. The inspection did not go well.3

During the inspection each area evaluated could receive one of five ratings: outstanding, excellent, satisfactory, marginal, or unsatisfactory. The wing received an overall inspection rating of unsatisfactory. Three areas were particularly noteworthy. First, the critical area of employment, which included weapons delivery effectiveness (how well the crews dropped bombs), received an unsatisfactory rating. Second, with no margin to spare, the wing achieved a satisfactory rating in deployment.

Deployment involved launching the F-111Ds from Cannon AFB and flying the aircraft on a simulated deployment route which returned to Cannon AFB. Tasked to deploy two 18 aircraft squadrons, the wing only deployed 30 aircraft on time. The remaining six aircraft deployed a day late. Finally, the wing failed to achieve a scheduled sortie rate of 1.2 sorties per aircraft per day and to use each aircraft 9.7 times over the course of the inspection. The wing only achieved a .93 sortie rate and a disappointing 7.2 aircraft utilization rate. Colonel Moore assessed his wing and began investigating ways to improve combat capability.4

On 7 March 1979, Colonel Moore sent his assessment of the 27th TFW to Lieutenant General James V. Hartinger, Commander of 12th Air Force. (Twelfth Air Force was the 27th TFW's parent organization.) Colonel Moore's primary reason for the poor performance of the 27th TFW was the wing's inability to provide sufficient continuation training sorties for TFS aircrews. Without practice the aircrews could not maintain a minimum level of proficiency in war fighting skills, such as bombing and low altitude navigation. Colonel Moore observed:

> I believe that the 27th Wing may finally have exceeded the optimum in doing more with less. Put another way, we cannot produce enough sorties to meet our needs. During CY 1978, inexperienced crews averaged 7.0 sorties per month. Experienced crews averaged 5.4 sorties per month. ... The Lakenheath replacement crew program receives highest priority and we

> graduated all that were scheduled. All the slippage and non-production was incurred in our local flying programs. So far in CY 1979, we are not showing improvement - nor can I find reason or support for forecasting that our operation is going to get better. ...
>
> The important aspect to our sustained low sortie production is that 27th Wing readiness is declining.[5]

Tactical Air Command Manual (TACM) 51-50 established training sortie requirements for aircrews. This manual called for four sorties a month for experienced aircrews and five sorties a month for inexperienced aircrews to maintain level A combat capability, the lowest acceptable level. From his experience, Colonel Moore believed that historical sortie availability rather than aircrew proficiency dictated these requirements. His staff proposed that eight sorties for experienced and ten sorties for inexperienced aircrews was a more realistic minimum requirement to maintain proficiency and the confidence needed for combat. This equated to a mean of nine sorties a month per aircrew. This point was academic, however, if the 27th TFW could not produce the training sorties needed.[6]

Colonel Moore was not without his reasons for the lack of sortie production. He referenced the historical shortfalls due to airframe and engine problems, as well as supply shortages. He noted an "overstatement of capability based on erroneous AFLC projections of support." (AFLC, the Air Force Logistic Command, is the Air Force agency responsible for logistic support of weapons systems).

Finally, he acknowledged that between 1975 and 1977 DOD committed some money to purchase spares for the F-111D; however, he also wrote:

> I have not been able to determine from TAC or the AFLC System Manager how much money was spent on exactly which spare equipment in what numbers. ... There is sufficient commonality in all F-111 airframes and in FB, F and D avionics that considerable cross flow of spares occurs. The F at Lakenheath and the FB in SAC have higher supply support priority identifiers than the D, so it is likely that some spares originally ordered for D support are "lost" in the system.[7]

Turning to past sortie production, Colonel Moore stated that between 1975 and 1978 the 27th TFW averaged 485 sorties per month for all wing flying activites. The best sustained performance occurred in 1977 when the wing flew an average of 520 sorties per month. From October through December 1978 (the first quarter of fiscal year (FY) 1979), the wing did better producing a total of 1895 sorties with approximately 50 functional aircraft, an average of 632 sorties per month. Although the sortie rate had improved, Colonel Moore considered the cost in maintenance effort, stress and fleet degradation "excessive", a result of working against too many non-flyable or non-workable aircraft. Additionally, periodic surge exercises, directed by Tri-Command Manual 60-6, actually hindered sortie production. During a sortie surge the wing flew at an increased rate for a short period of time, usually a few days. The sorties lost after the surge, due to surge

demands on supply assets, negated any gain in sortie production during the surge.[8]

Colonel Moore did not believe the wing could sustain the FY 79 first quarter production rate. Based on an average of 55 aircraft available to fly and each aircraft flying 9.4 times a month, he expected the wing to average approximately 500 sorties a month between March and September 1979. (The actual average was 579 sorties per month.) This established a baseline against which Colonel Moore compared sortie requirements.[9]

Colonel Moore divided wing sortie requirements for the remainder of FY 1979 into five categories: 1) F-111F replacement crew training for RAF Lakenheath, 2) F-111D replacement crew training for Cannon AFB, 3) support, 4) overhead, and 5) TFS continuation training. F-111F replacement crew training for RAF Lakenheath required an average of 97 sorties per month. F-111D replacement crew training for Cannon AFB required 126 sorties per month. No training occurred during a support or overhead sortie, such as a functional check flight (FCF). Specially trained aircrews flew FCFs after maintenance personnel performed certain types of maintenance on an aircraft, such as replacing both engines. Support and overhead sorties were constant planning factors for each month, 80 sorties for support and 60 sorties for overhead. This left 137 sorties for TFS continuation training, resulting in an average of

3.4 sorties per crew. Sortie availability for TFS continuation training was not sufficient.[10]

Colonel Moore's staff prepared three possible solutions to the problem. These solutions concentrated on F-111D replacement crew training for Cannon AFB, TFS manning, and the organizational structure of the 27th TFW. Colonel Moore's staff considered F-111F replacement crew training for RAF Lakenheath as "inviolate", since it provided crews for another command, the United States Air Forces in Europe (USAFE).[11]

The first solution proposed continued efforts to improve sortie production. If the wing could increase its sortie production from 500 to 600 sorties per month, TFS crews would fly an average of 5.9 sorties per month. This average would at least meet TACM 51-50 level A requirements. Colonel Moore did not believe this would solve the problem of degraded training for his crews. He also commented, "... while 600 sorties per month sounds good, I would be less than candid if I failed to admit that it is pie in the sky."[12]

The second solution recommended reduction of F-111D replacement crew training for Cannon AFB by cancelling 14 pilot and 9 weapon systems officer training slots between March and December 1979. This proposal increased TFS aircrew sorties to 6.0 per month. As with the first solution, this proposal only met TACM 51-50 requirements and

fell short of the sorties believed necessary. Furthermore, maintaining this sortie rate would require cancelling more training slots in the future, causing aircrews to serve an extended tour of duty at Cannon AFB. Being "trapped" at Cannon AFB was a major concern of the aircrews, but Colonel Moore realized, "That may be another bullet we have to ask them to bite."13

The third solution involved changing the organizational structure of the 27th TFW. The proposed new structure deleted the 481st TFTS, an 18 UE squadron. The 522nd TFS and 524 TFS would change from 18 UE squadrons to 24 UE squadrons, with the 524th TFS converting to a TFTS to replace the 481st TFTS. The 523rd TFS would remain a 24 UE squadron. The wing would maintain six "not operationally assigned" aircraft, giving two to each squadron. This accounted for 78 of the wing's 84 aircraft. The six remaining aircraft would go into storage at Davis-Monthan AFB in Arizona where the majority of their parts would be removed and entered into the F-111D supply system. In summary, this proposal reduced the number of TFS aircrews, reduced the number of replacement crews requiring training, reduced the number of aircraft requiring support, and increased the supply of much needed spare parts. These changes would increase the average number of sorties for TFS aircrews to 8.4 per month. Colonel Moore felt this average was acceptable. The obvious drawback to this proposal was

that the 27th TFW and the Air Force would lose an F-111D TFS. But Colonel Moore reaffirmed that he was not confident in the present combat capability of the 27th TFW, and that reorganization would, "capitalize on our real capability."[14]

Action on Colonel Moore's assessment regarding surge exercises came quickly. On 10 April 1979, the 27th TFW was exempt from meeting surge exercise requirements directed in Tri-Command Manual 60-6. Action on the reorganization of the 27th TFW took longer. But by October 1979, the Air Staff had approved the reorganization, and TAC wanted to move the 1 July 1980 effective date up six months. The Air Staff approved TAC's request and on 1 January 1980 the 27th TFW reorganized. (This action and the reorganization would prove beneficial to Coronet Hammer training discussed later.) Following Colonel Moore's proposal, the reorganized wing consisted of three squadrons; the 522nd TFS, the 523rd TFS which retained its subordinate mission as the replacement training unit (RTU) for RAF Lakenheath aircrews, and the 524th TFS which assumed the Cannon AFB training role. On 8 July 1980, the Air Force officially retired the 481st TFTS and the 524th squadron became a TFTS.[15]

Change of Command

On 7 May 1979, Colonel Robert I. McCann assumed command of the 27th TFW from Brigadier General Moore who was promoted to Brigadier General on 26 March 1979. Colonel

McCann was no stranger to the F-111. In July 1977, he became the Deputy Commander for Operations of the 366th TFW at Mountain Home AFB, Idaho. The 366th TFW flew the F-111A. Subsequently, in July 1978, Colonel McCann served as the Vice Wing Commander of the 366th TFW. Colonel McCann was an experienced pilot with over 4500 hours of flying time and had served with the Joint Chiefs of Staff at the Pentagon. Colonel McCann's past experience prepared him well for his new duties.[16]

TAC Operational Readiness Inspection (ORI)

An ORI assessed the operational readiness of a unit to accomplish its wartime mission. The TAC Inspector General (IG) evaluated the unit in four critical areas: 1) Initial Response, 2) Employment, 3) Ability to Survive, and 4) Combat Support. The IG determined the frequency and scope of an ORI based on need and conducted ORIs on a no-notice or prior-notice basis. The IG usually conducted an ORI in phases that included one or more of the following areas: 1) Mobility, 2) Aircraft Generation, 3) Deployment / Regeneration, 4) Employment, 5) Ability to Survive, and 6) Combat Support.[17]

Between 30 July and 1 August 1979, the TAC IG conducted a no-notice ORI of the 27th TFW; phases evaluated were mobility and aircraft generation. The ratings achieved by the wing in these areas were Excellent and Outstanding

respectively. The rating of outstanding in aircraft generation was important, demonstrating the wing's ability to prepare for deployment within an allotted time frame. To achieve this rating, wing maintenance personnel readied aircraft for flight (aircraft generation) in 75% or less of their allotted time. The aircraft were capable of performing combat missions, and the IG required the aircrews who flew them to validate this in writing when they accepted an aircraft for deployment. Acknowledgement of the wing's accomplishment came in the form of a message from General Wilbur L. Creech, TAC Commander, to Colonel McCann:

> Warmest congratulations to the 27th Tactical Fighter Wing for achieving ratings of outstanding and excellent on the generation and mobility phases of the recent no-notice ORI. These are noteworthy accomplishments which reflect great pride, professionalism and "can do" spirit. Please convey my congratulations to all of the men and women of the 27th -- I am extremely proud of them.[18]

Circling the Wagons

Although the Air Staff, by May 1979, had established their position for retention of the F-111D, the issue was far from over. In July 1979, continuing the PPBS process, the Office of the Secretary of Defense (OSD) forwarded to the Air Force the draft Program Decision Memorandum (PDM). The PDM approved each service's Program Objective Memorandum (POM) as amended by the Secretary of Defense (SECDEF). The Defense Resources Board (DRB) assisted the SECDEF in the preparation of the PDM. The DRB included the Service

Secretaries, the Chairman of the Joint Chiefs of Staff, the OSD Director of Programs Analysis and Evaluation (PA&E), and a member from the Presidents Office of Management and Budget (OMB). The draft PDM moved the F-111D from the core level of the Air Force POM to the enhanced level of the POM based on financial constraints. Programs at the enhanced level of the POM received funds only if Congress fully funded the DOD budget. Since this rarely happened, movement to the enhanced level of the POM virtually guaranteed the F-111D would go unfunded in 1981 and ensure its retirement. The Air Force prepared and submitted a request to move the F-111D back to the core level in the POM.19

The Air Force POM did not change and the F-111D remained at the enhanced level of the Air Force POM. From August through November 1979, Secretary of the Air Force, Hans Mark, and Chief of Staff of the Air Force, General Lew Allen Jr., personally presented the case for the F-111D to Secretary of Defense, Dr. Harold Brown. Their efforts resulted in the SECDEF's decision to retain the F-111D for two and one half years but to review the status of the system in one year's time. OSD then moved the F-111D back to the core level of the Air Force POM.[20]

Throughout this process PA&E and OMB objected to the retention of the F-111D. Mr. Thomas P. Christie, Deputy Assistant Secretary (Operational Test and Evaluation) PA&E,

explained why PA&E rejected the F-111D. He "implied" that Air Force data was in question and that:

- $200-300 million was required to bring reliability / maintainability to acceptable standards.
- The system was not deployable or had limited deployability because of complex support equipment requirements.
- Lack of effective munitions would preclude killing worthwhile targets.
- The money could be spent better elsewhere.[21]

To defend the F-111D the Air Staff needed hard evidence showing improvement in maintainability and reliability. Therefore, on 9 September 1979, the Air Staff tasked TAC Logistics (LG) to develop an approach to measure achieved improvements. This program became known as Coronet Reaper. The Air Staff requested the Air Force Logistics Command to assist TAC in their efforts. Finally, the Air Staff emphasized that rapid progress was essential. The Air Staff needed the information for the POM cycle which would begin in early 1980.[22]

TAC LG held a planning meeting for Coronet Reaper on 3-4 October 1979. During this meeting attendees identified five broad categories for assessment: flying performance; maintenance; supply; reliability / maintainability; and other areas, which included deployability. Also in October 1979, Major General Dewey K.K. Lowe, Commander of the

Sacramento Air Logistics Center (SM-ALC) at McClellan AFB, California, proposed the formation of a "General Officers' Steering Group" to the Air Staff. SM-ALC was the primary AFLC center responsible for logistics support to the F-111D. The General Officers would review the objectives and plan of action to defend the the F-111D in the upcoming budget program cycle. General Lowe recommended that the first meeting be held at Cannon AFB in November.23

The Air Staff quickly responded to Major General Lowe's proposal with approval. The first meeting of the F-111D General Officers' Review Group (GORG) was held on 16 November 1979. During this conference, briefers presented a detailed history of the F-111D retention issue. Colonel McCann reviewed the logistic and maintenance posture of the 27th TFW and presented four initiatives which would improve the F-111D's maintainability and performance.[24]

The first initiative was a proposal to configure three Lead-The-Force (LTF) aircraft with the new and-or improved avionics equipment that AFLC was fielding for the F-111D. Colonel McCann identified the following items for the LTF aircraft: the new Advanced Microelectronic Converter set and Digital-Signal Transfer Unit, and the improved Inerial Reference Unit, Navigation Converter Unit, and avionics Battery Unit. The LTF aircraft would provide a data base to evaluate the maintainability of the avionics modifications. The second initiative called for freezing

approximately 250 experienced maintenance non-commissioned officers (NCOs) at Cannon AFB. This would increase the number of experienced personnel working on the F-111D which would improve the quality of maintenance performed and reduce the time an aircraft was not available. The third initiative centered on augmenting automated avionics test stations with manual stations and tying the test stations into an integrated mockup to more thoroughly test equipment inspected or repaired. Finally, to improve the deployment capability of the test stations, an improved portable air conditioner would be tested and evaluated. The air conditioner was an essential piece of equipment designed to keep the avionics test equipment at the proper temperature.[25]

On 29 November 1979, the Air Staff authorized the 27th TFW to designate three F-111D's as Lead-The-Force aircraft and to, "accumulate maximum time possible on recently produced avionics mods." Following this action the wing received approval, on 5 December 1979, to freeze 232 selected maintenance personnel from reassignment until 30 December 1980.[26]

Coronet Beacon

Under the direction of the Chief of Staff of the Air Force, TAC began a series of short term overseas deployments in 1975. The purpose of these deployments was to

familiarize TAC forces with the unique aspects of operating outside the United States. Coronet Beacon to the Pacific theater of operations was the second such deployment for the 27th TFW and the F-111D. The first deployment, Coronet Kingfisher, occurred in September 1978 when the wing deployed eight aircraft to Gardermoen, Norway. This deployment was in support of a larger North Atlantic Treaty Organization (NATO) exercise called Northern Wedding.27

The Coronet Beacon deployment, from 3 October to 27 November 1979, involved F-111D participation in two separate exercises. Sponsored by the Australia-New Zealand-United States (ANZUS) alliance, the first exercise, Kangaroo III, ran from 6 October to 5 November. The United States Pacific Air Forces (PACAF) sponsored the second exercise, Cope Jade Charlie, from 5 November to 19 November 1979. The 27th TFW deployed six F-111D aircraft manned by aircrews from the 524th TFS, first to RAAF Amberley, Australia, and then to Taegu AB, Korea. Following the F-111Ds were 140 maintenance and support personnel and additional aircrews primarily from the 524th TFS and 524th AMU. These personnel deployed with their equipment and supplies in five C-141 aircraft. The deployment commander was Colonel David H. Reiner, 27th TFW Vice Commander.28

Initial planning for this exercise began in May 1979. Wing representatives attended the final planning conference for Kangaroo III in Sydney, Australia in July 1979. The

final planning conference for Cope Jade Charlie convened during the Kangaroo III exercise, and 27th TFW personnel did not attend. While in Australia for the Kangaroo III planning conference, 27th TFW personnel conducted a site survey of RAAF Amberley, the home of Australia's F-111C's. Site survey personnel completed negotiations for F-111D parking, unit work areas, and billeting. Also, they completed an agreement on the use of common aerospace ground equipment (AGE) used by both the F-111C & D. During this trip wing personnel also completed a site survey of Taegu AB, with final agreements confirmed at PACAF Headquarters, Hickam AFB, Hawaii.29

On 3 October 1979, the 27th TFW began the Coronet Beacon deploymet when 12 F-111Ds, the six primary aircraft and six airborne spares, departed Cannon AFB for Hickam AFB. After the first of two scheduled air refuelings two of the F-111D air spares returned to Cannon AFB. The air spare aircraft would fill in for a primary aircraft if it experienced maintenance problems in the air, such as not being able to air refuel. After approximately a seven hour flight the ten remaining aircraft landed at Hickam AFB. On 5 October 1979, eight of the ten F-111Ds, the six primary aircraft and two air spares, departed Hickam AFB for RAAF Amberley. The other two spare aircraft had aborted prior to takeoff at Hickam AFB with maintenance difficulties. After the first of four scheduled air refuelings for this leg, the

remaining two air spare aircraft returned to Hickam AFB. Completing the ten and one-half hour flight, the six primary F-111D's landed at RAAF Amberley.30

Kangaroo III employment sorties began on 11 October 1979. During this exercise, 524th TFS aircrews flew 38 sea surveillance / sea strike sorties in conjunction with the United States Navy and New Zealand surveillance P-3 Orion aircraft. The remaining 32 exercise sorties were traditional F-111 long range, day and night, interdiction missions. In addition to exercise sorties, aircrews flew: 55 local sorties, six VIP sorties, and five incentive sorties with selected maintenance personnel. The deployed forces flew 136 of 140 scheduled sorties, and the four sorties lost were due to bad weather. Kangaroo III was highly successful as reflected in this quote from the after action report signed by Colonel Reiner:

> In every aspect, Exercise Kangaroo III was highly successful. The employment phase provided valuable training for all 27TFW personnel. The maritime sorties were unique in that 524TFS aircrew members lacked familiarity with sea surveillance and sea strike tactics and the learning curve was high. The interdiction missions were very realistic with several day and night sorties requiring air refueling.31

On 5 November 1979, the six F-111D's departed RAAF Amberley for Taegu AB, Korea. After about eight and one half hours of this flight, one of the aircraft lost oil pressure in an engine and, escorted by another F-111D, diverted to Kadena AB, Okinawa. The remaining four aircraft

completed the ten hour flight to Taegu AB. On 6 November 1979, a team of maintenance personnel flew to Kadena AB and repaired the disabled aircraft. By 7 November 1979, all six F-111D's were in position at Taegu AB and ready to commence exercise operations.[32]

Cope Jade Charlie tasking began on 8 November 1979. The 524th TFS flew 16 sorties during the employment phase, which included: interdiction, offensive air support, pathfinder, and faker missions. In addition to exercise sorties, aircrews flew 17 local and three VIP sorties. While in Korea, the 524th TFS also completed 14 sorties in support of Commando Scoop, a classified operation directed by the Joint Chiefs of Staff. The wing flew 50 of the 52 sorties scheduled in Korea. The two sorties not flown were VIP missions cancelled for bad weather. Of the 50 sorties flown, only one was non-effective when a maintenance malfunction resulted in the aircraft air aborting prior to attacking its target.[33]

On 19 November 1979, five of the six deployment aircraft began the redeployment phase of Coronet Beacon. The five aircraft departed Taegu AB for Mountain Home AFB, Idaho. During this flight, the heating system of one aircraft failed to the full cold position. This aircraft, escorted by another F-111D, diverted to Elmendorf AFB, Alaska, which was two hours away. Hospitalized immediately after landing, the two crew members received treatment for

potential frostbite. Released from the hospital on 20 November 1979, the crew eventually flew their repaired aircraft to Cannon AFB on 22 November 1979. The escort aircraft departed Elmendorf AFB on 20 November 1979 for Mountain Home AFB and completed the redeployment to Cannon AFB with the remaining three F-111Ds on 21 November 1979. The F-111D remaining in Korea had suffered a bird strike on 16 November 1979, which damaged a portion of the escape system of the aircraft. This plane eventually returned to Cannon AFB on 27 November 1979.34

Maintenance support during the exercise was excellent. During the deployment aircrews flew 235 sorties and 791.6 hours. The Mission Capable (MC) rate, the percent of the deployed aircraft that were capable of completing a combat mission, averaged 88% during Kangaroo III, and 80% during Cope Jade Thunder. These rates exceeded the average 33% rate at Cannon AFB and the TAC standard of 50%.[35]

There were three main reasons for this excellent performance. First, five avionics test stations deployed with the detachment. This was the first time that test stations had deployed out of the continental United States (CONUS). The wing's experience from Coronet Kingfisher, where the 27th TFW relied heavily on daily lateral support from USAFE F-111 units for spares, clearly showed a need for these test stations. During Coronet Beacon, test station personnel tested, repaired as necessary, and returned to

service 166 replaceable systems from aircraft, called line replaceable units (LRUs). A typical example of an LRU was the weapons delivery digital computer. When this computer failed, a technician could easily remove it from the F-111D and replace it with a good computer. Test station personnel would determine what was wrong with the bad computer, repair it, and return it to supply. Coronet Beacon also showed, inadvertently, that the test stations could stand up to the rigors of deployment. Two of the test stations fell from a truck during unloading at Taegu AB. Although the test stations suffered external damage, they worked normally when set up for operation.[36]

The second reason for the success of the deployment centered on the supplies taken. The wing had tailored a specialized war readiness spares kit / mission spares kit (WRSK/MSK) to support the six F-111Ds. The total number of spare parts deployed equaled 70% of what would normally support 18 aircraft. Even though the deployment started out with 12 aircraft on 3 October 1979, which was approximately 70% of 18, the wing only used six aircraft for the majority of the deployment, or 33% of 18. Therefore, the deployed forces had more than twice the supplies they would have in a wartime deployed situation. This abundance of spare parts significantly contributed to the maintainability of the deployed aircraft and the overall success of the deployment.[37]

Finally, the cooperation between the 524th TFS and the 524th AMU was outstanding. The 27th TFW, throughout 1979, had been operating under a new maintenance concept called POMO (Production Oriented Maintenance Organization). One of the actions taken under POMO was the alignment of each of the three wing AMUs with the three TFSs to build a strong relationship. Under the previous centralized maintenance system alignment of AMUs and TFSs did not occur. Another POMO action was to crosstrain maintenance specialists in non-specialist areas of maintenance. Put in layman's terms, this would enable more maintenance personnel to help each other repair and ready aircraft to fly. A crew chief with one or two assistants "owned" each F-111D aircraft. The crew chief completed the routine maintenance on the aircraft required prior to and after each flight. His duties included checking fluid levels and the pneumatic systems. He duties also included bigger jobs such as a tire change. To complete such a job the crew chief could now get assistance from an electrical technician or an engine mechanic. Two quotes from the after action report highlighted the importance of cooperation and esprit-de-corps:

> ... high morale, dedicated crew chiefs, and maintenance supervisors out on the line with their crew chiefs and airplanes were major factors contributing directly to the overall success of the operation.

> The interface between maintenance and operations was excellent. The POMO concept coupled with marrying the fighter squadron and the aircraft maintenance unit was a success on this deployment. Recommend that future deployments use the same concept to the maximum extent possible.[38]

RED FLAG 80-1

As Coronet Beacon was coming to a close the 522nd TFS and 522nd AMU were completing final preparations for deployment to Nellis AFB, Nevada, to take part in RED FLAG 80-1. RED FLAG was one of a series of FLAG programs sponsored by TAC to improve combat readiness. RED FLAG provided tactical aircrews with realistic combat training in the simulated combat environment of the Nellis tactical range complex. Flying on the Nellis ranges, the 522nd TFS aircrews faced opposing forces equipped with fighter aircraft, simulated surface-to-air missiles, and anti-aircraft artillery. Wing aircrews had flown in previous RED FLAG exercises, but normally F-111D aircraft flew direcrly from Cannon AFB to the Nellis ranges and then returned to Cannon AFB. This procedure did not allow the F-111D aircrews to participate in the briefings or debriefings at Nellis AFB that were essential to realizing the full potential of RED FLAG training. This was only the second time in history that 27th TFW personnel had deployed to Nellis AFB for RED FLAG training.[39]

On 24 November, eight F-111Ds and 130 personnel departed Cannon AFB. The deployment ran to 22 December

1979. Halfway through the exercise, 11 new crews replaced the initial 11 crews deployed to maximize the exposure of wing aircrews to this valuable training. Colonel Richard A. Jones, 27th TFW Deputy Commander for Operations was the detachment commander for the first half of the exercise. Colonel Howard W. Nixon, Assistant Deputy Commander for Operations replaced Colonel Jones for the second half of the exercise. Lieutenant Colonel Jack E. Gray, commanded the 522nd TFS throughout the exercise.[40]

While deployed, the aircrews of the 522nd TFS flew 141 sorties in 19 days. Although this deployment followed immediately after Coronet Beacon, and many WRSK items had not returned to Cannon AFB, the mission capable (MC) rate for the deployment was 68%. This rate was lower than normal for deployed operations but still twice the rate at Cannon AFB and greater than the TAC standard of 50%.[41]

RED FLAG 80-1 was a valuable training experience for the 522nd TFS aircrews. As well as traditional F-111 single ship, day and night interdiction sorties, the aircrews received training in a variety of missions which included: offensive counterair, composite strike, suppression of enemy air defenses, and night beacon bombing.[42]

1979 Summary

As 1979 came to a close the 27th TFW was well on its way to demonstrating the supportability and operational capability of the F-111D as reflected in Coronet Beacon and RED FLAG 80-1. The wing was making final preparations for reorganization, while TAC, aided by the General Officer's Review Group, was beginning to gather the data for the logistic assessment. Three other noteworthy events occurred in 1979. In January 1979, Shah Mohammed Reza Pahlavi fled Iran, shattering the pro-U.S. power balance in Southwest Asia. Then, in December 1979, the Soviet Union invaded Afghanistan. While these two events did not directly effect the 27th TFW in 1979, they did in 1980 when the Air Force designated the 27th TFW as one of the units of the Rapid Deployment Joint Task Force (RDJTF). This action helped support retention of the F-111D by showing a further need for the aircraft in support of United States contingencies in Southwest Asia. The third event, although not of world importance, set the agenda for the 27th TFW for 1980. In November 1979, General Allen directed that a previously scheduled 27th TFW deployment to RAF Boscombe Down, England, in May 1980, would serve as the central vehicle to demonstrate the capability and reliability of the F-111D. The Air Force nicknamed the deployment, Cororet Hammer.[43]

Operationally Ready

The 27th TFW began 1980 as it did 1979, with a Local Operational Readiness Inspection. This inspection, however, was different; it was a practice for Coronet Hammer. The wing had selected the 522nd TFS as the squadron to deploy for Coronet Hammer in May 1980. The wing reorganized on 1 January 1980 and the 522nd TFS was now a 24 UE squadron; but for Coronet Hammer the wing would deploy only 18 aircraft. Between 8 and 15 January 1980, the 27th TFW isolated the 522nd TFS, 522nd AMU, and 18 aircraft and moved avionics test stations into a hangar simulating deployed conditions. The primary objective of the inspection was to fly Coronet Hammer sortie rates.[44]

The 27th TFW knew what the sortie requirements were for Coronet Hammer. The 522nd TFS had to fly at, or exceed, USAFE wartime sortie rates. The tasking called for the squadron to fly 505 sorties over 20 flying days, but the flying days had limited windows for operations. Table 3-1 depicts Coronet Hammer flying time available for each day during a week. To accomplish the sortie requirements in the alloted time, the 522nd TFS would surge during two days of each week, Tuesday and Wednesday, to a 2.0 sortie rate. Over the entire deployment, the squadron would need to average a 1.4 daily sortie rate. To maintain the sortie rate, the mission capable (MC) rate would also have to be high.[45]

TABLE 3-1. Coronet Hammer Flying Envelope

Day	Mon & Fri	Tues - Wed - Thur
Flying Envelope	0830 - 1830	0830 - 2330
Time	10 Hours	15 Hours

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1989, p. C-10-3.
Major General Larry D. Welch and Brigadeir General Albert G. Rogers, "TAC Final Report on the Coronet Hammer F-111D Deployment: 7 May - 9 June 1980," 30 June 1980, p. iii.

The wing tasked the 522nd TFS heavily during this inspection, scheduling an average of 28 sorties per day. On one day, 13 January, the wing scheduled 39 sorties. The results were outstanding. Of the 173 sorties scheduled over the six day inspection, the 522nd TFS flew 161 sorties. On the 13th, the squadron flew 38 of the 39 scheduled sorties. The average daily sortie rate for the inspection period was 1.5, exceeding the Coronet Hammer requirement. Additionally, the 522nd AMU achieved a 72% mission capable rate. This compared very favorably with the wing's 1979 average MC rate of 33.1%, and the established 50% TAC standard.46

One month later, the TAC IG returned to Cannon AFB to conduct an ORI. Again, the inspection scenario surpassed Coronet Hammer tasking. Between 24 and 28 February, the IG tasked the wing to fly 126 sorties, which equaled a 1.8

daily sortie rate. Again, the wing exceeded the requirement. Over the four day inspection, the wing scheduled 134 sorties and flew 135. On the last day of the inspection, 28 February 1980, the wing added and flew three additional sorties over the scheduled sorties for that day. At the end of the ORI the wing had achieved a 1.9 daily sortie rate. In fact, the wing had flown over a 2.0 sortie rate for three out of four of the inspection days. The mission capable rate was equally impressive. At 82%, this was the best MC rate the wing had achieved since Coronet Beacon.47

SECDEF Support

In early February the SECDEF, Dr. Harold Brown, presented testimony before the House Subcommittee on the Department of Defense, Committee on Appropriations. Dr. Browns' testimony was important to the Air Force because he went on the record in support of the F-111D. He could certainly change his mind if Coronet Hammer went poorly, but for the moment he demonstrated his confidence in the F-111D and his willingness to defend the aircraft to Congress. The subcommittee was chaired by New York Representative (Rep), Joseph P. Addabbo. Dr. Brown was questioned by Rep. Jack Edwards of Alabama as follows:

> Mr. Edwards. Well, what you are really saying is that no clear decision was made that we put in 500 GLCMs and Pershing IIs in order to

release so many squadrons of F-111s or F-4s or something else.

Secretary Brown. I have my own ideas on that, but I would expect a rather vigorous discussion before such a change was made.

Mr. Edwards. What are your long range plans for the F-111?

Secretary Brown. I think it remains the most accurate long-range tactical aircraft that we have as is the A-6. Therefore I want to keep it in the force. We had a considerable discussion of the F-111D this year, which is the most accurate.

Mr. Edwards. You mean in the Pentagon?

Secretary Brown. Yes, in the Pentagon. The discussion concerned its maintainability. I conclude that we should leave it in the force because, although it is relatively expensive, it does provide very high accuracy when it is working.[48]

3 March 1980 Meeting of the GORG

On 3 March 1980, the second meeting of the General Officer Review Group convened at Wright-Patterson AFB, Ohio. This was the most productive meeting, and although unknown to the attendees, the last meeting of this group. Major General Jack W. Waters, Air Force Logistics Command (AFLC), chaired the meeting. General Waters opened the meeting by announcing that the delegation from TAC, headed by Brigadier General Albert G. Rogers, TAC/LG, would not be able to attend due to heavy snow at Langley AFB.[49]

Four other general officers attended the meeting. General Waters asked for opening remarks from each general,

after reminding all members that changes in logistic support come slowly. Major General Malcom E. Ryan, 12th Air Force Vice Commander, noted that the F-111D was a difficult issue due to the "off again" "on again" status of the program over the past two years. Major General Dewey K.K. Lowe, SM-ALC Commander, presented his view that the Air Force needed to streamline some of its management/decisionmaking processes in order to expedite support for the F-111D. He remarked, he was still seeing some of the same problems in March 1980 that he saw in 1971 and that approximately 50% of Air Force contracts at SM-ALC were delinquent because of contractor low priorities. General Lowe closed his remarks by pointing out that operations, logistic support, and industry, made up a "triad" that needed special attention to provide the support required by the F-111D. Brigadier General Lawrence D. Garrison, Director of Maintenance and Supply at the Air Staff, concurred with General Lowe's comments and pledged his support at the Air Staff to improve these areas. Finally, Brigadier General Leo Marquez, AFLC, indicated his belief that the Air Force was more supportive of the F-111 than in the past, but he was not completely sure the Air Force would retain F-111. He added, he had not seen much money provided for the F-111 since 1977. The General Officers all agreed:

> ... the basic problem is that we are facing the same <u>support deficit</u> which has been

> in existence since 1969. ... that with adequate funding it would still require two to three years to procure and receive assets to cover the deficit.50

The conference continued with the first of seven briefings. The first briefing, by Lieutenant Colonel Edward B. Parks, Air Staff, covered the history of the F-111D budget/program and future events. Of particular importance, Colonel Parks briefed that the OSD Research and Engineering Staff would write an issue paper, as part of the PPBS process, on the F-111D program. Lieutenant Colonel Parks expected completion of a draft paper by 20 June 1980. The SECDEF would complete his review of all issue papers, with the OSD staff, by 18 July 1980. The Air Force would subsequently receive the Air Force PDM by 25 July 1980.51

Mr. F.E. Armstrong, from the General Dynamics Corporation, presented the next briefing. His presentation concentrated on the performance of the F-111D compared to the other F-111 models. He began his briefing by pointing out that the F-111D required the most logistic support, but also possessed the greatest combat capability. One key point was that the "high priority" F-111s in USAFE, the F-111E and F-111F, were consistently above the TAC mission capable (MC) standard of 50%, while the TAC F-111s, the F-111A and F-111D, were consistently below the standard during normal operations. Therefore, he concluded that

support priority based on unit assignment had a major impact on MC rates.52

Mr. Armstrong also presented data which indicated the following: 1) all F-111 units expended about the same amount of maintenance manhours per flight hour; 2) most F-111 "downtime", when the aircraft was not MC, was due to incompleted maintenance actions, NMCM (Not Mission Capable Maintenance); 3) all F-111 units were at or below the TAC Not Mission Capable Supply (NMCS) standard of 7%, NMCS was the "downtime" due to the lack of a part; and 4) the frequency with which maintenance personnel had to take a part from one aircraft to fix another, called cannibalization (CANN), was 1.3 to 3.8 times more for TAC F-111s than for USAFE F-111s; and the F-111D CANN rate was twice that of any other F-111 unit.53

General Ryan took exception with the NMCM and NMCS information presented during the briefing, adding that, "statistics tend to mask real world performance". He cited the example of the "hangar queen", an aircraft that had not flown for over 21 days, generally for a part that was not available. The wing could report the aircraft as Not Mission Capable Maintenance (NMCM). But if the part was on hand maintenance personnel would have repaired the aircraft returning it to MC status. He pointed out that if a part is not available, through no fault of the unit maintenance or supply organizations, the reporting indicator would provide

a false indication of the root cause. At Cannon AFB and Mountain Home AFB both units had previous engine problems that resulted in a significant number of "hangar queens" waiting for engines. These aircraft provided much needed spare parts through cannibalization. This fact compounded the backlog of maintenance actions needed to restore these aircraft to MC status. General Lowe added that the F-111 was particularly sensitive to timely maintenance, and that when parts are not available maintenance backlogs increase which are not maintenance driven. General Lowe restated the general officer concensus that the root cause of the maintainability problem of the F-111 was a "supply deficit".[54]

Colonel McCann continued the briefings with an update on operations at Cannon AFB. He reported that the number of possessed aircraft at Cannon AFB had increased to sixty-seven. Furthermore, with most of the engine problems resolved, FY 1979 marked the first year that the wing had achieved its flying hour goal. The trend for daily sortie production had improved, as indicated by improvement in the sortie utilization rate and the flying hour utilization rate. Colonel McCann then echoed Mr. Armstong's remarks concerning MC rates and the greater priority given to USAFE units.[55]

Addressing operations, Colonel McCann briefed on the low experience level in the operational squadrons. This

resulted from the necessity to assign most of the wing's instructor pilots to the 524th TFS, to support its training mission. General Ryan developed this subject further with the following observations/comments: 1) trained personnel left Cannon AFB for overseas, but returned to staff positions, therefore Cannon's replacements came from undergraduate pilot and navigator training (UPT & UNT); 2) UPT people should go to either the A-10 or F-15 as these were less demanding aircraft; and 3) Cannon AFB needed more skilled people who knew what to do when flying an aircraft that was not "full-up." General Waters asked if all sorties flown were productive. Colonel McCann replied that about 80% of flown sorties were productive, but that this figure would increase if more skilled or experienced crews were flying.56

Returning to maintenance performance, Colonel McCann briefed that the NMCM rate had decreased as the wing returned more "hangar queens" to MC status, and that the 27th TFW reported "hangar queen" aircraft in the Not Mission Capable Both (NMCB) category. NMCB credits "downtime" to both maintenance and supply. At this point Colonel Thomas C. Germscheid, from SM-ALC, interjected that USAFE units did not have many "hangar queen" aircraft, and that this made statistical comparison difficult and might lead to improper conclusions. General Ryan added his concurrence, and

reiterated that "'hangar queens' mask true maintenance data and provide a distorted picture."[57]

Colonel McCann continued, briefing that shortage of spares drove CANN rates even higher during deployments. This generated a discussion on spares for the F-111D. General Ryan stated that AFLC generally purchased parts that were common to all F-111s, and not for the F-111D specifically. Aside from the impact on the F-111D, this also created a problem for the Air Force in identifying to Congress a correlation between assets purchased and improvement in the F-111D. Therefore, if additional money for spares became available in FY 1981, Air Force procurement officers would have to ensure they purchased the right F-111D assets.[58]

Concluding his remarks, Colonel McCann briefed that Mountain Home AFB had transferred peacetime operating stocks (POS) to Cannon AFB to help fill Cannon's war readiness spares kit (WRSK). The WRSK was still 5% short of key assets, and now both Cannon AFB and Mountain Home AFB were short of POS to support peacetime flying. Finally, he briefed that avionics modifications were showing the improved reliability hoped for, and that the three Lead-The-Force aircraft had received their modified components. Colonel McCann's assessment, "we are holding our own."[59]

At this point in the conference, General Ryan commented on several different items. One dealt with the accuracy of the F-111 force. Using outdated data, PA&E was challenging the accuracy and overall capability of the F-111. Countering this new challenge was imperative. Colonel McCann responded that the PA&E argument was "without basis", and that F-111D performance during the recent ORI compared favorably with other TAC and Air National Guard units. General Ryan indicated that TAC would be the office of primary responsibility (OPR) to coordinate the response to this challenge.60

The remaining four briefings of the conference concentrated on more specific logistic studies and actions to support the F-111D. Important areas raised during these briefings included the following: 1) TAC and AFLC needed to work closer together, identifying more specifically the needs of the F-111D, and then act accordingly; 2) the Air Staff needed to review the higher supply priority given to USAFE F-111s, which included authorization for larger stockage levels, in light of the current needs of TAC F-111s; 3) with the completion of PACER CAN and stockage of engines at 100%, the major engine problems at Cannon AFB were over, and the masking effect in statistics due to PACER CAN was decreasing; and 4) AFLC had awarded contracts to improve the performance of existing avionics test stations

and work was progressing on the development of new test stations.[61]

The meeting closed with the General Officers agreeing that progress was appearent. The group had assigned eighteen specific action items during the meeting which would help to either more clearly define F-111D support requirements, or contribute directly to the support of the F-111D.[62]

TAC F-111D Logistic Assessment

On 21 March 1980, TAC Logistics (LG) issued an interim report on the F-111D logistic assessment program, Coronet Reaper. The purpose of the report was to provide data on the performance of the 27th TFW/F-111D during FY 1980 (October 1979 through February 1980). The report provided little evaluation of the data, leaving this to the reader. Since the organizational meeting of 3-4 October 1979, TAC/LG had added an additional assessment category to the five original categories. The sixth category covered the Lead-the-Force aircraft program proposed by Colonel McCann at the first meeting of the General Officer's Review Group in November 1979. The report also included, in Section III, a logistics comparison of the different F-111 models.[63]

To develop baseline references TAC/LG used historical data from FY 1979 (October 1978 - September 1979). Using

the baseline data TAC/LG then computed a Threshold of Significant Improvement for as many logistic indicators as possible. The Threshold of Significant Improvement provided an additional reference to evaluate performance between FY 79 baseline data and FY 80 data. As indicated in the report summary, Section IV, the report showed "mixed results."64

Section II of the interim report covered the six logistic categories. The first category was Flying Performance. (TABLE 3-2) The report narrative highlighted the following flying performance indicators: 65

1) Abort Rate. This indicator included aircraft that aborted prior to flight and aborts in the air. Although the FY 80 Monthly Average showed a decrease from the FY 79 Monthly Average, the February 1980 value of 10.1% reflected a statistically significant increase in aborts when compared with the Threshold of Significant Improvement.

2) Sorties Flown. The FY 80 Monthly Average of 660 sorties showed an 11% increase over the FY 1979 Monthly Average value of 596 sorties. Any increase in sortie production was encouraging, and the data for February 1980 indicated a continuing trend.

3) Hours Flown. Closely related to Sorties Flown, Hours Flown also increased from the FY 79 Monthly Average of 1404 hours to 1523 hours for the FY 80 Monthly Average. This was an 8% increase.

TABLE 3-2. F-111D FLYING PERFORMANCE: OCT 79 - FEB 80

	BASELINE: FY 79 DATA		FY 80 DATA	
LOGISTIC INDICATOR	FY 79 MONTHLY AVERAGE (OCT 78 - SEP 79)	THRESHOLD OF SIGNIFICANT IMPROVEMENT	FY 80 MONTHLY AVERAGE (OCT 79 - FEB 80)	FEB 1980
ABORT RATE %	8.8	LT 7.5	7.7	10.1
AVG ACFT POSSESSED	58.7	GT 64.7	68.8	66.5
HOURS FLOWN	1404	N/A	1523	1433
HOURLY UTE RATE	24.1 (19.8)	N/A	22.1	21.5
SCHEDULING EFFECTIVENESS	38.1	GT 52.6	50.4	51.3
SORTIES SCHEDULED	640	GT 762	705	714
SORTIES FLOWN	596	GT 697	660	662
SORTIE UTE RATE	10.1 (8.3)	N/A	9.8	10.7
SPARES SCHEDULED	129	N/A	112	90
SPARES USED	133	LT 98	112	131
1ST SORT'S SPARED	N/A	N/A	54	65
% OF 1ST SORT'S SCHDL	N/A	N/A	13.9	15.3

LT = LESS THAN GT = GREATER THAN N/A = NOT AVAILABLE

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 5, Table 2.

4) Sortie Utilization (UTE) Rate. The FY 1979 Monthly Average presented two figures for this indicator. TAC/LG computed the first figure, 10.1 sorties / aircraft / month, based on an adjusted number of aircraft possessed by the 27th TFW due to the PACER CAN engine modification program. The authorization for this adjustment terminated in September 1979, so to accurately compare FY 80 data TAC/LG also computed an unadjusted figure (8.3). The 27th TFW goal for FY 80 was 8.5, therefore, the FY 80 Monthly Average and February values of 9.8 and 10.7 respectively were very encouraging.

The second category assessed in Section II was Maintenance. (TABLES 3-3, 3-4 & 3-5) The information in this section was generally good. The report highlighted the following maintenance indicators: 66

1) Mission Capable (MC). Although the report showed no long term increase in the MC rate, the trend in the MC rate showed steady improvement.

2) Fully Mission Capable (FMC). The FMC rate showed significant improvement in January and February 1980. However, the FY 80 Monthly Average did not yet reflect this improvement.

3) Not Mission Capable - Maintenance (NMCM). A significant improvement (decrease) in NMCM (11.5%) occurred in January and February 1980. A corresponding increase (11.5%) in the Not Mission Capable - Both (NMCB) rate

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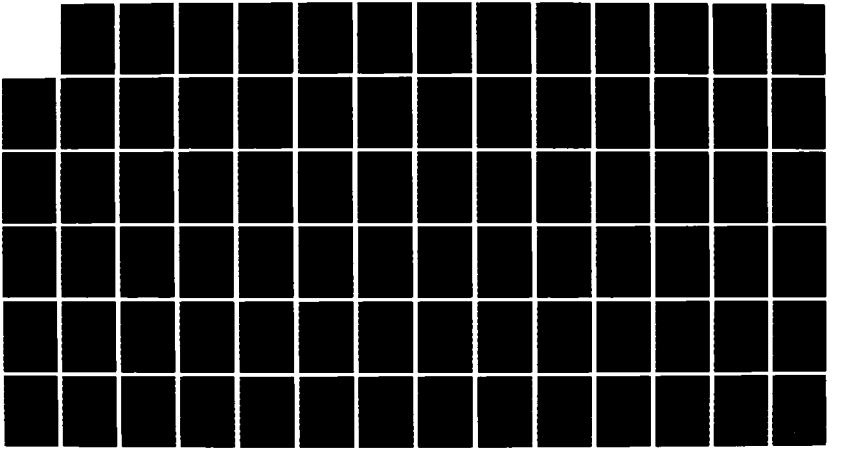

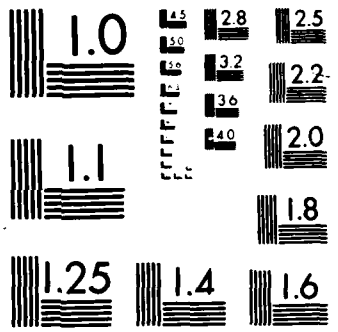
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however, offset this improvement. These two indicators reflected a change in reporting procedures at Cannon AFB.

TABLE 3-3. F-111D MAINTENANCE ASSESSMENT: OCT 79 - FEB 80

	BASELINE: FY 79 DATA		FY 80 DATA	
LOGISTIC INDICATOR	FY 79 MONTHLY AVERAGE (OCT 78 - SEP 79)	THRESHOLD OF SIGNIFICANT IMPROVEMENT	FY 80 MONTHLY AVERAGE (OCT 79 - FEB 80)	FEB 1980
MC RATE	33.1	GT 36.1	33.8	34.6
FMC RATE	14.7	GT 19.8	17.7	21.6
NMCM	45.3	LT 32.0	35.6	31.5
NMCS	4.2	LT 1.5	3.4	3.0
NMCB	16.6	LT 11.1	27.8	31.0
PARTIALLY MC (PMC) RATE	18.5	LT 13.0	16.0	13.0
PMC MAINT.	16.3	LT 13.0	13.8	11.4
PMC SUPPLY	1.9	0.0	1.5	1.1
PMC BOTH	0.3	0.0	.8	.5

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 9, Table 3.

4) Recovery Rates. Recovery Rates showed significant improvement. This improvement began in November 1979 at the 6 and 12 hour points. In December 1979 there was noticeable improvement at all levels. The improvements corresponded to the Coronet Beacon and RED FLAG 80-1

TABLE 3-4. F-111D BREAK AND RECOVERY RATES: OCT 79 - FEB 80

	BASELINE: FY 79 DATA		FY 80 DATA	
LOGISTIC INDICATOR	FY 79 MONTHLY AVERAGE (OCT 78 - SEP 79)	THRESHOLD OF SIGNIFICANT IMPROVEMENT	FY 80 MONTHLY AVERAGE (OCT 79 - FEB 80)	FEB 1980
BREAK RATES %				
1ST SORTIE	40.0	LT 36.5	43.6	37.3
TOT SORTIES	39.0	LT 34.2	41.8	35.5
RECOVERY RATES %				
RECOVERED @ 6 HRS	4.8	GT 9.3	13.8	21.2
RECOVERED @ 12 HRS	12.4	GT 20.7	29.8	42.9
RECOVERED @ 24 HRS	24.1	GT 34.9	44.3	62.3
RECOVERED @ 48 HRS	33.1	GT 46.8	54.8	73.6
RECOVERED @ 72 HRS	39.0	GT 53.5	59.7	77.1
DELAYED DISCREPANCIES %				
AWAITING MAINTENANCE	13.3	LT 6.0	14.3	23.8
AWAITING PARTS	3.7	LT 1.2	3.3	4.2
TOTAL	17.0	LT 7.2	17.6	28.0

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 10, Table 4.

deployments; however, in January and February the trend continued, indicating the experience from these two exercises had carried over into normal operations at Cannon AFB.

5) Cannibalization (CANN). The number of CANNs increased significantly in FY 80. Coronet Beacon was partly to blame for this increase. Due to the number of spare assets that the wing deployed to support Coronet Beacon aircraft, maintenance actions at Cannon AFB necessitated more cannibalization. Additionally, TAC "froze" War Readiness Spare Kit (WRSK) assets at Cannon AFB between 26 January and 15 February. This action prohibited maintenance personnel from using spare parts from the WRSK. This factor also contributed to the increased CANN rate.

6) Hangar Queens. TAC/LG computed the FY 79 Monthly Average of 10.8 aircraft by excluding the aircraft affected by the PACER CAN program. With these aircraft figured into this value it increased to 21.6 aircraft. This figure was very close to the reported FY 80 Monthly Average and the value for February 1980, which included thses aircraft. This data supported the observation by the General Officers' Review Group that "hangar queens" due to PACER CAN had not returned to MC status as engines became available. This was a direct result of cannibalization of these aircraft while they were without engines. These aircraft, therefore,

remained in "hangar queen" status waiting for the replacement parts that they had lost.

7) Spare Engines. With 13 spare engines in February 1980, Cannon AFB possessed 65% of its authorized 20 spare engines. Compared to the severe shortage of engines over the preceding two years due to PACER CAN, as reflected in the FY 79 Monthly Average of -24.8 engines, TAC/LG no longer considered the supply of engines as a major detriment to the maintainability of the F-111D.

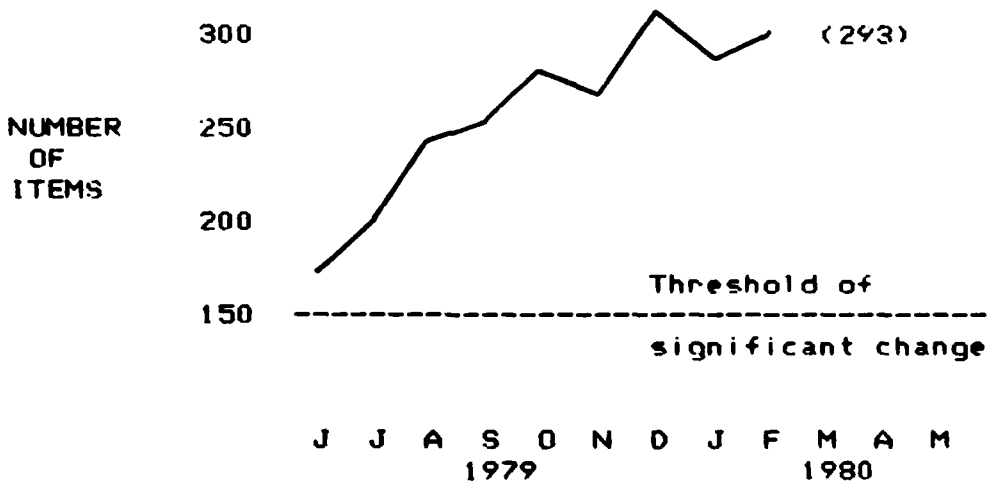
TABLE 3-5. OTHER MAINTENANCE INDICATORS: OCT 79 - FEB 80

	BASELINE: FY 79 DATA			FY 80 DATA	
LOGISTIC INDICATOR	FY 79 MONTHLY AVERAGE (OCT 78 - SEP 79)	THRESHOLD OF SIGNIFICANT IMPROVEMENT		FY 80 MONTHLY AVERAGE (OCT 79 - FEB 80)	FEB 1980
CANN'S					
PER 100 SORTIES	39.5	LT	18.9	72.0	81.9
TOTAL NUMBER	236.5	LT	112.2	476.6	542
HANGAR QUEENS *	10.8	LT	5.9	20.8	20.0
MAINT PLANNING EFFECTIVENESS	69.9	GT	89.2	86.8	94.1
SPARE ENGINES	-24.8	GT	-4.6	11	13

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 13, Table 5.
NOTE: (*) FY 79 data excludes PACER CAN affected aircraft.
FY 80 data includes PACER CAN affected aircraft.

The next category presented was Supply. The most significant supply indicator reported dealt with the number of items Awaiting Parts. This covered "items" such as aircraft electrical generators, engines, and the attack radar. Also covered were Line Replacement Units (LRUs) such as the weapons delivery computer or inertial refenence unit. The Awaiting Parts indicator had increased steadily since June 1979. (FIGURE 3-1) The report noted the adverse affect on this indicator caused by a lack of parts used to fix the LRUs, such as printed circuit boards, called Shop Replacement Units.67

FIGURE 3-1. F-111D MONTHLY ITEMS AWAITING PARTS



SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 17, Figure 5.

The next two closely related categories were Reliability/Maintainability and Lead-the-Force (LTF) aircraft. The Air Force Logistics Command (AFLC) was introducing six, new or modified, avionics components to the F-111D to improve reliability/maintainability. AFLC had already installed one of the components fleet wide, a modified Multi-Sensor Display used by the weapon systems officer for navigation and weapons delivery. The three LTF aircraft were the first to receive the remaining five components. The LTF program began on 15 February 1980 and the 27th TFW had not accumulated enough flying time on most of the individual components for TAC/LG to make statistical evaluations. Nonetheless, the trend on all components indicated an improvement in reliability over the components they had replaced. To aid the evaluation of the LTF aircraft the 27th TFW also maintained a control group of three aircraft without modified components. The LTF aircraft had flown 87.7 hours with two component failures, while the control group had flown 126.8 hours with six corresponding component failures. This equated to a mean time between failure (MTBF) of 43.8 hours for the LTF aircraft and 21.1 hours for the control group. Although this data was preliminary, it was encouraging.[68]

The final assessment category covered Other Areas, which included a Deployment/Surge Summary. (TABLE 3-6) The summary clearly showed that when deployed the 27th TFW could achieve MC rates significantly higher than those at Cannon AFB during routine flying operations. The data indicated that when properly supported, as in the case of a deployment, the F-111D could accomplish wartime tasking.69

TABLE 3-6. DEPLOYMENT / SURGE SUMMARY

DEPLOYMENT	# ACFT DEPLOYED	TOTAL SORTIES REQ/FLOWN	TOTAL HRS FLOWN	MC RATE
Bold Eagle/ Sortie Surge 20 Oct - 13 Nov 77 Homestead AFB, Fl.	24	544/546	1233.0	87
Coronet Kingfisher 30 Aug - 20 Sep 78 Norway	8	122/125	411.0	86
Coronet Beacon 3 Oct - 18 Nov 79 Pacific Theater	6	150/235	762.0	84
RED FLAG 80-1 25 Nov - 16 Dec 79 Nellis AFB, Nv.	8	133/141	246.6	68
Wing Initiated ORI 9 - 14 Jan 80 Cannon AFB, NM.	18	152/162	N/A	72
TAC ORI 24 - 28 Feb 80 Cannon AFB, NM.	18	126/135	58.3	82

Cannon AFB FY 1979 Mission Capable Rate				33

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. C-3.

Section III of the interim report provided statistical data on all four tactical models of the F-111 in the USAF. The format of this section followed that of Section II, but Section III only covered three of the logistics categories: 1) Flying Performance, 2) Maintenance, and 3) Supply. Within each category, the report limited coverage to a select number of indicators.[70]

Flying Performance addressed four logistics indicators. The report did not provide a reason for the difference in Abort Rates (TABLE 3-7) between USAFE F-111s (F-111E & F-111F) and TAC F-111s. One highly probable reason however, related to spare parts. If an aircraft had a maintenance malfunction prior to takeoff and the spare part was not available to fix the aircraft quickly the aircraft ground aborted. Given the higher priority USAFE F-111s had for spare parts it is fair to assume they could fix more aircraft prior to takeoff resulting in an overall lower Abort Rate. Another possible reason for the difference may lie in the complexity of the aircraft. The F-111D was the most complex of the four models, so logically it would experience the greatest number of problems during launch or in flight. The F-111A was not especially complex, but it had to live with system imperfections (engine inlet design, stores management system) that General Dynamics corrected in the follow-on models.[71]

TABLE 3-7. ABORT RATES

MDS	FY 79 ABORT RATE %	FY 80 ABORT RATE %	TAC STD %
F-111D	8.9	7.7	5
F-111A	8.7	11.7	5
F-111E	5.1	4.4	
F-111F	6.4	4.5	
FY 79 - OCT 78 to SEP 79		FY 80 - OCT 79 thru FEB 80	

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 31.

The report highlighted a significant increase in possessed aircraft for the F-111D (TABLE 3-8). The increase followed the cancellation of the PACER CAN aircraft adjustment in September 1979.

TABLE 3-8. POSSESSED & AUTHORIZED AIRCRAFT

MDS	FY 79 POSS	FY 79 AUTH	FY 80 POSS	FY 80 AUTH	% AUTH FY 79	% AUTH FY 80
F-111D	58.7	78	68.8	72	75.3	95.6
F-111A	76.5	84	78.0	84	90.6	92.8
F-111E	73.2	72	66.5	72	101.7	92.4
F-111F	81.9	84	75.2	84	97.5	89.5

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 31.
NOTE: Aircraft possession was based on the number of hours a unit possessed the aircraft during the given reporting period; an aircraft not capable of flight could be removed from the units possession but still be located at the units base. Authorized Aircraft was based on the UE status of the unit; i.e. in January 1980 the 27th TFW had three 24 UE squadrons which equaled 72 authorized aircraft.

TABLE [illegible] clearly showed that a [illegible] is used their aircraft at approximate [illegible] same sort of threat [illegible] these [illegible] AFB mar[illegible] the [illegible]

The CANN rate was particularly telling with regard to the spare parts issue. The lack of spare parts for the TAC F-111s causing CANN rates as much as seven times greater than USAFE F-111s. (TABLES 3-10 & 3-11)72

TABLE 3-10. AIRCRAFT STATUS

MDS	MC %		FMC %	
	FY 79	FY 80	FY 79	FY 80
F-111D	33.1	33.8	14.7	17.7
F-111A	31.1	34.9	16.5	28.1
F-111E	66.0	67.0	55.0	53.9
F-111F	63.1	70.3	51.6	52.4

MDS	NMCM %		NMCS %		NMCB %	
	FY 79	FY 80	FY 79	FY 80	FY 79	FY 80
F-111D	45.3	35.4	4.2	3.4	16.6	27.8
F-111A	38.3	39.2	6.9	7.1	23.5	20.7
F-111E	23.6	20.7	4.2	5.3	6.2	7.1
F-111F	27.9	24.0	3.8	2.8	5.1	2.9

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 32.

TABLE 3-11. CANNIBALIZATIONS

MDS	CANNIBALIZATIONS PER 100 SORTIES	
	FY 79	FY 80
F-111D	40	72
F-111A	38	27
F-111E	13	20
F-111F	18	10

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 33.

Maintenance Man Hours per Flying Hour and per Sortie (TABLE 3-12) indicated that all F-111 aircraft required approximately the same amount of maintenance. This data was in line with the Sortie and Hourly Utilization Rates (TABLE 3-9). The Maintenance Plan Effectiveness and Scheduling Effectiveness were lower than the other F-111s and the TAC standard of 95%. The report narrative noted the significant improvement in Plan Effectiveness in FY 80, this supported sound management of the wing. The low rating in Scheduling Effectiveness was not addressed; however, it could be attributed to an aggressive schedule to produce as many sorties as possible, which by its very nature would be less effective on paper though more productive overall. (Ref. TABLE 3-2: Sorties Scheduled and Sorties Flown)

TABLE 3-12.

MAINTENANCE MAN HOURS / FLYING HOUR / SORTIE

MDS	MHR / FHR FY 79	MHR / FHR FY 80	MHR / SORTIE FY 79	MHR / SORTIE FY 80
F-111D	56.9	50.9	134.8	115.2
F-111A	60.5	51.1	138.6	116.9
F-111E	52.9	74.6	140.0	175.0
F-111F	47.0	43.8	117.1	110.0

MHR = Man Hours FHR = Flying Hour

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 32.

TABLE 3-13. MAINTENANCE PLAN / SCHEDULING EFFECTIVENESS

MDS	PLAN EFFECT % FY 79	PLAN EFFECT % FY 80	SCHDL EFFECT % FY 79	SCHDL EFFECT % FY 80	TAC STD %
F-111D	69.9	86.8	38.1	50.4	95
F-111A	89.5	93.2	49.9	48.1	95
F-111E	92.1	-	96.3	96.3	
F-111F	90.9	-	38.1	95.7	

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 34.

The Supply section addressed only two logistics indicators which covered all four F-111 models. The report highlighted the fact that the higher withdrawal rate from the F-111D WRSK was in line with the higher cannibalization rates.73

TABLE 3-14. WAR READINESS SUPPLY KIT (WRSK) FILL RATE

MDS	SIZE	WRSK/BLSS	FILL RATE % FY 79	FILL RATE % FY 80
F-111D	18 ACFT	WRSK	89.4	93.2
	18 ACFT	WRSK	75.8	81.0
F-111A	24 ACFT	WRSK	86.0	86.0
F-111F	18 ACFT	WRSK	94.1	94.3
F-111E	54 ACFT	BLSS	83.0	86.1
F-111F	66 ACFT	BLSS	78.3	79.6

BLSS = Base Level Supply System

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 35.

TABLE 3-15. WRSK / BLSS-WITHDRAWALS

MDS	WITHDRAWALS PER 100 SORTIES FY 79	FY 80
F-111D	18.6	22.9 WRSK
F-111A	9.1	12.3 WRSK
F-111E	33.1	20.1 BLSS
F-111F	26.9	12.2 WRSK/16.7 BLSS

SOURCE: Brigadeir General Albert G. Rogers, TAC/LG, "TAC F-111D Logistics Assessment Interim Report: October 1979 - February 1980," 21 March 1980, p. 35.

Overall the Interim Report portrayed a unit aggressively pursuing its goal. Sortie production was up, spare engines were available, and the wing performed excellently during deployments. The Mission Capable and Cannibalization rates were still far from satisfactory, but the data showed, as expected, that the spare parts deficit, partly caused by the priority given to USAFE F-111s, was the root cause of these problems. The next interim report was scheduled for July following Coronet Hammer the operational test of the 27th TFW.

Coronet Hammer

The purpose of Coronet Hammer (7 May - 9 June 1980) was straightforward - prove that an F-111D squadron with 18 aircraft could deploy in support of NATO and and meet wartime tasking. There was no question that Coronet Hammer would ultimately determine the fate of the aircraft. Space

was already available for the F-111D at Davis-Monthan AFB, the Air Force graveyard for retired aircraft. There was also no question, at the end of Coronet Hammer, that the 27th TFW and the F-111D had "devastated" the critisism of the aircraft's ability to fly and fight.74

Planning for the exercise started as soon as the 27th TFW received its tasking. In December 1979, 27th TFW personnel completed a site survey of RAF Bascombe Down. In February 1980, wing personnel attended a USAFE planning conference for Coronet Hammer held at Ramstein AB, Germany, USAFE Headquarters. Thoroughness and attention to detail characterized the planning of Coronet Hammer. The TAC Final Report on Coronet Hammer cited outstanding planning as one of the primary reasons for the success of the deployment.75

The wing carefully managed the deployment package for Coronet Hammer. First, following a comprehensive review of the War Readiness Spares Kit (WRSK), the wing proposed and TAC approved a 24 aircraft WRSK to help offset the significant increase in sortie rates tasked, coupled with the restricted flying day. Second, wing personnel evaluated the WRSK during the Local Operational Readiness Inspection Exercise, in January, and the TAC Operational Readiness Inspection, in February. Finally, the wing identified the aircraft for the Coronet Hammer early and tracked them for 60 days prior to deployment to monitor required maintenance inspections, avionics systems reliability, and weapons

release systems. By 1 April 1980, the wing had also identified, by name, all deploying personnel, and the aircrews completed a special training program to prepare them for the European environment. Of the 58 primary aircrew members to deploy, 36 had previous USAFE experience and most of the aircraft commanders (pilots) were instructor pilots and multiple aircraft "flight" leads.76

Movement of wing personnel to RAF Bascombe Down began on 26 April 1980 when an advance team of 26 people departed Cannon AFB. The advance team helped with the reception and processing of arriving airlifted supplies and personnel. The first C-141, loaded with maintenance personnel and equipment, arrived at RAF Bascombe Down on 1 May 1980. Between 1 and 7 May, 12 C-141s and one DC-8 moved 500 tons of equipment and 560 personnel to RAF Bascombe Down. Additionally, TAC deployed a special Coronet Reaper team to RAF Bascombe Down. The team was part of the Coronet Reaper assessment group and their mission was to collect more extensive data on the wing's performance for a special TAC after action report.77

Some of the most important equipment deployed was a squadron compliment of 19 avionics test stations. The wing dedicated two C-141s to the airlift of these stations. The performance of the test stations was a high interest item since contractors, such as McDonnell Douglas and General Dynamics, had already designed more fighter aircraft with

Line Replacement Units (LRUs) requiring test stations to maintain them. Coronet Hammer was the first squadron size deployment of the test station concept. Wing maintenance personnel assembled all 19 test stations in the parachute shop at RAF Bascombe Down in ten and one half hours. At 3:30 AM, 3 May, test station personnel completed an operational checkout of their equipment. All 19 test stations reported fully mission capable.[78]

On 6 May 1980, beginning at 8:05 PM 24 F-111D aircraft, 18 primary aircraft and 6 air spares, departed Cannon AFB for RAF Bascombe Down. The wing used one ground spare aircraft during the launch; however, the change occurred early enough in the launch sequence that all 18 primary aircrews deployed on schedule. The 24 aircraft divided into three cells of eight aircraft each, six primary aircraft and two air spares. After the first of three scheduled air refuelings the air spares departed the cells and returned to Cannon AFB. The remaining 18 F-111Ds, accompanied by KC-135 tankers, completed the ten and one half hour flight to RAF Bascombe Down without incident.[79]

The first critical test for the 27th TFW began as the F-111Ds landed at RAF Bascombe Down. Wing maintenance personnel had to ready (regenerate) the aircraft for combat as fast as possible, which included: servicing - checking and topping off fuel and oil; repairing any malfunctions that occurred during deployment; and arming each F-111D with

12 general purpose bombs called MK-82s. The USAFE criteria required regeneration of 50% of the aircraft in each arriving cell within six hours. At 12 hours, 70% of all aircraft required regeneration. Within 24 hours all 18 F-111Ds needed to be combat ready. Of the 18 aircraft deployed, only one landed with no discrepancies, and one aircraft required an engine change, which was a major maintenance action. Nonetheless, wing maintenance personnel completed the first requirement early by 35, 2, and 95 minutes respectively for each of the three cells. In fact, at the end of the first six hours maintenance personnel had regenerated 12 of the 18 aircraft. The wing met the second requirement six hours early, and all F-111Ds were ready for combat missions four hours early.80

The next phase of Coronet Hammer, employment, began on 9 May with the start of flying operations. The task during this phase was to fly a TAC goal of 505 sorties over 20 flying days, which equated to 1.40 sorties per aircraft per day. The tasking required the wing to fly 134 sorties per week with a weekly schedule of 18, 36, 36, 22, and 22 sorties Monday through Friday respectively. The wing flew the first 36 sorties to familiarize the aircrews with United Kingdom (UK) peacetime procedures. Following the familiarization sorties, the wing received daily tasking from the NATO agencies in Europe that would task, or "frag", the 27th TFW during war. Colonel Richard C. Jones, Deputy

Commander for Operation of the 27th TFW, commented on these missions in an article for Airman magazine. "They didn't fly simple sorties. Each was a very demanding, realistic combat profile."[81]

To demonstrate the F-111D's ability to support wartime tasking, NATO fragged the F-111Ds to fly four different categories of missions. The first category was the traditional F-111 Interdiction mission. The typical Interdiction mission consisted of attacks against bridges, road intersections, and practice bombing ranges in the UK and continental Europe. The aircrews flew realistic altitude profiles to simulate penetrating enemy defenses. Numbering 382, Interdiction missions made up the vast majority of the sorties flown by the 27th TFW.[82]

The next mission category was Offensive Counter Air (OCA). Aircrews flew fifty OCA missions against selected airfields located on the continent. The third mission category was Offensive Air Support (OAS). Offensive Air Support, a unique mission category within NATO, consisted of Battlefield Air Interdiction (BAI) and Close Air Support (CAS) missions flown under the direction of a Forward Air Controller (FAC) located on the ground. Wing aircrews flew 28 OAS missions. Many of the OAS CAS missions used the beacon bombing technique, simulating support to Army ground units against difficult non-radar targets.[83]

The final mission category was Tactical Air Support of Maritime Operations (TASMO). NATO tasked the wing to fly TASMO sorties against ships of the Royal Navy, and in support of a NATO exercise called Dawn Patrol 80. During these missions F-111D aircrews first flew over a ship for visual identification and then dropped practice bombs on targets towed behind the ship.[84]

A high interest item during the employment phase was weapons delivery. Aircrews completed 786 practice weapons deliveries in eight different weapons events, on eight different practice bombing ranges. The Circular Error Probable (CEP), a measure of accuracy, for each event was less than the established criteria for that event. TABLE 3-16 summarizes weapons delivery performance.[85]

The 27th TFW surpassed all established goals during the employment phase. The wing reached the 505 sortie requirement on 4 June, with two full flying days still available. By 6 June, the wing had scheduled and flown 554 sorties, which included 18 VIP/incentive sorties for British officials and selected 27th TFW enlisted personnel. Of the 554 missions flown, 538 were successful, on time on target, for a 97% mission success rate. During the 554 sorties the F-111Ds logged 1152.2 flying hours. The daily sortie rate was 1.52, which equated to a 32.2 monthly sortie utilization rate, and a 67.2 hourly utilization rate. During two days of each week the 27th TFW met or surpassed the 2.0 sortie

rate requirement. Finally, based on the compressed flying schedule, the wing operated at a 3.0 sortie rate for a comparable 24 hour flying day. 86

The success of the flying operation meant that the maintenance operation was equally successful. An adequated supply of WRSK spare parts, outstanding performance by the

TABLE 3-16. WEAPONS DELIVERY

EVENT	NUMBER DROPPED	CEP (FEET)	WITHIN CRITERIA (PERCENT)
RADAR LAYDOWN (LOW ALTITUDE)	283	97	92
RADAR LAYDOWN (HIGH ALTITUDE)	88	300	85
VISUAL LAYDOWN	265	131	89
STRATEGIC BOMBING RANGE	32	600	59
LOW ALTITUDE LEVEL DELIVERY W/CONTINUOUSLY COMPUTED IMPACT POINT (CCIP)	69	70	80
LOW ALTITUDE LEVEL DELIVERY W/MANUAL SIGHT	45	150	50
LOW ANGLE BOMB W/CCIP	2	HIT	100
TOSS	4	239	100
TOTAL	786	AVG.	85

SOURCE: Colonel William K. James, Commander 27th TFW, "Coronet Hammer After Action Report," 18 August 1980, p. B-4.

avionics test stations, and hard work by well trained and experienced maintenance personnel payed off. The cumulative Mission Capable (MC) rate for the exercise was 88.4%, with an 86.4% Fully Mission Capable (FMC) rate. The Cannon AFB MC rate was 33.8%. During the deployment, aircraft landed with some type of discrepancy 40.9% of the time on the first sortie of the day, and 41% of the time on subsequent sorties. However, within six hours maintenance personnel had 78.6% of the broken aircraft fixed, and 92.7% fixed at the 12 hour point. The wing started each day with an average of 17 out of 18 aircraft FMC. On 9 of the 20 flying days all 18 aircraft were FMC at the start of the day.87

The avionics test stations worked excellently. Each morning Coronet Reaper evaluators recorded the status of the test stations. The 19 test stations averaged 95% FMC status throughout the deployment. More important, however, was the contribution the test stations made to the availability of parts during the deployment. At the beginning of the employment phase the WRSK was 97% complete. By the end of the deployment the WRSK was at 85%, but during the deployment test station personnel repaired 747 items that replaced items taken form the WRSK. If test station personnel had not repaired these items the WRSK would have been at 56.9% on 7 June. This effort amounted to over 86 million dollars of assets repaired and returned to the WRSK.[88]

Another aspect concerning maintenance and supply was the amount of "lateral support" provided to the 27th TFW. When an item was not available in 27th TFW deployed assets, the wing submitted a requisition for lateral support through the 20th TFW, at RAF Upper Heyford, in accordance with established supply procedures. During the deployment the wing initiated 371 such requests, the USAFE supply system satisfied 189 of the requests. This represnted 12% of all parts requested during the deployment.[89]

With the completion of the employment phase, 27th TFW personnel prepared to return to Cannon AFB. On 9 June, the 18 F-111D aircraft departed RAF Bascombe Down. The first two cells of six aircraft each completed the three air refuelings without incident and recovered to Cannon AFB. In the third cell, however, one of the aircraft experienced an engine failure approximately 600 miles from Goose Bay, Labrador. Escorted by another F-111D the two aircraft landed at Goose Bay. An enroute support team landed at Goose Bay that night, and maintenance personnel changed the engine and returned the aircraft to MC status in seven hours. The two F-111Ds departed Goose Bay on 10 June and recovered to Cannon AFB via Pease AFB, where they stopped for fuel. Twelve C-141s and one DC-8 returned the men and equipment of the 27th TFW between 10 and 13 June. Coronet Hammer was done.[90]

The eyes of the Air Force were on the 27th TFW during Coronet Hammer, and the accomplishment of the wing did not go unnoticed. Colonel McCann received the following messages before the last F-111D landed on 9 June 1980.91

> You and your command did superbly on the deployment to England. Congratulations to you all. Good show.
>
> General Lew Allen, Jr.
> Chief of Staff of the Air Force

> You have set a new standard of excellence ... Please convey to all personnel involved my great admiration and deep appreciation for a challenging job brilliantly done.
>
> General W. L. Creech
> Commander, Tactical Air Command

> The Coronet Hammer deployment was an overwhelming success and countered all doubts concerning the ability of the F-111D to perform...
>
> General John W. Pauly
> CINCUSAFE

The Aftermath of Hammer

The aftermath of Coronet Hammer began before the deployment was over. Responding to questions from Rep. William Chappell of Flordia on 4 June 1980, General Creech used preliminary data from Coronet Hammmer.

> Mr. Chappell. Just trying to compare it - I feel that this committee, certainly since I

> have been on it, has not spent enough time understanding the capability of the F-111. From what you say today, and what Mr. Edwards indicates, there is apparently a lot that can be done with the aircraft, if handled or managed in the right way. Isn't that about the sense of it?
>
> General Creech. That is my belief, and I believe it is also highly maintainable if we have the spares. I can prove it. In fact, our deployment has proven that today, 85 percent MC rate flying twice the wartime surge requirement.92

On 30 June 1980, the Tactical Air Command published its Final Report on the Coronet Hammer F-111D Deployment. The executive summary from the report concisely presented the results of Coronet Hammer.

> The results of this deployment clearly show that when parts and resources are scaled to the requirement, the F-111D has readiness rates (MC=88.4%) and effectiveness rates (97%) that equal other TAC fighters.93

To support this statement the report included a listing of comparative fighter deployments (TABLE 3-17).

Following publication of the Final Report, General Creech briefed the results of Coronet Hammer to; General Allen, Air Force Chief of Staff; representatives from OSD; and congressional staff workers. So conclusive were the Coronet Hammer results that the OSD Research and Engeneering Staff never submitted to the Secretary of Defense the proposed issue paper on F-111D retention. F-111D funding in the 1980 Air Force Program Objective Memorandom (POM) went unopposed during review by the DOD Defense Resources Board

in July 1980, and the F-111D maintained its position in the Air Force Program Decision Memorandom (PDM) issued by the Secretary of Defense.[94]

TABLE 3-17. COMPARATIVE FIGHTER DEPLOYMENTS

NAME	ACFT	TOTAL SORTIES REQ/FLOWN	TOTAL HOURS FLOWN	MC RATE	FMC RATE
CRESTED CAP 79 28 AUG - 30 SEP 79	48 F-4E 4 TFW	-/876	906.9	75	68
CORONET HOOF 17 JAN - 14 FEB 79	18 A-10 354 TFW	427/187	310	--	--
CORONET RACE 2 - 25 MAY 79	12 A-7D 23 TFW	240/216	382.7	81	77
CORONET RIDER 19 SEP - 12 OCT 79	18 A-7D 140 TFW	427/383	378	95	94
CORONET HAMMER 7 MAY - 9 JUN 80	18 F-111D 27 TFW	536/554	1152	88	86

SOURCE: Major General Larry D. Welch, TAC/DO, and Brigadeir General Albert G. Rogers, TAC/LG, "TAC Final Report on the Coronet Hammer F-111D Deployment: 7 May - 9 June," 30 June 1980, p. 18, Figure 9.

General Creech returned to Congress in February 1981 with additional testimony on the F-111D and Coronet Hammer. He submitted to the Senate Committee on Armed Services a prepared statement covering several topics, one of which was, "F-15 and F-111 Deployments."

> ... We ran a similar acid test earlier in 1980 on an F-111D squadron deployed to Boscombe Down in the United Kingdom. There they

> flew a full range of F-111 missions, at almost twice the required rate, over only a 15 hour flying window daily (again, peacetime constraints); and once again, on a self-sufficient basis operating out of its own WRSK. Moreover, this same F-111D squadron achieved an 86.4 percent aircraft FMC rate thoughout the period of its deployment (as contrasted with a 34 percent rate at home station due to the shortage of spare parts).

When asked by Senator Gordon J. Humphery of New Hampshire if the only distinction between the deployment and home station operations was spare parts, General Creech emphasized that the distinction was, "they had their authorized parts." General Creech's statement once again pointed to the supply deficit as the root cause of the F-111D maintainability problem.[95]

By February 1981 the F-111D retention issue was effectively over. All overt opposition to the aircraft ceased following Coronet Hammer and the Air Force increased funding for F-111D specific spare parts with congressional approval. Between 1981 and 1983 the Air Force spent approximately 150 million dollars on the F-111D, and the Mission Capable rate improved to 60 to 70%.[96]

Chapter 3 - Endnotes

1 TAC Regulation 23-67: Organization and Mission-Field, Tactical Fighter Wing/Groups, 7 Feb 1977; TAC Regulation 23-66: Tactical Fighter Squadrons, 24 May 1976; TAC Regulation 23-65: Training Squadron, 30 June 1978, cited by Michael K. Phelps, History of the 27th Tactical Fighter Wing: 1 January - 31 March 1979, 29 June 1979 (Maxwell AFB, Al.: USAF Historical Research Center, n.d.), p. 1.

2 Interview with Lieutenant Colonel Michael F. Carpenter, Operations Officer 523rd TFS, Cannon AFB, N.M., 23 April 1986.

Interview with Chief Master Sergeant Dennis E. Miles, Non-Commissioned Officer-in-Charge 522nd AMU, Cannon AFB, N.M., 23 April 1986.

Colonel Joseph D. Moore to Lieutenant General James V. Hartinger, "Sortie Production/Wing Reorganization," 7 March 1979, [Secret/Declassified: 7 March 1985], History of the 27th TFW: 1 October - 31 December 1979, 21 April 1980, document #6 (Maxwell AFB, Al.: USAF Historical Research Center, n.d.), p. 4.

3 Michael K. Phelps, History of the 27th Tactical Fighter Wing: 1 January - 31 March 1979, 29 June 1979 (Maxwell AFB, Al.: USAF Historical Research Center, n.d.), p. 36.

"27th TFW Local Operational Readiness Inspection Exercise Report," undated, cited by Michael K. Phelps, History of the 27th TFW: 1 January - 31 March 1979, 29 June 1979, document #6 (Maxwell AFB, Al.: USAF Historical Research Center, n.d.), p. 11.

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CHAPTER 4

WHAT - HOW - WHY

This thesis covered the events that surrounded the controversial F-111D retention issue. Over a two year time span the Programs Analysis and Evaluation Staff of the Office of the Secretary of Defense and the Presidential Office of Management and Budget contended that the F-111D was unmaintainable and proposed the retirement of the F-111D. The determined and hard working men and women of the Air Staff, the Tactical Air Command, and especially the 27th Tactical Fighter Wing demonstrated that the F-111D was maintainable and capable of carrying out its wartime mission.

Compendium

In 1959 General Everett looked for a tactical strike fighter capable of delivering nuclear weapons from tree top level at supersonic speed. He also wanted an aircraft that could take-off and land on 3000 feet of runway and fly 3000 miles unrefueled. John Stack, a NASA engineer, solved the aerodynamic problems of the TFX that led to the future development of the proposed new aircraft.

Secretary McNamara's decision to build the F-111 in 1964 marked the end of one era and the beginning of another for the Air Force and the Department of Defense. The F-111

introduced high technology to military aircraft, but with high technology came high cost. Secretary McNamara believed commonality would reduce the impact of higher costs. He learned that parochialism was difficult to combat among the services, which jealously protected their weapons development tradition. The Navy did not want the F-111B and eventually succeeded in cancelling this aircraft in favor of one of its own design. General Dynamics served as the prime contractor for development of the F-111A and built the aircraft for the Air Force.

As the F-111A entered operational service, the Air Force decided to conduct a combat evaluation of the new aircraft in Vietnam. The 428th TFS flew single aircraft interdiction missions, primarily at night and often in poor weather. 428th TFS aircrews attacked marshalling yards and supply areas in and around the city of Dong Hoi. Bombing results were good, but problems with the Terrain Following Radar, flight control system, and wing carry through box resulted in the aircraft returning to the United States after 55 missions for additional tests and evaluation.

In 1972 the F-111A returned to Vietnam, flew over 3500 missions in seven months, and participated in the Linebacker II operation in December 1972. The interdiction role of the F-111 continued with single aircraft missions attacking power stations and marshalling yards. The Air Force also employed the aircraft in offensive counter-air

operations attacking North Vietnamese airfields and in suppression of enemy air defenses attacking SAM sites. Additionally, F-111 aircrews led multi-aircraft formations as a pathfinder and supported ground forces through the use of beacon bombing. By the end of the Vietnam war the primary mission of the F-111 was still interdiction, but mission roles had expanded.

In 1968 the Air Force hoped the F-111D was the ultimate F-111. It failed in that calling, due to massive cost overruns and technical imperfections. This resulted in the limited production of only 96 aircraft. The Air Force subsequently developed two additional F-111 models, which were more maintainable and reliable, though less capable overall. The F-111E, which actually entered service before the F-111D, went directly to England in support of NATO. The F-111F, initially stationed at Mountain Home AFB, Idaho, demonstrated the ability of the F-111 to deploy overseas and increase the combat power of existing forces, as in the case of Korea in 1976. The F-111F moved to England in 1977 as part of Ready Switch. This resulted in the Air Force having 50% of all F-111 assets stationed overseas in support of NATO. Because of the United States' commitment to NATO, the F-111E and F-111F received priority for F-111 spare parts.

In the mid 1970's the mission of the F-111 remained primarily interdiction; however, delivery techniques expanded to include dive bomb, and toss deliveries. As the

F-111D entered the critical 1979 - 1980 time frame, potential wartime tasking required aircrew proficiency in a variety of weapons deliveries, and differing employment techiques for both single and multi-ship formations.

The F-111 had marked the beginning of a new era, and the 1970's reflected that new era with the introduction of four new tactical aircraft. The Navy finally developed the F-14, the aircraft that replaced the F-111B. The Air Force introduced the F-15, A-10 and F-16. These new generation aircraft, like the F-111, cost considerably more than the aircraft they replaced. Procurement costs, therefore, were substantial, leaving little money for the purchase of spare components for all Air Force aircraft.

With the higher priority of the F-111E and F, and the limited spares available in the mid 1970's, the F-111D faced a shortage of repair parts. The lack of spare parts, coupled with a major engine maintenance program, PACER CAN, resulted in high cannibalization rates to keep some aircraft flying. Cannibalization led to high "hangar queen" rates which in turn led to low mission capable rates. When evaluated in 1978 by the Air Staff, the F-111D appeared unsupportable and a suitable candidate for retirement. Not all of the Air Staff and the Air Force supported this decision. Led by the Deputy Chief of Staff, Plans and Operations, the Air Staff subsequently reconsidered its position, and in February 1979, overturned its decision to

retire the F-111D. However, the Office of the Assistant Secretary of Defense for Programs, Analysis and Evaluation and the President's Office of Management and Budget did not support the retention of the F-111D. The PA&E and OMB offices questioned the deployability, maintainability and capability of the F-111D, and believed money proposed for the F-111D could be spent better elsewhere.

The case against the F-111D had some merit. TAC demanded high performance standards; the 27th Tactical Fighter Wing and the F-111D, in February 1979, did not meet those standards. Colonel Joseph D. Moore realized this in March 1979 when he recommended the realignment of the 27th Tactical Fighter Wing to, "capitalize on our true capability." The Air Staff knew that only hard evidence would save the F-111D. The Air Staff, therefore, ordered TAC in September 1979 to conduct a logistics assessment and provide a complete picture of F-111D logistics. Additionally, a General Officer's Review Group, formed in November 1979, and acting in behalf of the Air Staff, assisted in coordinating actions to improve the maintainability of the F-111D.

In May and June 1980, the 27th TFW deployed 18 F-111D aircraft to RAF Bascombe Down, England, to demonstrate the maintainability and capability of a squadron sized unit deployed overseas. During this deployment, called Coronet Hammer, the 27th TFW surpassed wartime mission tasking, and

maintained a very high mission success rate. The wing demonstrated the accuracy of the F-111D, and the versatility of the F-111D to conduct different types of missions, which included: interdiction, offensive counter air, offensive air support, and tactical air support of maritime operations. Coronet Hammer was a stunning success, and following this deployment all overt opposition to the F-111D disappeared.

Research Questions Revisited

This study of the F-111D retention issue explored three research questions.

1) What maintenance and logistics factors contributed to the retention of the F-111D?

Five maintenance and logistics factors contributed to the retention of the F-111D. The first factor dealt with spare parts. This factor, more than any other, affected the poor maintainability of the F-111D. As clearly pointed out by the General Officer's Review Group, the fundamental problem facing the F-111D was a supply deficit. To overcome this problem in the short term, Cannon AFB received parts from Mountain Home AFB and parts originally destined for USAFE F-111s. When the 27th TFW deployed on Coronet Hammer, its WRSK for a 24 aircraft squadron was 97% complete. In normal operations this figure averaged 82%. The WRSK provided the parts to fix broken aircraft, and that

capability directly contributed to the overall 88% mission capable rate during Coronet Hammer.

The performance of the avionics test stations was the second factor contributing to the retention of the F-111D. The introduction of Line Replacement Units (LRUs) to aircraft maintenance, which simplified maintenance actions on the flight line, required the development of avionics test stations. Deployability of these stations was critical for keeping maintenance standards high. Whether at Cannon AFB or on deployment, the avionics test stations returned to service millions of dollars of parts otherwise replaced from limited supply assets. An additional important factor related to test stations and highlighted in the 21 March 1980, *TAC Interim Report on F-111D Logistics*, was the need for Shop Replacement Units used by test station personnel to repair the LRUs that went into the aircraft.

The third factor dealt with PACER CAN. In February 1980, for the first time in over two years, the 27th TFW had serviceable spare engines. An aircraft could be partially mission capable with selected systems inoperable, this of course was not the case with engines for routine flying operations. Many F-111D aircraft were not mission capable due to a lack of engines between 1977 and 1980. Spare engines enabled maintenance personnel to repair an aircraft that needed an engine change, rather than have the aircraft sit idle and become a "hangar queen."

The fourth factor was the logistical experience 27th TFW personnel gained from deployments and exercises that preceded Coronet Hammer. These activities helped wing personnel learn how to objectively evaluate their War Readiness Spares Kit, and how to effectively manage a deployment maintenance operation.

The final maintenance and logistics factor was the freeze of 232 maintenance personnel who were retained to manage and work solely on the F-111D. The best test equipment or an unlimited supply of spare parts was of no value without the people who knew how to use the equipment and what to do with the parts. Experienced maintenance personnel identified the cause of maintenance malfunctions quicker and more accurately. On an aircraft as sophisticated as the F-111D, experienced maintenance personnel reduced down time and increased mission capable rates.

2) What leadership and management actions contributed to the retention of the F-111D; and what operational accomplishments demonstrated the capability of the F-111D to meet the worldwide mission requirements of the 27th TFW?

Four leadership and management actions supported the retention of the F-111D. The first action, the realistic evaluation of the capabilities of the 27TFW conducted by Colonel Moo.e in March 1979, resulted in the

reorganization of the wing in January 1980. The wing could not support four fighter squadrons. The reorganization enabled the wing to properly train the aircrews stationed at Cannon AFB. The wing accomplished this within its sortie production capability, while maintaining the wing's training commitment to USAFE.

The second and third leadership and management actions were closely related. The TAC Logistics Assessment program, Coronet Reaper, and the General Officer's Review Group, provided high level scrutiny of logistics support given to the F-111D that was essential in identifying the problems that plagued the aircraft and monitoring the programs to correct them. The unprecedented success of Coronet Hammer resulted in the Air Staff abruptly cancelling Coronet Reaper and the GORG. Although short lived, these two programs furnished valuable inputs contributing to the retention of the F-111D.

The last leadership and management action was not accomplished singularly. Between January 1979 and June 1980 two wing commanders and numerous subordinate commanders led the men and women of the 27th TFW through a rigorous period of evaluation and demonstration. The 27th TFW could not afford to fail at home or on deployment. The wing successfully demonstrated the maintainability and capability of the F-111D when supported with spare parts during Coronet Beacon, RED FLAG 80-1, the wing and TAC ORIs, and Coronet

Hammer. This was possible only through sound leadership and management decisions throughout the wing organization during each exercise or deployment.

Without question, the operational accomplishment, Coronet Hammer, was the final action leading to the retention of the F-111D. Following this exercise all overt resistance to the F-111D ceased. Coronet Hammer demonstrated the ability of the 27th TFW to deploy a squadron of F-111D aircraft overseas and conduct mission tasking in excess of wartime requirements. Essential to the success of Coronet Hammer was the wing's ability to maintain the F-111D over 20 flying days using deployed avionics test stations and authorized WRSK assets. Coronet Hammer also demonstrated the capability of the F-111D to conduct various types of wartime missions with a high mission success rate and weapons delivery accuracy surpassing established standards.

3) Did the F-111D fit the "traditional" employment role of the F-111 during this period, and did this play a role in the retention issue?

At the end of the Vietnam war, the primary mission of the F-111 was interdiction. Single aircraft flew these missions, usually at night and at low altitude. They dropped bombs from a level delivery. During 1979 and 1980 the F-111D did not fit the "traditional" role of the F-111. The 27th TFW conducted training for a variety of missions,

which included composite force, close air support, and tactical air support of maritime operations, as well as interdiction, offensive counter air, and suppression of enemy air defenses. Additionally, aircrews practiced dive and toss bomb deliveries. These new missions and weapons delivery techniques were as demanding as single aircraft night interdiction missions and required appropriate training. The initial impetus behind these changes in TAC came from the expanded mission roles of USAFE F-111s supporting NATO.

The mission of the F-111D did not play a direct role in the retention issue. Rather, the retention issue focused on the maintainability of the F-111D. Nonetheless, the F-111D supported United States commitments around the world. The F-111E and F-111F wings in NATO required training support in peacetime and reinforcement during war. TAC needed the capability to support worldwide missions with a night / all-weather aircraft in Korea or Southwest Asia. These mission requirements were the primary reasons the Air Force wanted to retain the F-111D. Simply put, the unique combat capabilities of the F-111D enhanced by the expanded mission roles of the aircraft provided too much capability to retire. Therefore, the employment role of the F-111D played an important indirect role in the retention issue.

Conclusion

The F-111D retention issue centered on the maintainability of the aircraft. The poor maintainability of the F-111D was primarily the result of a severe supply deficit of spare parts. The supply deficit resulted from the lack of money in the mid 1970's to procure new aircraft and adequate spare parts for all tactical aircraft. When the Air Force gave priority for spare parts to USAFE F-111s, the situation at Cannon AFB deteriorated. The position of the Air Force in 1978 was the F-111D was not supportable. However, this position lacked logic because the Air Force consistently failed to provide the critical spare parts essential to mission capability.

Since the first F-111D landed at Cannon AFB in September 1971 the aircraft had a low priority. The Air Force could "afford" to take this position with the F-111D because four months after Cannon AFB received its first F-111D, Mountain Home AFB received its first F-111F. After the F-111F moved to RAF Lakenheath and the Air Force earmarked 42 F-111As for EF-111s, the F-111D became TAC's only asset for night / all-weather reinforcement of NATO and other contingencies, such as the Korean incident in 1976.

Once the Air Force realized in 1979 the F-111D was important in maintaining the capability of both NATO and TAC, it reversed its position and decided the aircraft was supportable. Unfortunately, the Office of the Secretary of

Defense and the Office of Management and Budget did not agree with this decision. The Air Staff, Tactical Air Command, Air Force Logistics Command, and 27th Tactical Fighter Wing subsequently expended considerable effort to demonstrate that the F-111D was both maintainable and capable. Although it may seem obvious, it is important to emphasize that had the F-111D not possessed a combat capability that was essential to the Air Force, it would not be in the inventory today.

Following the successful defense in 1978 of the F-111 fleet versus the Ground Launched Cruise Missile, the Air Force evaluated the F-111D. Had the Air Force evaluated the aircraft based on mission requirements and investigated the real cause of its poor maintainability, instead of evaluating the aircraft in terms of dollars, the entire issue could have been avoided. This was the primary lesson learned from the F-111D retention issue.

APPENDIX A

CHRONOLOGY OF EVENTS

2 December 1968	First flight of an F-111D.
11 September 1971	F-111E moves to RAF Upper Heyford.
1 November 1971	27th TFW receives its first F-111D.
December 1972	First F-111D squadron becomes operationally ready.
19 August 1976	F-111Fs deploy to Korea in response to murder of two U.S. Army Officers.
June 1977	F-111F moves to England.
19 December 1977	PACER CAN begins.
May 1978	Air Staff Board deletes F-111D from Air Force POM.
31 January - 8 February 1979	27th TFW conducts Local Operational Readiness Inspection - Overall rating: Unsatisfactory.
February 1979	Air Force Council revisits F-111D retirement decision and General Hill directs retention.
7 March 1979	Colonel Moore sends reorganization letter to General Hartinger.
May 1979	F-111D is included in the 1979 Air Force POM.
7 May 1979	Colonel McCann assumes command of the 27th TFW from General Moore.

30 July - 1 August 1979	TAC No-Notice Operational Readiness Inspection - wing receives ratings of Outstanding and Excellent in generation and mobility.
August - November 1979	AF Secretary Mark and General Allen present F-111D case to DOD Secretary Brown - Secretary Brown directs retention for 2.5 years with review in one year.
9 September 1979	Air Staff directs TAC to conduct a Logistics Assessment of the F-111D.
3 October 1979	Organizational meeting for TAC Logistics Assessment - program named Coronet Reaper.
3 October - 27 November 1979	Coronet Beacon.
18 October 1979	General Lowe recommends a General Officer's Review Group to study F-111D problems - Air Staff Concurs.
November 1979	General Allen tasks 27th TFW with Coronet Hammer.
16 November 1979	First meeting of General Officer's Review Group.
24 November - 22 December 1979	RED FLAG 80-1.
1 January 1980	27th TFW reorganization implemented.
8 January 1980	27th TFW conducts an ungraded Local Operational Readiness Inspection - practice for Coronet Hammer.
4 February 1980	Secretary Brown shows support for F-111D in Congressional testimony.

24 February 1980	TAC Operation Readiness Inspection - overall rating Outstanding.
3 March 1980	Second meeting of the General Officer's Review Group.
21 March 1980	TAC issues F-111D Logistics Assessment Interim Report as part of Coronet Reaper.
26 April - 9 June 1980	Coronet Hammer.
30 June 1980	TAC issues Final Report on the Coronet Hammer F-111D Deployment as part of Coronet Reaper.

APPENDIX B

DEFINITIONS

Air Interdiction (AI) - Air interdiction operations are conducted against the ememy's military potential before it can be effectively used against friendly surface forces. These operations restrict the combat capability of the enemy by delaying, disrupting, or destroying their lines of communications, their forces, and their resources. It is used to disrupt enemy plans and time schedules.

Battlefield Air Interdiction (BAI) - A special sub-element of air interdiction, battlefield air interdiction operations are conducted against interdiction targets that will have a near term affect on frienly ground forces. Battlefield air interdiction sorties do not require close coordination with ground forces.

Aircrew - (F-111) An aircrew in the F-111 system consists of a pilot, who is the Aircraft Commander (AC), and a navigator, who is the Weapon Systems Officer (WSO).

Close Air Support (CAS) - Close air support involves air attacks against hostile targets that are in close proximity to friendly ground forces. Close air support missions require detailed integration with the fire and maneuver plans of friendly ground forces. Close air support may be used to support offensive or defensive ground operations. It may also be used during counter-attack or counter-offensive operations.

Composite Force - A composite force is comprised of several different aircraft working in close coordination together to achieve mission success. A typical composite force could include air superiority fighters, electronic warfare aircraft, specialized "wild weasel" aircraft for suppression of enemy air defenses, and attack aircraft.

Continuation Training - These are training sorties flown in the Tactical Fighter Squadron to maintain proficiency in essential warfighting skills, such as weapons delivery and navigation.

Counterair (CA) - Counterair operations are conducted with the ultimate goal of gaining and maintaining air supremacy. Air supremacy is a condition that gives frienly forces freedon of action throughout the area of conflict, while denying the enemy the same freedom. Counterair operations include offensive, defensive, and defense suppression tasks.

Faker - A faker mission is not a formal Air Force mission type, it is a mission tactic. The faker aircraft intentionally reveals his position to the enemy to draw attention away from the actual attacking aircraft.

Mission - A mission is tasked by a higher headquarters and can be flown by one or several aircraft. All the aircraft involved in a composite force would fly the same mission.

Offensive Air Support (OAS) - Offensive air support is a unique term to the NATO environment. Offensive air support is comprised of close air support, battlefield air interdiction, and tactical reconnaissance missions flown in support of ground forces.

Pathfinder - A pathfinder mission is not a formal mission type, it is a mission tactic. The pathfinder aircraft leads other aircraft to a target for conventional weapons delivery. The pathfinder aircraft usually has a more sophisticated navigation system to assist in locating the target.

Sea Surveillance - Visual or sensor identification of shipping to assist naval forces in sea control.

Sortie - A sortie represents a single aircraft. A mission is completed with one or more sorties.

Suppression of Enemy Air Defense (SEAD) - Suppression of the enemy's counterair system is vital to successful air operations. Defense suppression is designed to degrade, neutralize, or destroy the enemy's surface air defense and command and control systems, so that air operations can be conducted with greater flexibility and reduced losses.

Tactical Air Support of Maritime Operations (TASMO) - Missions flown in support of naval operations. TASMO missions will normally consist of a composite force that launches to attack a naval target that has been identified through sea surveillance.

APPENDIX C

ACRONYMS

AAA	- Anti-Aircraft Artillery
AC	- Aircraft Commander
ACFT	- Aircraft
AFB	- Air Force Base
AFC	- Air Force Council
AFLC	- Air Force Logistics Command
AGE	- Aerospace Ground Equipment
AMU	- Aircraft Maintenance Unit
ANZUS	- Australia - New Zealand - United States
ASD	- Average Sortie Duration
AWP	- Awaiting Parts
BAI	- Battlefield Air Interdiction
BLSS	- Base Level Supply System
CAS	- Close Air Support
CCIP	- Continuously Computed Impact Point
CEP	- Circular Error Probable
CG	- Consolidated Guidance
CINCEUR	- Commander-in-Chief Europe
CINCUSAFE	- Commander-in-Chief USAFE
CONUS	- Continental United States
CY	- Calendar Year
DOD	- Department of Defense
DRB	- Defense Resources Board

FAC	- Forward Air Controller
FCF	- Functional Check Flight
FMC	- Fully Mission Capable
FY	- Fiscal Year
GLCM	- Ground Launched Cruise Missile
GORG	- General Officer's Review Group
IP	- Instructor Pilot
LG	- Logistics
LRU	- Line Replacement Unit
LTF	- Lead-The-Force
MC	- Mission Capable
MSK	- Mission Spares Kit
MTBF	- Mean Time Between Failure
NASA	- National Aeronautics and Space Administration
NMCB	- Not Mission Capable Both
NMCM	- Not Mission Capable Maintenance
NMCS	- Not Mission Capable Supply
OAS	- Offensive Air Support
OCA	- Offensive Counter Air
OPR	- Office of Primary Responibility
ORI	- Operational Readiness Inspection
OSD	- Office of the Secretary of Defense
PA&E	- Programs Analysis and Evaluation
PACAF	- Pacific Air Forces
PDM	- Program Decision Memorandom

PMCB	- Partially Mission Capable Both
PMCM	- Partially Mission Capable Maintenance
PMCS	- Partially Mission Capable Supply
POM	- Program Objective Memorandom
POMO	- Production Oriented Maintenance Orgaization
POS	- Peacetime Operating Stocks
PPBS	- Planning Programming Budgeting System
R&D	- Research and Development
RAAF	- Royal Australian Air Force
RAF	- Royal Air Force
RDJTF	- Rapid Deployment Joint Task Force
RTU	- Replacement Training Unit
SAC	- Strategic Air Command
SAM	- Surface to Air Missile
SEAD	- Suppression of Enemy Air Defenses
SECDEF	- Secretary of Defense
SM-ALC	- Sacremento Air Logistics Center
SOR	- Specific Operational Requirement
SRU	- Shop Replacement Units
TAC	- Tactical Air Command
TACM	- Tactical Air Command Manual
TASMO	- Tactical Air Support of Maritime Operations
TFR	- Terrain Following Radar
TFS	- Tactical Fighter Squadron
TFTS	- Tactical Fighter Training Squadron
TFW	- Tactical Fighter Wing

TFX	- Tactical Fighter Experimental
UK	- United Kingdom
UNT	- Undergraduate Navigator Training
UPT	- Undergraduate Pilot Training
USAF	- United States Air Force
USAFE	- United States Air Forces in Europe
UTE	- Utilization
VIP	- Very Important Person
WRSK	- War Readiness Spares Kit
WSO	- Weapon Systems Officer

APPENDIX D

Survey of Literature

This survey of literature was designed to assist future researchers interested in the F-111 in general and the F-111D specifically. As indicated in chapter one, limited published material existed for the F-111 after the late 1970's. Sufficient information, in the form of books and periodicals, however, was available for the early development of the F-111 (1960 thru 1973) to allow the researcher to crosscheck details in several sources. The sources of information used in the thesis included: histories of the 27th TFW, books, periodicals, government publications, congressional hearings and reports, and interviews.

The backbone of the thesis consisted of the histories of the 27th TFW. Each history contained a footnoted narrative that directed the researcher to support data which provided primary source information. Two problems, or restrictions, occurred using official unit histories. First, the problem of classification occurred. Unclassified information introduced a topic, or discussed a topic in general, such as the accuracy of the F-111D versus the F-4 or F-16, the F-111D was the most accurate. However, classified information discussed the topic in detail, providing the most interesting information, such as the

accuracy in feet of each aircraft. The second problem dealt with limitations on the distribution of information. "Privileged Information" and "For Official Use Only" information are not classifications, they are restrictions on the distribution of information. Individual unit commanders have more liberty in using these restrictions. Information that had no restrictions during Colonel Moore's command of the 27th TFW, appeared as "Privileged Information," or "For Official Use Only," during Colonel McCann's command.

Books dealing directly with the F-111 were not found with publication dates later than 1978. Books provided excellent data on the early development of the F-111. Four books in particular were very interesting and informative. The first was F-111, by Bill Gunston. His book provided general information on each of the F-111 models and their development, and the performance of the F-111A in Southeast Asia. The second book was The TFX Decision: McNamara and the Military, by Robert J. Art. As the title implies this book dealt with the controversy surrounding, then Secretary of Defense, Robert S. McNamara's decision to build the TFX, which became the F-111. Robert F. Coulam's book, Illusions of Choice: The F-111 and the Problem of Weapons Acquisition Reform, provided a detailed presentation and analysis on the Navy's efforts to cancel the F-111B. Finally, the Encyclopedia of U.S. Air Force Aircraft and Missile Systems,

vol. 1, Post-World War II Fighters, 1945 - 1973, published by the Office of Air Force History and written by Marcelle S. Knaack, served as an excellent source for specific bits of information on each of the F-111 models.

Articles written on the research topic provided the information and perspective not found in official air force histories. Three such articles were: "New Roles for TAC's F-111," by Captain Kenneth C. Stoehrmann, in Air Force; "F-111 Fighter Role Being Expanded," by Craig Covault, in Aviation Week and Space Technology; and "Call It 'D' for Defiant", by Major Anthony L. Batezel, in Airman. Each of these articles touched on a different aspect of the development of the F-111. One especially noteworthy article dealt with the F-111A's role in Southeast Asia. In June 1973, Air Force magazine published, "Whispering Death: The F-111 in SEA", by Mr. Wayne Thomis. This article chronicled the second deployment of the F-111A to Southeast Asia by the 474th Tactical Fighter Wing, and vividly described the capabilities of the F-111 and the accomplishments of the 474th during the closing days of the Vietnam conflict.

Interviews provided the best behind the scenes information and helped tie loose ends. This became particularly important for this thesis. Following Coronet Hammer, the F-111D retention issued died a quick death, Coronet Reaper and the General Officer's Review Group were both cancelled without publishing final reports, and OSD

Research and Engineering did not write the proposed issue paper. The lack of written material was staggering and offers fertile ground for researchers to explore in the future. Interviews with several of the princple individuals involved solved this problem and provided the answers to the final questions on the F-111D retention issue.

Data Acquisition

Several reference aids helped locate the source data for this thesis. Particularly helpful were: the Defense Technical Information Center (DTIC) system, the Air University Index, and the New York Times Index. For the researcher wishing to conduct a DTIC search, the key words F-111 and night interdiction are recommended. Most of the information located in the Air University Index came under the heading, Airplanes - Fighter - United States - F-111.

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