UNCLASSIFIED

AD NUMBER
AD912755
LIMITATION CHANGES
TO: **Approved for public release; distribution is unlimited. Document partially illegible.**
FROM: **Distribution authorized to U.S. Gov't. agencies only; Test and Evaluation; 01 JUN 1973. Other requests shall be referred to Army War College Carlisle Barracks, PA 17013. Document partially illegible.**
AUTHORITY
usawc ltr, 7 feb 1974

THIS PAGE IS UNCLASSIFIED

AD912755

MONOGRAPH

WILL THE ATTACK FIGHTER FULFILL THE ARMY'S CLOSE AIR SUPPORT REQUIREMENTS.

BY

LIEUTENANT COLONEL JAMES E. DANIEL, JR.
USAF

LIBRARY
APR 20 1973
ARMY WAR COLLEGE

US ARMY WAR COLLEGE, CARLISLE BARRACKS, PENNSYLVANIA

Distribution limited to U.S. government agencies only; Test and Evaluation (1 June 1973). Other requests for this document must be referred to Commandant, US Army War College, Carlisle Barracks, Pa. 17013

BEST AVAILABLE COPY

USAWC RESEARCH PAPER

WILL THE ATTACK FIGHTER FULFILL THE ARMY'S CLOSE AIR SUPPORT REQUIREMENTS.

MONOGRAPH

by

Lieutenant Colonel James E. Daniel, Jr.
USAF

US Army War College
Carlisle Barracks, Pennsylvania
23 February 1972

Distribution limited to U.S. Government Agencies only; Test and Evaluation (1 June 1973). Other requests for this document must be referred to Commandant, US Army War College, Carlisle Barracks, Pa. 17013

AUTHOR: James E. Daniel, Jr., Lt Colonel, USAF
FORMAT: Monograph
DATE: 23 February 1972 PAGES: 33 CLASSIFICATION:
TITLE: Will the Attack Fighter (A-X) Fulfill the Army's Close Air Support Requirements

The basic question addressed in this research report is the capability of the Attack Fighter (A-X) to fulfill the Army's close air support requirements. The A-X's capability was analyzed in relation to the tactical air power doctrine, and, particularly, the relationship of the close air support mission to the counter-air and interdiction missions. Further, the A-X was evaluated against the requirements for responsiveness, ordnance carriage capability, lethality, maneuverability, survivability, communication equipment and simplicity of design. Since the AH-56 Cheyenne and the AV-8 Harrier are competing for this mission, the A-X was compared with these vehicles. The conclusions reached were that: the Marines should continue their procurement, development of operational techniques and experience with the Harrier; the Army should cancel the Cheyenne and the Air Force should continue with the A-X Program.

TABLE OF CONTENTS

		Page
ABSTRACT		ii
LIST OF TABLES		iv
CHAPTER I.	INTRODUCTION	1
	Background	1
	Statement of the Problem	2
	Analysis	2
	Delimitations	3
II.	THE DEVELOPMENT OF CLOSE AIR SUPPORT DOCTRINE	4
III.	WHY AN AIRCRAFT SPECIFICALLY FOR CLOSE AIR SUPPORT	10
IV.	WHAT ARE THE ARMY CLOSE AIR SUPPORT REQUIREMENTS	13
V.	HOW WELL WILL THE PROPOSED ATTACK FIGHTER (A-X) MEET THE SPECIFIC REQUIREMENTS FOR CLOSE AIR SUPPORT	14
	Responsiveness	15
	Ordnance Carriage Capability	16
	Lethality Requirements	16
	Maneuverability	17
	Survivability	18
	Communications	19
	Simplicity of Design	20
VI.	COMPARISON OF THE HARRIER, CHEYENNE AND THE ATTACK FIGHTER	21
	Harrier	23
	Cheyenne	24
	Attack Fighter	25
VII.	CONCLUSIONS	27
SELECTED BIBLIOGRAPHY		30

Copy available to DDC does not permit fully legible reproduction

LIST OF TABLES

Page

TABLE 1. 22

TABLE 2. 29

CHAPTER 1

INTRODUCTION

BACKGROUND

The importance of close air support to a successful land campaign and the overlapping of functions in this area in Vietnam resulted in the Close Air Support Study in 1972 that was chaired by Deputy Secretary of Defense David Packard. This committee was composed of senior members of the services, Joint Staff, and OSD. Their initial statement, which follows, indicated the national significance of close air support and the various services' solution to the problem.

> Close air support has become an essential ingredient in any successful land campaign. Examination of conflicts to which U. S. forces could be committed in the late 1970's shows an increasing requirement for close air support, both in quantity and quality. To meet these requirements, the Department of Defense has initiated several programs to develop close air support weapons and systems. The Department is developing the Cheyenne helicopter, the A-X fixed wing aircraft for close air support, and has a limited procurement program for the Harrier, one of whose prime missions is close air support. In addition, a number of new weapons specifically for close air support have been or are being developed.[1]

In Vietnam, the Air Force has used many types of aircraft to provide close air support to the Army; although, none of these aircraft had been designed for the specific mission of close air support. From the beginning in Vietnam, the Army has sought to

acquire some close air support capability of their own. First, they introduced the UH-1 Gunship, then the AG-1 Cobra, and now they are developing the sophisticated AH-56 Cheyenne to provide what they call "direct fire support."

STATEMENT OF THE PROBLEM

The primary purpose of this paper is to determine the capability of the proposed single-mission Attack Fighter (A-X) aircraft to fulfill the close air support requirements of the Army.

ANALYSIS

In the evaluation of the A-X's close air support capability, it will be necessary to review the development of the current tactical air power doctrine and, particularly, the position and priority of close air support within the total tactical air power picture. Furthermore, the A-X aircraft must be evaluated against certain specific criteria that have been determined as critical to the successful performance of the close air support mission. The Marines are currently purchasing the Harrier aircraft for the close air support mission, while the Army is in the final engineering development stage of the Cheyenne helicopter for close fire support; therefore, a comparison of these two close air support vehicles with the yet untested A-X should be most valuable.

DELIMITATIONS

The current Air Force/Army disagreement on close air support is not completely over the quality or quantity of close air support provided by the Air Force, but to a great degree, relates to the age-old roles and missions controversy. In order to limit the scope of this paper, the following assumptions and/or limitations are presented.

1. The roles and missions controversy will not be addressed.

2. The Air Force is assumed to have, and will continue to have, the requirement of providing close air support to the Army.

3. Only primary and secondary unclassified source material available at the Army War College will be utilized.

CHAPTER II

THE DEVELOPMENT OF CLOSE AIR SUPPORT DOCTRINE

The development of the current Air Force close air support doctrine owes much to the Marine Corps. The Marines have traditionally placed great emphasis on the integration and close cooperation of ground and air forces. They were the first to develop and use close air support techniques against an opposing armed force in Nicaragua during 1927.[2] On a much larger scale, the Germans, early in World War II demonstrated how effective planned close air support could be as their armies rapidly rolled across Europe. They utilized the Stuka dive bombers to attack enemy strong points immediately in front of the ground troops. The Stuka and their close air support effort was outstanding so long as their air superiority was maintained. The Air Force doctrine of tactical air power emerged during the North African campaign.[3] It was through experience gained during that campaign that the doctrine of equality of air, ground and sea operations evolved.[4] Initially, in that campaign, the air resources had been parcelled out and subordinated to the Army commander of a specific area. The Casablanca Conference in January 1943 resulted in the reorganization of the Army Air Forces along tactical and strategic lines.[5] This proved to be a more effective and efficient means of allocating the scarce air power.

As a result of this conference, several basic principles were established and published as doctrine for the employment of tactical forces. The first requirement was that gaining air superiority is necessary for successful major land operations.[6] The inherent flexibility of airpower enables rapid concentration of all available forces at the critical battle area and has proved to be its greatest asset. Finally, it was established that "the control of available airpower must be centralized, with command exercised through the Air Force commander."[7] These principles have been proven in every major conflict since their establishment.

The gaining of air superiority through counter-air operations has always been more glamorous than interdiction or close air support. This has led many people to believe, and particularly our Army compatriots, that close air support of friendly ground troops did not have the priority that this mission deserved. It is quite true that the CAS capability and support provided to the Army from Korea until about 1962 progressively decreased. This was during the period of the "doctrine of massive retaliation" in which most of the Defense Budget went to the strategic offensive and defensive forces. During this period, tactical air forces accepted an additional strike mission (i.e., nuclear) in order to stay alive. At first, when the aircraft had only a visual capability to navigate and deliver ordnance on the

target, the reduction in CAS capability was minimal; however, with the introduction of more sophisticated aircraft capable of all-weather delivery, the training and capability of CAS declined.

Starting in 1962, tactical airpower as part of the general purpose force increased in strength and greater emphasis was placed on the CAS mission. When we became involved in South Vietnam, all of our tactical aircraft were the general purpose type; but, we did enjoy complete air superiority and low ground fire threat. This has enabled the Air Force to utilize many aircraft that could not have survived if these two vital factors had not been present (i.e., A-1, B-26, AC-47, T-28, etc.). In order to maintain these important elements, tactical airpower was utilized in a counter-air role in North Vietnam and an interdiction role in both North Vietnam and Laos. The Air Force in SEA has given the highest priority to CAS missions whenever Army ground troops have been in combat, and this fact has been stated numerous times by Army commanders from the highest on down. For example, on the 19th of March 1971, General Westmoreland stated, "In Vietnam the United States Army has been very satisfied and pleased with the quality of tactical air support provided by the Air Force, specifically, 7th Air Force, ... In my opinion it is fully equal to that provided by Marine Air Wings to the Marine ground elements."

The Air Force will continue to do so in the future, but their is no set formula that can be used to break down the amount of tactical force into counter-air, interdiction or close air support sorties. It has always depended on the situation, and probably always will. For example, in the Korean War, the allocation of tactical sorties was 21 per cent for counter-air, 60 per cent for interdiction and 19 per cent for close air support.[8] They are all important facets of the total picture.

Perhaps, a discussion of the basic scope of tactical airpower would be worthwhile. Actually, there are five basic missions, however, for this presentation, air reconnaissance and assault airlift will not be considered. The mission of counter-air is to gain and maintain control of the air over the battle area.[9] The primary objective is the destruction of enemy aircraft. The enemy's aircraft can be more effectively destroyed if they can be caught on the ground; however, it is those aircraft that are destroyed in aerial combat that have resulted in the highest honors being bestowed to the victor. From World War I onward, it has been traditional that the destruction of five enemy aircraft in aerial combat resulted in the highly sought after title of "Ace." The

titles of "Ace" and the other awards that have invariably accompanied this achievement have provided the glamor to the counter-air mission more than to any other mission. Other targets in the counter-air area are radars, missile sites (SAM & SSM), and command and control elements.[10] Interdiction performs the vital function of destroying some of the enemy's combat forces and logistics prior to its arrival at the battle area.[11] Naturally, the destruction of all his forces and supplies prior to their contact with our ground forces would be a utopia; unfortunately, this has never been possible. The following information from sensors along the Ho Chi Minh Trail illustrate the importance of interdiction for all of our forces in South Vietnam: "In 1969-70 season, Seamans said the enemy started about 68,000 tons of supplies down the trail and only 21,000 tons got through. In the 1970-71 period, about the same tonnage was put in at the north but only 9,500 tons made it to the south.[12] It is apparent from this that the interdiction mission has been and will continue to be a vital requirement in the future. Close air support operations are carried out in conjunction with surface forces to directly assist in the defeat of enemy troops, strong points and weapons on the battlefield or its immediate vicinity as required by the ground commander.[13] Aircraft in the CAS role can provide substantial increases in land force effectiveness by bringing direct fire to bear on battlefield targets as an additive to the organic Army firepower or as an extension thereof. The inherent flexibility of tactical airpower enables it to effectively attack critical elements of the target array

Copy available to DDC does not permit fully legible reproduction

which varies widely by theater. For example, in Europe we face a highly mobile massed armored threat, in Korea the threat is more non-mechanized forces in rugged terrain, while in SEA it has been primarily light infantry, dense foliage or underground base camps. In each case, terrain, target motion, and target hardness may restrict fire coverage and effectiveness by surface weapons. The Air Force defines three primary tasks involved in the CAS mission: Close Supporting Fire (CSF), Armed Escort (AE) and Armed Recce (AR) in the battle area, any of which may involve anti-tank and anti-mechanized vehicle operations. CSF consists of attacks on hostile targets in close proximity to friendly forces. AR searches for and attacks targets in the battle area. CSF is the dominant of the three in terms of urgency and effort required. Targets are provided for CSF missions by either the ground commander or the airborne forward air controller (FAC).

Copy available to DDC does not permit fully legible reproduction

CHAPTER III

WHY AN AIRCRAFT SPECIFICALLY FOR CLOSE AIR SUPPORT?

First of all, the United States has never had an aircraft designed specifically for the close air support mission.[14] It has been a long-recognized fact that there never has been a fighter aircraft that was outstanding in every facet of tactical fighter operations. There appears to be two areas that warrant development of single purpose aircraft, "...that is at the extreme ends of the spectrum of tactical aviation, single purpose aircraft are not only desirable but cost-effective, and it is for that reason that we have come to the conclusion that the F-15, which is highly optimized for the air superiority role, operating on the one end and the A-X, which is highly optimized for this very close-in support of the ground troops engaged in combat, on the opposite end, these are justifiable as single purpose aircraft."[15] The great speed, design characteristics, and sophistication required to produce an air superiority aircraft or an all-weather tactical strike (nuclear) aircraft that can effectively perform its mission in today's and tomorrow's environment is an extremely expensive program. The astronomical increase in cost is a direct result of the continuous emphasis on pushing the "state of the art" or attempting to achieve significant scientific or technological

breakthroughs in order to maintain and, hopefully, exceed your opponent's capability. For example, the F-4 (air superiority) and the F-105 (all-weather strike/interdiction) aircraft can perform all the tactical fighter conventional roles (counter-air, interdiction and close air support); however, their success in these missions are of a lower quality. (Neither aircraft was capable of operating in the A Shau Valley in March 1966 when a Special Forces Camp came under attack by 1500 enemy troops. The terrain situation there was a valley about ten miles long and one and one half miles wide, and the weather over the entire valley was 500 feet overcast, except for some small holes at the North end of the valley. In this situation, two squadrons of A-1 aircraft were able to provide effective close air support for the two days.[16] Now, this particular situation is not an isolated instance. Similar poor weather and terrain situations are common in Europe and other parts of the world. In these situations, a specialidized CAS aircraft is a vital requirement because currently we do not have an aircraft that can perform under such conditions (i.e., F-100, F-105, F-4, A-7).

Cost effectiveness is another vital factor to be considered in the production of CAS sorties. A CAS aircraft must have the capability to survive the predominant 14.5 millimeter ground fire threat, accurately deliver weapons, and have the simplicity for reliable maintenance and responsiveness. Sophisticated

aircraft are just two expensive and susceptible to battle damage to provide an acceptable cost per sortie. An old and trite saying that "war is an uneconomical operation" does not mean that even the world's richest nation should not try to economize whenever it is possible. In fact, in this era of declining Defense Budget, rising weapons systems cost and lack of public support for the military in general, it is critical to national security that we do not price ourselves out of the market. In World War II, we had time to develop and produce aircraft, but we learned that it is better to have a lot of good aircraft rather than a few of the best. In Korea and SEA, we learned that you fight with what you have and modify to meet the situation. We must economize so that we can have sufficient aircraft available in the inventory to perform the directed mission if we become involved in another limited conflict.

CHAPTER IV

WHAT ARE THE ARMY CLOSE AIR SUPPORT REQUIREMENTS?

The Army has a requirement for a manned aircraft that is responsive to the immediate needs of the ground commander; maneuverable enough to identify both friendly and enemy troops; able to carry sufficient ordnance to destroy or neutralize either soft or hard targets; the required accuracy to deliver ordnance in immediate proximity to friendly ground troops; and, the equipment necessary to communicate with the ground commander. In addition, this manned aircraft must have a high degree of survivability to ground fire, capability to operate from austere bases and sufficient simplicity to enhance maintenance reliability. Accuracy of weapons delivery is a must in a limited war. We want to reduce collateral damage to a minimum in any environment, but especially in the case of targets lying in friendly territory. Also, our experience in Vietnam has shown that close support of ground forces often has to be very close. Errors of even a few feet cannot be tolerated when the safety of friendly ground forces is at stake. Beyond these considerations, the ability to destroy a target on the first pass, day or night, and in any weather, greatly reduces the vulnerability of our tactical fighter to ground fire.

CHAPTER V

HOW WELL WILL THE PROPOSED ATTACK FIGHTER (A-X) MEET THE SPECIFIC REQUIREMENTS FOR THE CLOSE AIR SUPPORT MISSION?

The Attack Fighter (A-X) Program was started in September 1966 when the United States Air Force Chief of Staff decided that a specialized CAS fighter was a basic requirement. Six contractors submitted their proposals in August 1970. These proposals were evaluated and competitive contracts were awarded to Fairchild-Hiller and Northrop in December 1970.[17] Interestingly enough, in the original specification to the contractors, the type of engine (reciprocating, turboprop or turbofan) and the number was left to the contractors to decide.[18] One contractor submitted a proposal for turboprop, while the remainder recommended the turbofan engine.[19] It was found that the turbofan engines would give the same capability as the turboprop on the low end of the airspeed spectrum and additional capability at the high end of the spectrum.[20] The V/STOL concept was eliminated because it would cost 30-100 per cent more, longer development time was required, adequate payload and loiter capability were lacking.[21]

Each contractor will produce two prototype aircraft for a fly-off competition beginning in June 1972. The contractors will flight test their aircraft for four months and submit detailed

proposals for a full-scale acquisition.[22] The Air Force will flight test the aircraft for two months and then evaluate the test results in conjunction with the financial data prior to selecting the contractor.[23] This is the current concept of "fly-before-you-buy". Primary objectives of the A-X Program are low cost, high effectiveness and survivability. Relatively low risk is involved in the development of the A-X, since most of the parts will be off the shelf. The competitive prototype phase and full-scale development and testing of Category I and II aircraft will cost $281 million.[24] The cost of the A-X will be about $2 million; perhaps, slightly lower.[25]

RESPONSIVENESS

One of the prime, if not the most important, requirements of a CAS aircraft is the ability to effectively deliver ordnance on the target within minutes after the request is submitted. Responsiveness can be achieved by either loitering in the battle area or by operating from forward bases. The A-X will have the required design capability to operate from austere bases, short take-off and landing, and ease of maintenance. The actual figure concerning its ability to loiter are classified; but one source states that " ...internal fuel capability shown here (deleted) hours loiter 250 nautical radius carrying 18 Mark 82 bombs".[26] Another source states

that "the A-X will be able to linger over the battlefield from one to four hours depending on the length of take-off and amount of ordnance carried."[27] In Vietnam in 1969, in a specific test of the advantages of fixed-wing, long-loiter close air responsiveness was conducted with the OV-10A. The OV-10A's average response time was 5.1 minutes.[28] The A-X will be faster than the OV-10A is; therefore, it could either respond faster for the same area of responsibility or have a larger area of responsibility with a similar average response time.

ORDNANCE CARRIAGE CAPABILITY

The A-X is designed to carry a maximum of 16,000 pounds of ordnance.[29] It will have an internally-mounted 30 millimeter gun with 1350 rounds of ammunition, which will be capable of piercing any armored vehicle in the Soviet inventory.[30] The A-X will have ten external store stations capable of carrying the following types of ordnance: 500, 750 and 2000 pound bombs, fire bombs, flare launchers, dispenser weapons, missiles and gun pods.[31]

LETHALITY REQUIREMENTS

A high degree of accuracy will be obtainable through the ability to stabilize the A-X on a 45° dive at 275 knots.[32] This will allow the pilot to track the target easier and get

closer to the target before initiating his pullout. The other vital factor will be a dual reticle optical sight. "One reticle is a moving reticle to be tied to a lazer spot-seeker for use with forward air controllers who have a lazer target designator."[33] This not only provides a system for greater accuracy under visual conditions; but this system can be used at night without the necessity of using flares. An additional asset will be what is called a "heads-up display" (HUD) of airspeed, altitude and dive angle on the windscreen.[34] This will allow the pilot greater target concentration and not require the constant shift of vision from the target to his instruments within the cockpit. Sophisticated weapons delivery equipment, such as the A-7 has, could be added if deemed necessary and financially feasible.[35]

MANEUVERABILITY

The A-X will be able to operate in the 150-400+ knots range and pull 7 g's.[36] These factors will allow normal operations of the A-X in weather conditions of approximately 1000 feet ceiling and one mile visibility except in an emergency when it could effectively operate at lower minimums. This means we would be able to operate visually worldwide over 90 per cent of the time, and in Europe over 80 per cent of the time without

utilizing the emergency backup weather capability. The low end of its airspeed spectrum enhances the pilot's ability to acquire targets, stay close to the target and re-attack if necessary.[37] The ability to accelerate rapidly throughout the entire speed range and the capability to pull 7 g's will complicate the ground gunner's effectiveness, plus enabling the pilot to perform the necessary violent maneuvers required to negate a SAM or hostile aircraft attack. The low-speed maneuvering capability will enhance the effectiveness of escorting aircraft and helicopters.

SURVIVABILITY

Combat aircraft, in the past, have depended on their ability to change their altitude, direction of flight or accelerate to high speed quickly for survival. The A-X will have more survivability features designed into it than any other aircraft ever produced by the United States. The cockpit will be protected by 750 pounds of armor that will provide protection for the pilot from the 14.5 millimeter weapon which is the predominant threat; and, in addition, it will provide considerable protection from the 23 millimeter and higher threat.[38] It would have required over twice this amount of armor to have provided similar protection from the 23 millimeter threat.[39] Other vital

factors designed to increase survivability is "go-home fuel" protected by self-sealing tanks, two engines sufficiently separated to lessen the probability that a hit in one will cause the loss of the other, primary hydraulic flight control and a manual backup (the lines are routed separately except at the origin and destination), and the primary flight structures "...will not be vulnerable to a single hit by 23 millimeter HEI shells."[40]

COMMUNICATION

The A-X's avionics provide the simplest means to communicate, navigate, acquire targets and deliver weapons, plus the fact that they are, in being, on the shelf items available now. In CAS, it is imperative that the attack pilot, the FAC and the ground commander be in constant contact. The A-X will have UHF-AM for normal air-to-air and air-to-ground communications, VHF ~~UHF~~-AM for contact with Army ground control facilities, UHF-FM for direct contact with the Army Commander being supported, and HF/SSB can be installed for ferry missions or when operating at low altitude at extreme range from its own control facility.[41]

SIMPLICITY OF DESIGN

If the A-X is to have low acquisition and operating cost, simplicity is the critical factor.[42] Simplicity of design is a vital requirement if we must operate from forward bases.[43] Reliability and maintainability is a prerequisite in the basic design in order that a capability exist to produce sufficient sorties under normal combat conditions, yet have the inherent capability to accelerate the sorties production to meet a high-surge requirement.[44] There is a direct correlation between the complexity of an aircraft and the maintenance man-hour per flying hour (MMH/FH). For example, the MMH/FH for the F-4 is 34 while the A-37 is 8 and the A-X will be about 12.[45] Table #2 illustrates the relationship between simplicity and sorties per day in either a sustained or peak requirement period.[46]

CHAPTER VI

COMPARISON OF THE HARRIER, CHEYENNE AND THE ATTACK FIGHTER

In every major conflict since World War I, the importance of close air support of ground forces has been demonstrated. Experience gained in these conflicts and, particularly, in SEA has confirmed the tactical requirements for a close air support aircraft and has highlighted necessary attributes which are included in Table #1. The cost of weapons systems today are more critical than ever before. The cost of advanced weapons systems have increased at an astronomical rate during the past ten to twenty years while the purchasing power of the dollar and the amount of money allocated to the Defense Department has declined in relation to the GNP. By June 1972, the military strength of the Air Force will be at its lowest level since 1950.[47]

Comparison of the cost and close air support capabilities of the Harrier, Cheyenne and A-X are presented in Table #1. There are many ways of presenting statistics to prove your point; therefore, the author selected all of the data presented below from the same source.[48] Based on other unclassified information, the data appears to be generally correct. On the chart, there are several places that the aircraft have been rated as either first, second or third. These ratings were assessed by the author based on his past experience and interpretation of the information available.

TABLE #1

Items	Harrier	Cheyenne	A-X-A	A-X-B
Projected buy	114	375	500	100
Program unit cost (millions)	$4.4	$5.4	$2.0	$4.0
Operation & Maintenance cost (10 years in billions)	$1.0*	$4.0	$2.0	$0.8
Total Cost (billions)	$1.5*	$6.0	$3.0	$1.2
Total RDT&E (millions)	-	$293	$281.2	-
Maximum Ordnance Carriage: (VTOL)	3000#	4000	0	0
(STOL)	3000#	3000#	16,000#	16,000#
Operational Speed Range	150-600Kts	100-212Kts	150-400Kts	150-400Kts
Take-Off and Landing Capability	V/STOL	V/STOL	STOL	STOL
Aircrew Requirements	1	2	1	1
Engines	1	1	2	2
Maneuverability	Second	Third	First	First
Accuracy	Second	Third	First	First
Responsiveness/Loiter	Second	Second	First	First
Combat Radius	Second	Third	First	First
Lethality	Second	Third	First	First

Copy available to DDC does not permit fully legible reproduction

*Purchased in the United Kingdom.

HARRIER

The AV-8A Harrier was developed by Britain's Hawker-Siddeley Aviation. It is a V/STOL that is now operational with the British Royal Air Force units stationed in the United Kingdom and West Germany; therefore, no development or risk costs are involved for the Marine Corps in the procurement of this aircraft. The author has been briefed and observed demonstrations by the RAF on the operational capability and planned concept of operation of the Harrier in Germany.

The Marine Corps plans to procure 114 aircraft which will outfit three operational squadrons and one training squadron.[49] By the end of FY 1972, they are programmed to have procured 60 Harrier's.[50] The Harrier will be replacing three F-4 aircraft squadrons.

The Harrier is the second best aircraft with only its VTOL capability better than the A-X. When the Harrier is operated in the VTOL mode of operations, it is limited to a maximum of five-minute operations with 3000 pounds of ordnance at 50 miles.[51] The amphibious assault is the classic Marine mission and, under this condition, if the Navy did not provide close air support, then the Harrier would probably be the only solution during the period prior to establishing land bases.

CHEYENNE

The A-56 Cheyenne has been plagued by technological, managerial and large cost overrun problems from its inception. Lockheed was over-optimistic in their expectation to scale up from a 5000 pound gross-weight helicopter to a 20,000 pound system.[52] Major technological problems were encountered. As of March 10, 1971, there have been ten Cheyenne produced. Two have crashed, and "even the best of the flying aircraft was still nearly 10 per cent short of the specified level flight top speed of 220 Kts, 19 per cent short of dive speed specification, some 20 per cent deficient in maximum maneuverability, with similar restrictions covering at least 10 other flight specifications."[53]

One of the most critical statements from an authoritative source regarding the Cheyenne was made by Dr. John S. Foster, Jr., Director of Defense Research and Engineering.

> If the enemy defenses, even in the vicinity of our troops are formidable, if the fire is intense, the AX will probably survive while the Cheyenne will not. It will survive simply because it is a less complicated airplane. I don't believe we can make a helicopter that will take the beating the AX can take."[54]

The preceeding table clearly indicates that the Cheyenne has a limited capability to perform the mission, little chance of survival in the intense ground fire environment probably in the late 1970's and the high program unit cost will either

limit the total buy or, if the scheduled 375 aircraft are procured,[55] then the Army will have lost a significant portion of its budget which is badly needed elsewhere. Therefore, the continuation of this marginal weapons system will not only hurt the Army's combat capability, but also the capability of all general purpose forces.

ATTACK FIGHTER

For the purposes of this comparison, only the A-X-A will be considered. The A-X-B's additional cost, sophisticated avionics and tentative nature precludes a realistic comparison at this time. Of the three aircraft, the A-X is the only one that has not flown and is not scheduled for its initial test until June 1972.[56] The A-X is a new design but current technology is being utilized. The basic airframe is a conventional type structure, the engines will require minor development changes while the avionics are already available. It will be a simple, rugged, single-seat, twin-engined, fixed-wing monoplane, sized and powered for short takeoff and landing. Since the "state of the art" nor technological breakthroughs are required in any area of the A-X, the cost and the inherent risk associated with any new aircraft should be relatively low. One possible problem will be the interface of the 30 millimeter

cannon with the airframe. These two areas are being developed separately, but nearly simultaneous; however, they will not be integrated until after the selection of the final contractor. The Air Force does not feel that this procedure will create any problems.[57] The most important requirement of the A-X is to provide highly accurate weapons delivery in close proximity to friendly ground troops. It must be capable of performing this mission effectively and surviving the intense ground fire environment probable in the late 1970's. The preceeding table clearly illustrates the superiority of the A-X in the close air support mission. Equally important is the lower cost, which will allow procurement of more A-X aircraft than either of the other two aircraft.

CHAPTER VII

CONCLUSIONS

Although the Harrier has a limited capability to provide responsive and lethal firepower on a CAS target, it is the only operational V/STOL in the free world. There is always the possibility that V/STOL type aircraft may show sufficient improvement in design capability to become a competitive or outstanding aircraft in a future conflict. Another factor is the Marines' traditional emphasis of CAS that insures the necessary priority will be assigned to Harrier utilization. It would appear worthwhile from the National security viewpoint to invest an additional $237.6 million, so that the Marines can procure their programmed 114 aircraft.[58] This would allow the Marines to develop and test the Harrier's capability to effectively support ground troops in a CAS environment. If the Harrier or follow-on type V/STOL aircraft show significant improvement, we will then have the operational techniques and experience available for rapid utilization.

The Cheyenne is a marginal aircraft. The type and amount of ordnance the Cheyenne is programmed to carry will force it up into the prime ground fire envelop, but its limited maneuvering capability will limit the pilot's ability to reduce this threat. This makes the factor of survival critical for

the Cheyenne. The Army should be fully aware of the helicopter's capability to survive ground fire and, particularly, after the LAM SON 719 Operation in Laos. This was the first instance in SEA that the helicopter encountered any significant ground fire. Also, they have never been subjected to either a surface-to-air missile like our "Redeye" or hostile aircraft. Yet, fixed-wing aircraft have shown, in every conflict and under the heaviest hostile fire, the capability to effectively attack any target without incurring disasterous losses. It is doubtful that any future conflict will have such a low ground fire threat as has been the case in South Vietnam, but this is the period in which the Cheyenne is being proposed as an effective CAS vehicle. The only feasible solution is to cancel the Cheyenne before any more of our scarce general purpose force funds are wasted. The funds already expended in the research and development are not a total loss due to the technological and operational knowledge gained.

The proposed A-X is the best aircraft. The specific CAS requirements of the Army have been utilized in designing the A-X, and its ability to meet these requirements have already been discussed in detail. Our general purpose forces must have an effective CAS aircraft in sufficient number to fulfill our National objectives, and the A-X is that aircraft.

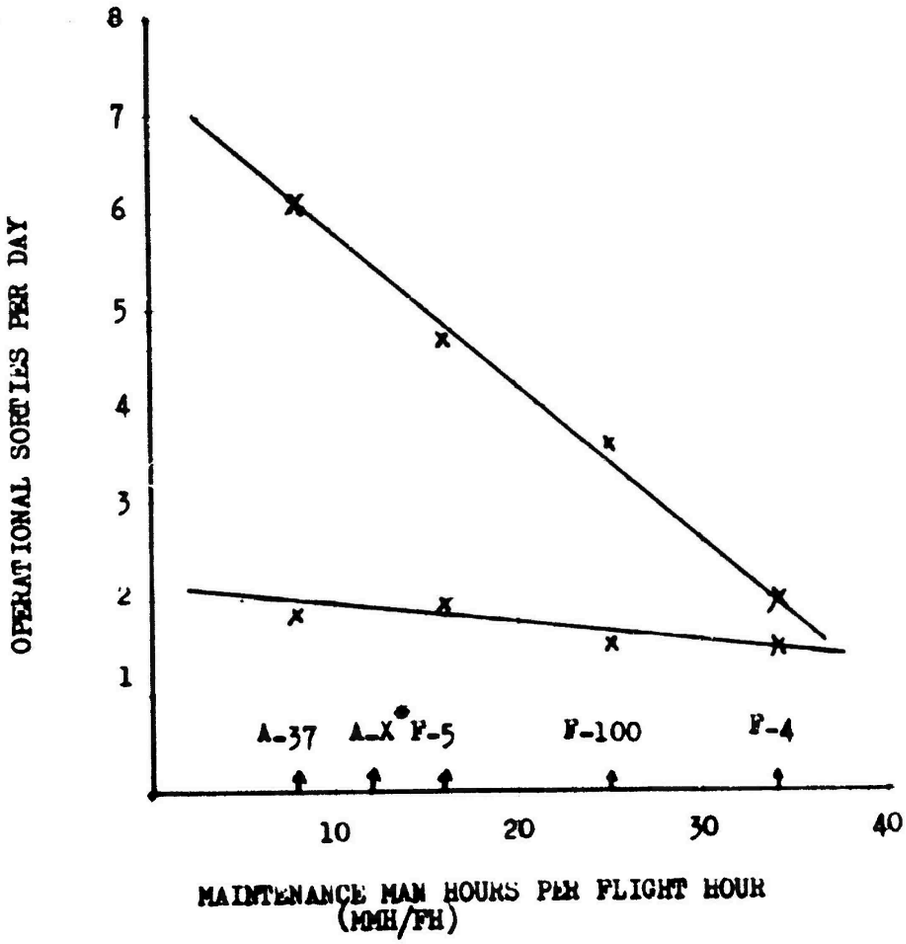
JAMES E. DANIEL, JR.
Lieutenant Colonel, USA

TABLE # 2

PEAK AND SUSTAINED SORTIE RATE VERSUS
AIRCRAFT MAINTENANCE REQUIREMENTS

NOTE:

MMH/FH ARE THEATER AVERAGE AND
INCLUDE ORGANIZATIONAL AND FIELD
LEVEL MAINTENANCE



* EXPECTED

SELECTED BIBLIOGRAPHY

1. US Congress, House, Committee on Appropriations, Subcommittee on Department of Defense Appropriations for 1972. 92nd Cong., 1st sess., 1971, Washington: US Government Printing Office, 1972, pp. 425. (UA23A5 1972aP7.5)

2. Parker, William D. A Concise History of the U. S. Marine Corps, 1775-1969. Headquarters United States Marine Corps, Historical Division, Washington, D. C., 1970, pp. 56, (UE-23 A451).

3. United States Air Forces Fact Sheet, Tactical Air Power, Secretary of the Air Force, Office of Information, Internal Information Division, Washington, D. C., 1-66, pp-4.

4. Ibid.

5. Ibid.

6. Ibid.

7. Ibid.

8. Ibid. pp-5.

9. Ibid. pp-1.

10. Ibid.

11. Ibid.

12. "Seamans Details SEA Reductions", Air Force Times, (Washington, D. C.) December 29, 1971, pp-9.

13. United States Air Force Fact Sheet, Tactical Air Power, pp-1.

14. US Congress, Senate, Senators William Proxmire and Charles Mathias issued a report on the AX, Harrier and Cheyenne close support aircraft. 92nd Cong., 1st sess., Sep. 16, 1971. Congressional Record, pp-E-9697.

15. US Congress. Senate. Committee on Armed Services, Air Force Programs A-X, Hearings, before an Ad Hoc Subcommittee on Armed Services, United States Senate, on S. 939 (H.R. 8687), 92nd Cong., 1st sess., 1971, pp-3872. Washington: US Government Printing Office, 1972. (UA23.3 A-67 1971c Pt.5 C.2)

16. US Department of Air Force. The Role of Fighter-Type Aircraft in Limited War, Supplement to the Air Force Policy Letter For Commanders, number 11-1967, pp-20.

17. US Congress. Senate. Air Force Programs A-X, Hearings, pp-3852.

18. Ibid.

19. Ibid. pp-3867.

20. Ibid. pp-3853.

21. Ibid.

22. Ibid. pp-3866.

23. Ibid.

24. Ibid.

25. US Congress. House. Committee on Appropriations, Subcommittee on Department of Defense Appropriations for 1972, pp-1021.

26. US Congress. Senate. Committee on Armed Services, Air Force Programs A-X, Hearings, pp-3855.

27. US Congress. House. Report on Close Support Aircraft: The A-X, Harrier, and Cheyenne, pp-[illegible].

28. Ibid.

29. US Congess. Senate. Air Force Programs A-X, Hearings, pp-3861.

30. US Congress. House. Report on Close Support Aircraft: The A-X, Harrier, and Cheyenne, pp-[illegible].

31. US Congress. Senate. Air Force Programs A-X. Hearings, pp-3857.

32. Ibid. pp-3861.

33. Ibid. pp-3863.

34. Ibid.

35. Ibid. pp-3875.

36. US Congress. House. Report on Close Support Aircraft: The A-X, Harrier, and Cheyenne, pp-{9698.

37. US Congress. Senate. Air Force Programs A-X. Hearings, pp-3859.

38. Ibid. pp-3856.

39. Ibid.

40. Ibid.

41. Ibid. pp-3863.

42. Ibid. pp-3860.

43. Ibid.

44. Ibid.

45. Ibid. pp-3861.

46. Ibid.

47. Ryan, John D., General, USAF, Presentation to the Committee on Armed Services United States Senate, Air Force Request for Authorization, Posture statement presented to the 92nd Cong., 1st sess., 1971, pp-22. (not yet published by US Senate)

48. US Congress. House. Report on Close Support Aircraft: The A-X, Harrier, and Cheyenne, pp-{9704.

49. US Congress. House. Subcomitte on Department of Defense Appropriations for 1972, pp-424-430.

50. Ibid.

51. US Congress. House. Report on Close Support Aircraft: The A-X, Harrier, and Cheyenne, pp-E9703.

52. Ibid. pp-E9700.

53. Ibid.

54. Ibid. pp-E9698.

55. US Congress. House. Subcommitte on Department of Defense Appropriations for 1972, pp-306.

56. US Congress. Senate. Air Force Programs A-X, Hearings, pp-3865.

57. Ibid. pp-3871.

58. US Congress. House. Subcommitte on Department of Defense Appropriations for 1972, pp-430.