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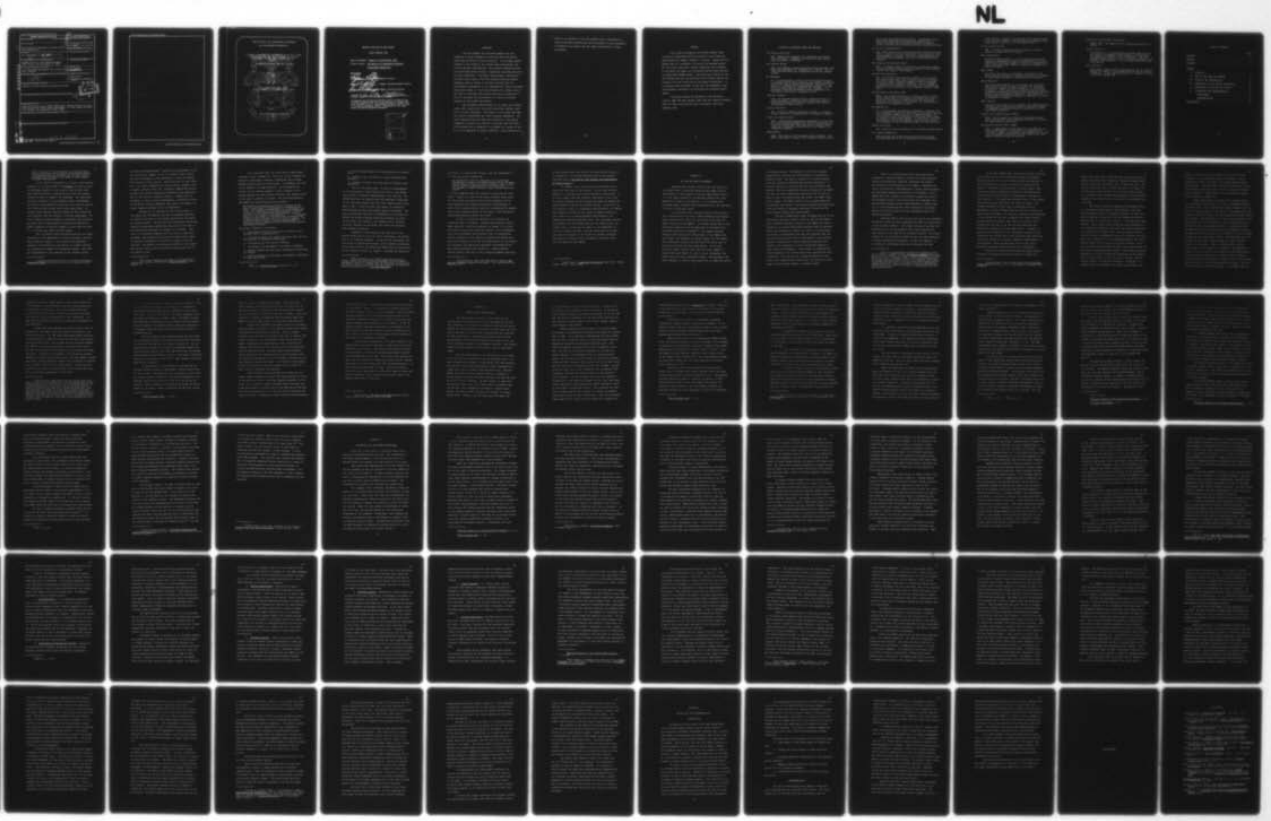

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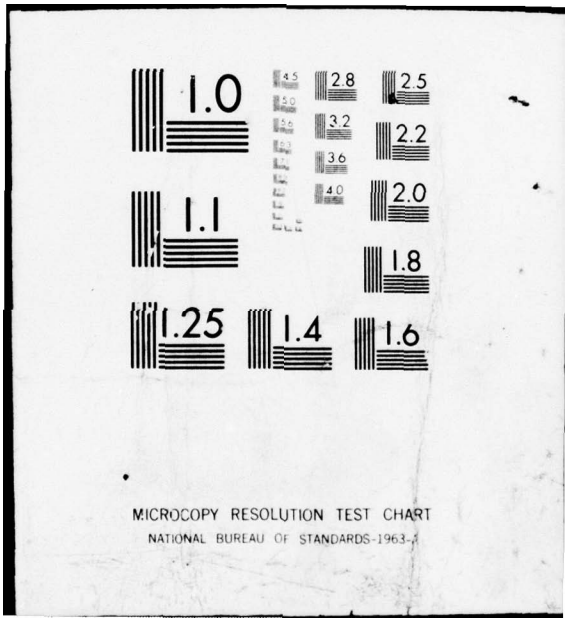
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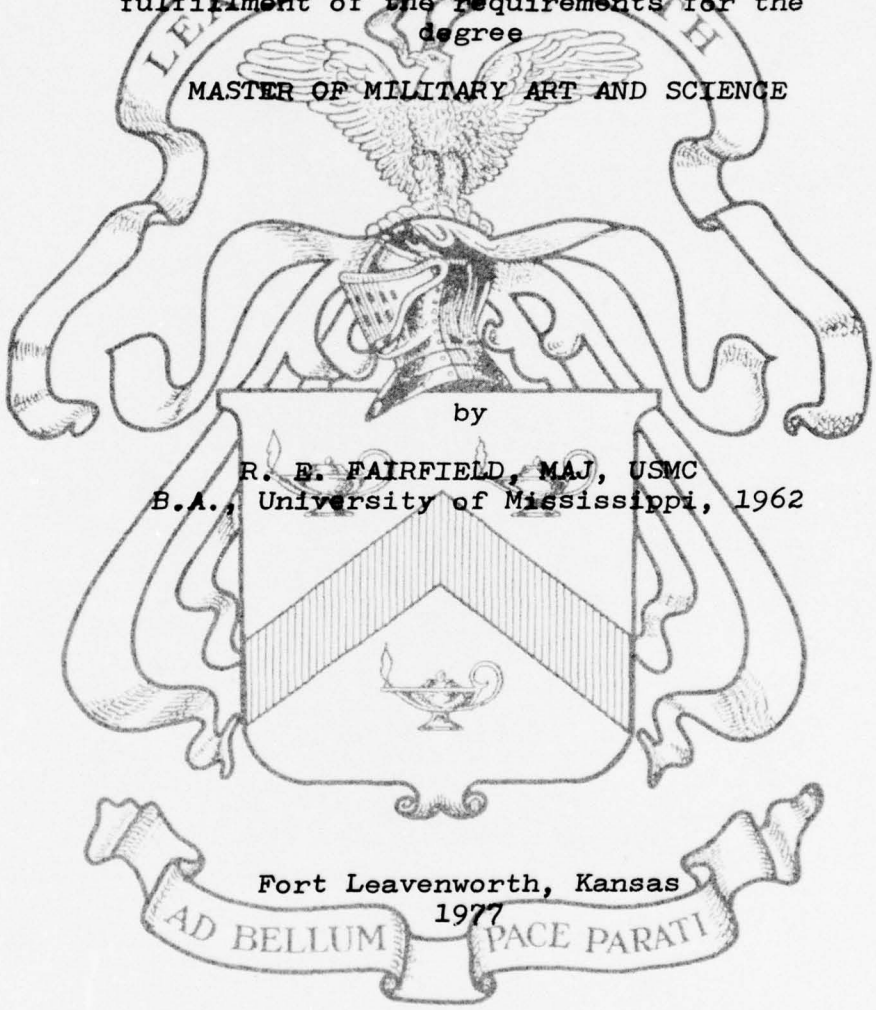

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The opinions and conclusions expressed herein are those of the individual student author and do not necessarily represent the views of either the U. S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

The 1973 Mideast War provided insight into the lethality of modern weapons systems with which the United States may be faced in future conflicts. Of the many lessons learned in the conflict, two lessons have particularly important military implications. New infantry weapons provide the individual ground soldier a significant antitank and antiaircraft capability. The small, man-portable, antiaircraft missiles, when coupled with more sophisticated air defense weaponry, poise a threat to tactical aircraft which is historically unsurpassed in its implications. This study ~~will~~ addresses the nature of the Soviet-oriented air defense threat and seeks to determine those areas which must be explored in order to increase the survivability of tactical aircraft employed on the modern battlefield.

The increased effectiveness of the Soviet air defense system when coupled with the Soviet electronic warfare capability is also discussed. This aspect of the threat may make the current, centralized air control system infeasible. The study concludes that the TACA can contribute to the ground commander's mission in a variety of ways and that the TACA's effectiveness can be enhanced if we expand our concept of how he is to be employed in future conflicts. This conclusion is

based on an analysis of the 1973 Mideast War, a discussion of Soviet doctrinal publications, and an analysis of the principles of offensive air support and the TACAs contribution to those principles.

PREFACE

This study investigates the current Marine Corps doctrine for employing tactical aircraft in the Close Air Support/Deep Air Support (CAS/DAS) missions. Using the 1973 Mideast War as a precedent, the Soviet air defense system and the Soviet electronic warfare capability are discussed to determine the impact on the present Marine Corps doctrine for employing CAS/DAS assets. The historical lessons of the 1973 Mideast War and the perceived Soviet threat require the presence of an air tactician on the modern battlefield. It is proposed that the TACA, if his role were expanded, could significantly contribute to countering the potential enemy threat.

My sincere thanks are extended to LTC William E. Loftus, USMC, MAJ Dave Skaggs, USAR, and MAJ "Pepper" Shlenker, USA, for their constructive advice throughout this past academic year.

GLOSSARY OF SELECTED TERMS AND WEAPONS

Air Defense Artillery

ADA. Weapons and equipment for combating air targets from the ground. Normally associated with gun systems only; exclusive of missiles.

Air Defense System

ADS. All weapons, including surface-to-air missiles, and associated equipment for combating air targets. Can include aircraft which are integrated into an air defense system.

A4 (Skyhawk)

A4. A single-engine, turbojet attack aircraft designed to operate from aircraft carriers, and capable of delivering nuclear and/or non-nuclear weapons, providing troop support, or conducting reconnaissance missions. It can act as a tanker and can itself be air refueled. It possesses a limited all-weather attack capability, and can operate from short, unprepared fields.

Close Air Support

CAS. Air attacks against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces.

Cluster Bomb Unit

CBU. Groups of bomblets released together. A cluster usually consists of fragmentation or incendiary bomblets.

Direct Air Support Center

DASC. A subordinate operational component of a tactical air control system designed for control and direction of close air support and other tactical air support operations and is normally collocated with fire support coordination elements.

EA6A Prowler

EA6A. ECM version of A6 Intruder attack aircraft. The EA6A is designed to operate from aircraft carriers and is

one of the most advanced EW aircraft. In addition to its impressive range and station-keeping capabilities, it mounts more than thirty different antennae to detect, locate, classify and jam enemy electronic radiation devices.

Electronic Countermeasures

ECM. That division of electronic warfare involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. Electronic Countermeasures include electronic jamming, deception, and counter-countermeasures.

Fire Support Coordination Center

FSCC. A single location in which are centralized communications facilities and personnel incident to the coordination of all forms of fire support.

Forward Air Controller

FAC. An officer (aviator/pilot) member of the tactical air control party who, from a forward ground or airborne position controls aircraft engaged in close air support of ground troops. FAC(A) is commonly used to designate the Forward Air Controller (Airborne). If the FAC(A) is airborne in a jet aircraft, he is commonly called a "FAST FAC."

Forward Edge of the Battle Area

FEBA. The foremost limits of a series of areas in which ground combat units are deployed, excluding the areas in which the covering or screening forces are operating, designated to coordinate fire support, the positioning of forces, or the maneuver of units.

F4 (Phantom II)

F4. A twin-engine, all-weather, supersonic, two-place jet fighter/bomber designed for operating from aircraft carriers for interception and destruction of enemy aircraft, for troop support, and the delivery of relatively heavy loads of nuclear or non-nuclear weapons, in addition to carrying four Sparrow IIIs or Sidewinders. This aircraft can be air refueled, or carry a tanker package for other aircraft.

Israeli Air Force

IAF. The air service component of the Israeli Defense Force.

Kelt (NATO designation)

Kelt missiles are large bomber-carried air-to-surface missiles employed by Soviet equipped air forces against

point targets. Capable of being armed with either nuclear or non-nuclear warheads, Kelt missiles were launched from TU-16 Badger aircraft in the 1973 Mideast War.

Surface-to-Air Missile

SAM. A surface launched missile designed to operate against a target above the surface.

SAM-2 (Guideline)

The Soviet SA-2 Guideline is a two-stage guided missile capable of engaging air targets at altitudes up to eighty thousand feet at slant ranges of forty-five kilometers or less. The radar-guided SAM-2 is ineffective against low-altitude targets.

SAM-3 (GOA)

The Soviet SA-3 Goa is a two-stage, solid-fuel, radar guided missile designed to engage low-altitude air targets at slant ranges between six and twenty-two kilometers.

SAM-6 (Gainful)

The Soviet SA-6 Gainful is a relatively new solid-fuel, radar guided missile designed to engage low to medium altitude air targets at slant ranges out to thirty-five kilometers. Three missiles are normally mounted aboard a tracked vehicle which provides this weapon with excellent mobility and redeployment capability. The SAM-6 uses sophisticated tracking and guidance technology which makes it difficult to counter.

SAM-7 (Grail)

The Soviet SA-7 Grail is an infrared, heat seeking missile, launched from a man-portable hand-held launcher capable of engaging low-altitude targets at ranges out to three and a half kilometers.

Tactical Air Command Center (USMC)

TACC. The principal air operations installation from which all aircraft and air warning functions of tactical air operations are controlled.

Tactical Air Control Party (USMC)

TACP. A subordinate control agency of the USMC air control system organic or attached to the landing force division, brigade, or battalion, and designed for the control of aircraft conducting close air support and other support missions as may be required.

Tactical Air Coordinator (Airborne)

TAC(A) USMC. See Chapter I for detailed description of duties.

ZSU-23-4 (Soviet)

The ZSU-23-4 is a self-propelled (tracked) 23mm gun system capable of engaging ground targets or low-altitude air targets at a range of three kilometers. The quad-barrelled weapon has excellent cross-country mobility, and utilizes self-contained radar for target acquisition and fire control.

ZU-23 (Soviet)

This light, towed, automatic antiaircraft gun is effective against air targets at a maximum range of two and a half kilometers. It was employed against the Israeli Air Force in the 1973 Mideast War.

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CHAPTER I

OVERVIEW

The increasing effectiveness of air defense systems in recent years has imposed serious constraints on the employment of close air support on the modern battlefield. Although the 1973 Mideast War is most commonly cited as the principal example of this situation, the increase in air defense effectiveness has, in fact, been evolving for many years. Admittedly, the past seven years have been particularly significant in terms of technological improvements in air defense weaponry. Military planners, especially those in the Soviet Union, are rapidly closing the gap which exists, (or existed), between aircraft technology and the applied technology of air defense weaponry. Some distinguished observers of the 1973 Mideast War have stated that in view of the modern Soviet air defense threat, it is highly unlikely and/or economically impracticable to employ close air support on the modern battlefield. These observers may be right, but if they are, then two obvious consequences would be: (1) We will fight the first battle of the next conventional war against a Soviet-oriented Force which possesses overwhelming numerical superiority in ground weaponry of all types; and, (2) We will be unable to employ the single, most formidable, means of firepower, the aircraft,

against the enemy first echelon maneuver forces. The only tactical situation worse than this would be one in which the enemy denied us the use of airpower and used their own air assets in the close air support role. Although this presently seems to be against his current doctrine, he is developing aircraft with an ever-increasing capability to exploit this situation.

The question of whether or not we can employ close air support against an enemy with modern air defense weaponry will not be answered on paper. It is also suggested that the Israeli Air Force experience in the 1973 Mideast War is not a completely valid prediction of our own air capabilities. This will be discussed later in this thesis. The philosophy currently expressed at the U.S. Army Command and General Staff College--"Don't depend totally on close air support"--is a healthy philosophy to follow. However, we must not cease or diminish our efforts to find the means, technologically and tactically, to defeat the Soviet air defense systems. In a recent article which compared American and Soviet defense technology, Dr. Malcolm R. Currie, Director of Defense Research and Engineering, observed:

> It is not clear how these technologies will influence the offense-defense balance; however our assessment is that the nation which exploits them more imaginatively and deploys them aggressively will gain enormous advantage. At present, we believe that the United States has the initiative in several areas, including precision-guided ordnance, battlefield target acquisition, remotely piloted vehicles (RPVs) and tactical airpower;

> while the Soviets have leadership in several others, such as artillery, ocean surface surveillance, battlefield mobility and air defense, and tactical cruise missiles--and the Soviets are ahead in sheer numbers in almost everything.[1]

If Dr. Currie's assessment is correct, that tactical airpower is the only element of firepower in which we enjoy an advantage relative to the Soviets, then we must exert every possible effort to defeating the Soviet air defense systems in order to exploit our advantage. The importance which one attaches to this challenge varies considerably. An officer in an Armored Division may view close air support as a "nice-to-have option" when facing enemy armor. An officer in an Infantry Division facing the same threat may well consider close air support a critical requirement. To a U.S. Marine Division, because it possesses less artillery and armor than an Army Infantry Division, the ability to employ airpower in close air support is more than critical, it is a factor upon which survival hinges.

The U.S. Marine Corps has always attached the utmost importance to the employment of tactical airpower, particularly close air support. The success of an amphibious operation is predicated on the ability to conduct tactical air operations in support of the ground element. This fact was instrumental in the evolution of the current concept

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[1] "Comparing American and Soviet Defense Technology," Commanders Digest, Vol. 19, No. 13, p. 12, June 17, 1976.

the Marine Air-Ground Team.[2] Because high performance tactical aircraft are organic to the U.S. Marine Corps, certain important advantages in the employment of close air support have accrued to this service. Those pertinent to this thesis are: (1) Total integration of ground and air elements into a single, cohesive force; (2) Excellent command and control systems which permit exceptional flexibility and responsiveness to the tactical situation; and (3) Perhaps most importantly in view of recent developments, a perspective within the Marine aviation community that places the support of ground elements foremost in all circumstances.

Somewhere in or implied by these three factors is the reason that the Marine Corps may be uniquely qualified to pioneer a solution to the threat presented by the Soviet air defense system. The Tactical Air Coordinator (Airborne), hereafter abbreviated TAC(A), may well play a vital role in penetrating and defeating the enemy's air defenses. This thesis is concerned primarily with the tactics, munitions, equipment, and training which tactical aviation must employ to maximize utilization of airpower in support of ground elements. The TAC(A), as an on-scene element of the command and control system, will be directly concerned with all of the factors cited.

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[2]For a more complete discussion of the Marine Air-Ground Team Concept, see FMFM 5-1, Marine Aviation, 1976, Chapter 1.

It is essential that the reader have a clear understanding of what a TAC(A) is. First, he is not a Forward Air Controller (Airborne), although a TAC(A) may have several FAC(A)s working under his supervision. To summarize the role of the TAC(A) in a single sentence: He coordinates and directs the air assets assigned to him in support of the ground elements and also controls indirect fire support means of all types to destroy the enemy. The following excerpts from FMFM 5-1, Marine Aviation are provided:

> The TAC(A) is an experienced aviator airborne in the area of operations in a helicopter or fixed-wing aircraft. His primary responsibility is to coordinate and direct the activities of aircraft assigned to him and to report to the appropriate ground and air control agencies in his area of responsibility . . . A secondary mission of the TAC(A) is the detection and destruction of enemy targets through close or deep air support. The TAC(A) should also have a thorough understanding of supporting arms coordination and artillery/naval gunfire spotting procedures.[3]

According to FMFM 5-1, the TAC(A):

a. Coordinates the activities of all aircraft in his assigned area of responsibility.

b. Coordinates direct air support missions with the fire and maneuver of friendly ground units.

c. Coordinates the activities of FAC(A)s.

d. Coordinates the assignment of aircraft to FAC(A)s.

e. Advises FAC(A)s and Helicopter Coordinators (Airborne) of weather.

f. Advises FAC(A)s and Helicopter Coordinators (Airborne) of enemy operations.

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[3]FMFM 5-1, Marine Aviation, Chapter 2, p. 78.

g. Detects enemy targets for neutralization or destruction.

h. Controls close and deep air support missions when directed.

i. Controls artillery and naval gunfire missions when required.[4]

Just as the ground commander must be knowledgeable in the principles of land warfare and tactics, the TAC(A) must possess a thorough understanding of air tactics. The TAC(A) must know the capabilities and employment techniques of the tactical aircraft and other fire support means available to him. During the past five years, air delivered munitions have become increasingly complex and lethal. The base of knowledge requisite to designation of an aviator as TAC(A) has become extremely large and technical in nature. On the "plus" side however, the capabilities of tactical aviation, assuming we can defeat the Soviet air defenses, have expanded enormously.

Initially, it was expected that the role of the Marine TAC(A) and his U.S. Air Force counterpart, the FAC(A), were to be examined together. It was quickly determined that this would be impractical because of the inherent differences in both the roles of the TAC(A) and FAC(A) and the differences in the concept of close air support. Although the following

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[4]From experience, the TAC(A) supports the ground element anyway he can--including assuming control of ground elements to assist in linking them up with their parent units. The TAC(A) rating is probably the most difficult to obtain in Marine aviation and it is <u>not rank dependent</u>.

quotation is of Korean War vintage, from all indications it is still an accurate comparison:

> To the Marines, close is considered to be that area immediately in front of friendly troops--50 to 100 yards. The Air Force on the other hand considers close to mean within several thousand yards of the front line . . . the distance to which artillery pieces would effectively reach.[5]

It is not suggested that one concept is wrong and the other right. However, in view of the Soviet doctrine which calls for him to mass his forces within a few kilometers of the enemy defenses then disperse following a breakthrough, it seems that we should explore means of coordinating the employment of all firepower assets on the enemy at that lucrative opportunity--where he masses his forces.

In fact, it would be difficult to overstate the potential value of airpower. General Andre Beaufre, French Army, observes: that air firepower, by reason of its speed and range of action can intervene rapidly, with considerable power, and formidable effectiveness; that in conventional warfare, aviation is the weapon of powerful and mobile firepower; and finally, if one has air superiority, he can prevent his adversary from making any important concentrations and make daytime movements very difficult. General Beaufre further asserts that this is the situation normally exploited

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[5]CDR Malcolm W. Cogle and CDR Frank A. Manson, The Sea War in Korea (Annapolis, Maryland: U.S. Naval Institute, 1957), p. 73.

by the Israelis when they had put the Egyptian Air Force out of commission. He further maintains that in the instance described above, land battle then becomes the exploitation of aerial victory.[6]

In summary then, this overview has provided an insight into the scope of the problem. We must use tactical airpower to overcome Soviet ground numerical superiority. If we are to employ tactical aircraft, especially in the close air support mission, we must develop the means to degrade the effectiveness of Soviet air defense systems. In his role as the on-scene element of coordination and direction, the TAC(A) must employ air assets in the close air support mission in such a way so as to ensure maximum effectiveness of air resources at minimum acceptable risk. The following chapters will address the 1973 Mideast War and its implications; the current Soviet threat and its impact on the employment of close air support aircraft; and some areas open to us which may provide solutions to the Soviet air defense challenge. These areas of analysis will be primarily directed toward the role played by the TAC(A).

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[6]Andre Beaufre, Strategy for Tomorrow (New York: Crane, Russak and Co., Inc., 1974).

CHAPTER II

THE IAF AND ARAB AIR DEFENSE

Although Andre Beaufre asserted that the success of the Israeli Army in previous conflicts had simply been an exploitation of the Israeli Air Forces (IAF) aerial victory, it is not known whether or not President Nasser ever read Beaufre's writings on the subject. It is apparent that President Nasser realized that neutralization of the IAF would be vital in defeating Israel.

On 22 January 1970, President Nasser visited Moscow and in discussions with Soviet leaders Podgorny and Kosygin, Nasser expressed his view that the threat of the IAF left Egypt "unprotected and naked." He further stated that it was absolutely essential that the Egyptians be provided with a "suitable system of air defense." This remark provoked Brezhnev into arguing the effectiveness of the SAM-2s with which Egypt was equipped, but Nasser argued that the SAM-2s were ineffective against aircraft below 500 meters and not much better between 500 and 1,000 meters. In the end, President Nasser won his case, and the Soviets agreed to supply sufficient SAM-3s to protect Cairo, Alexandria, the canal front, and other vulnerable areas. This agreement was later expanded to provide large quantities of SAM-6 and ZSU-23

air defense weapons. The addition of these two weapons significantly increased the effectiveness of the Arab Air Defense system. The SAM-6 is mounted on a tracked vehicle which has excellent rough-terrain crossing capability. It could be deployed to fill the gaps left by less mobile SAM systems. The most significant problem presented by the SAM-6 was that the radar frequencies associated with it were unknown to both the United States and Israel; the SAM-6 could not be jammed. The ZSU-23 proved to be a highly effective low-altitude gun system. Arab forces deployed them expertly--along air avenues of approach previously utilized by IAF pilots flying low-altitude penetrations.

The real dilemma which faced the Egyptians was in the additional training of missile crews to man the new SAM-3s. Even if crewmen presently trained on the SAM-2s were used, a minimum of six months additional training would be required. Nasser was unwilling to expose his cities to an additional six months of harassing by the IAF, and requested that the Soviets provide missile crews to man SAM-3s in the interior regions. Although the Soviets eventually approved this request, they considered it one of sufficient gravity to place before the Politburo. Never before in peacetime had twelve Marshals of the Soviet Union been consulted for such a decision. This was but one of many indications in the months that followed which reveal that the Soviets are well aware of the American resolve to support Israel.

There is a second factor which caused the Soviet hesitancy in approving Nasser's request for their missiles. During the Vietnam War, American technology had swiftly neutralized the effectiveness of the SAM-2s. American successes in electronic countermeasures to defeat these missiles and associated weaponry had startled the Russians. If the SAM-3s and other systems were provided to Egypt and used in the upcoming conflict, the Soviets knew that American technology could quickly develop countermeasures to defeat them. It is a safe speculation that this realization was weighed almost as heavily as the political consequences which the Soviets perceived.[1]

President Nasser had won his point and he now possessed the means by which he could challenge the IAF's air superiority in the upcoming conflict. The Soviet decision to provide the missiles was one of two elements which would threaten the very survival of the IAF in the upcoming conflict. The second element was the decision by Israel to deny the IAF permission to conduct preemptive airstrikes. Of the two elements, it is difficult to determine which most threatened the IAF.

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[1]Most of the historical information presented above can be found in Mohamed Heikal, The Road to Ramadan (New York: Times Book Co., 1975), pp. 83-90. Heikal accompanied President Nasser to Moscow in January 1970 for the missile conference. In reading and analyzing his book, it is probable that Heikal, and perhaps Nasser as well, did not appreciate technological reasons behind the Soviet reluctance to provide advanced air defense missilery, that is the fear of compromising the weapons effectiveness.

In the 1967 Mideast War, Israel had received criticism from certain nations for conducting preemptive airstrikes. Many governments of the United Nations questioned whether or not war would have occurred if Israel had "shown more restraint." Moreover, the government of Israel's major ally, the United States, repeatedly attempted to dissuade Israel "from any action which could be interpreted as causing the next conflict." If Israel were attacked first, it was argued, then world opinion would favor the cause of Israel. The primary proponents of this line of reasoning were U.S. Ambassador to Israel, Kenneth Keating, and U.S. Secretary of State, Henry Kissinger. In fact, Mr. Kissinger, upon learning of the outbreak of the war, telephoned the Israeli Foreign Minister Eban and stated: "Mr. Eban, this minute I got a message from the CIA to say that war has begun and that battles are raging on the Suez Canal front. I suppose it wasn't you who began it?"[2] Mr. Kissinger retained his misconception for several hours, even asserting that Israel had started the attack in a message released to King Faisal of Saudi Arabia. Since the King knew "who bit who first," Kissinger's message must have amused him considerably.

Because the United States influenced Israel against preemptive airstrikes, the combat losses to Israel were

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[2]Insight Team of the London, Sunday Times, The Yom Kippur War (Garden City, N.Y.: Doubleday and Company, 1974), p. 129.

higher than those which would have been experienced had preemptive airstrikes been conducted. Because of heavy combat losses, Israel came extremely close to losing the war. One can only speculate, but if Israel had lost or if major U.S. military units were required to prevent an Israeli defeat, it is probable that the American government's advice against preemptive airstrikes would be viewed with considerably more criticism.

The Israeli Air Force Commander, MG Benjamin Peled, is a dedicated professional of world reknown. His very professionalism makes it extremely difficult for those who want to analyze the events of the 1973 Mideast air battle; MG Peled has not written much about it. Two facts are clear, however. First, Peled fully recognized the consequences of not conducting preemptive airstrikes and argued persuasively for permission to conduct them. Second, despite the fact that the Israeli intelligence Service was deceived initially about the outbreak of war and subsequently about the time of attack, Peled was not deceived in either instance. On his own initiative, Peled placed the IAF on full alert almost two days before mobilization was ordered. When Peled was denied permission to conduct preemptive airstrikes, he was assured that "a major portion of the first day's sorties could be utilized against the Arab air defenses." Although it is probable that this assurance was given in good faith, the

combat situation during the first two days did not permit employment of the IAF against Arab air defenses. No one realized how sudden and massive the threat against Israel would develop. The IAF's main efforts for the first two days on both Arab fronts were flown in direct support of Israeli ground elements. During that period, the Arab air defense system extracted a heavy toll.

Before discussing the events which occurred during the 1973 Mideast air battle, it is best to summarize Israeli aircraft losses. This provides an excellent insight into the specific time and nature of the threat. Although sources vary slightly, Israel lost more than 102 fixed-wing aircraft during the conflict. Approximately 50 of these were destroyed in the first three days of the conflict, a period during which the IAF flew very few anti-missile sorties. Although the Arab ground-to-air missile systems met with considerable success, the Egyptian Air Force, which is an element of its air defense system, met with disastrous failure. The Egyptians lost 172 aircraft in air-to-air combat compared to only 5 Israeli losses in this manner. This is a loss-to-kill ratio of better than 1:34 in favor of the Israelis. (As compared to a ratio of 1:5 in favor of the Israelis in the Six-Day War.) If the air-to-air losses on the Israeli side are deducted from the total aircraft losses, a figure of 97 to 103 aircraft can be credited to the Arab ground-to-air systems. Since 80 of these losses occurred over Golan, it is evident that the

Syrians used their new Soviet antiaircraft weaponry more effectively than did the Egyptians. Unfortunately, little information is available on Syrian air defense tactics. Most of the Israeli aircraft shot down were engaged in close support of the ground forces; half were downed by antiaircraft missiles, the remaining half by conventional antiaircraft guns. A significant weakness in the Arab air defense system was revealed in target identification. The Arabs shot down approximately 100 Israeli aircraft and 58 of their own.

Although the IAF was initially committed to action on the Sinai front, the lethality of the Arab air defenses in Golan was far greater. Very little has been published to date about the nature of the air battle over Golan, so much of the following discussion will be speculation.

From a map study of the Golan, it is readily apparent that the terrain is nearly ideal for air defense. There are very few terrain features which provide concealment for air avenues of approach. Where these existed, the IAF used them expertly. The Syrians had learned their lessons well under Soviet tutelage. The three armored forces which entered the Golan against the Israeli's were accompanied by a mix of air defense weaponry which included the SA-7 Strella (man-portable missile), the ZSU-23 (quad-barrelled, self-propelled anti-aircraft gun), and the SAM-6 (a missile effective against low and medium flying aircraft mounted on a self-propelled tracked chassis).

Two primary factors combined to cause the awesome losses experienced initially by the IAF in Golan. First, the IAF had no effective electronic countermeasures to defeat the SAM-6. Without adequate countermeasures, an aviator could only rely upon evasive maneuvers to elude the missiles. Evasive maneuvering was countered by the Arabs on both fronts by launching several SAM-6 missiles simultaneously at single aircraft, and this multiplied the lethality of this system. The SAM-6s forced the IAF to penetrate Arab defenses at low altitudes where they faced the extremely effective ZSU-23s and Strellas. Second, once an aviator penetrated this deadly umbrella at low altitude, he had to climb to altitude, enter a dive, and release his ordnance. He was once again exposed to all the elements of the air defense system, an easy target during the delivery phase of the attack. The IAF had only small quantities of "retarded" munitions which could be delivered low and fast.

During interviews with Israeli officers and NATO observers who witnessed IAF attacks against the Arab air defense system, it was repeatedly stated that the sight of several SAM-6s launched against individual aircraft made ground commanders reluctant to request air support. Nevertheless, the IAF did not slacken the pace and during this war and flew four times as many sorties as in 1967. Moreover, each time a Syrian ground commander moved out from under his air defense umbrella, the IAF attacked him, with

devastating results. When Israeli ground forces slowed the Syrian advance, the IAF attacked specific missile batteries and breached the umbrella. Most sources agree that this occurred on the third day of battle on the Golan front and the aircraft loss rate substantiates this conclusion. The loss rate per hundred sorties after this period decreased by more than half.[3]

During the Golan campaign the IAF discovered that the launcher for the SAM-6 could not elevate the missile to the vertical position. The IAF began approaching SAM-6 batteries at high altitudes, entering a near vertical dive, and destroying the missile sites. The Syrians had not positioned SAM-2s and SAM-3s in sufficient quantities to counter this tactic nor was the Syrian Air Force effective in protecting the SAM-6 batteries. Following the collapse of the Syrian air defense umbrella, the IAF struck Syrian ground units and ranged throughout Syria, bombing strategic targets which included oil facilities, bridges, airfields, and power plants. When Syria committed the air force to defend itself, 222 aircraft were lost, 162 in air-to-air engagements with the IAF.

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[3]There are few published statistics in aircraft loss rates during the 1973 Mideast War. By consolidating data from several sources, the loss rate in the first three days on the conflict approximates 8 aircraft lost per hundred sorties. (Twice the rate of the 1967 war.) After the third day, when the IAF began in earnest to attack Arab missile batteries, the loss rate fell well below that experienced in the 1967 war. Edward N. Luttwak, former Deputy Director of the Middle East Study Group, has fixed the IAF losses at 99 aircraft for 7,272 sorties. This indicates a loss rate of one aircraft per 73.5 sorties flown.

In contrast to the limited information published about the air battle over Golan, a great deal of information is available concerning tactical air operations in the Sinai/ Suez areas. Prior to the start of the Sinai campaign, Egypt possessed 150 batteries of SAM-2, SAM-3, and SAM-6 missiles. Approximately three-quarters of this number were the highly effective SAM-6s. Each SAM-6 battery mounted 12 missiles on 4 launching vehicles; after firing the launchers could be reloaded rapidly.

The air defense system deployed along the Suez Canal was exceptionally dense, with over 50 SAM batteries covering the 100 mile frontage from Port Said to Suez City. The air defense system deployed to protect the Egyptian advance into Sinai was more dense in this area than the Soviet air defense system deployed around Moscow in 1973. The number of missiles fired by the Egyptians in the first 3 days equalled the total NATO stocks in Europe.[4]

In analyzing the effectiveness of the Egyptian air defenses deployed along the Suez Canal, several factors must be kept in mind: The Egyptians did not attempt to move their air defense system, therefore, there was no degradation from movement which may have been the case with the Syrian air defenses. Egypt deployed its missile sites along the entire length of the canal, thereby precluding the IAF from using a

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[4] The Yom Kippur War., p. 189.

mass air attack to defeat the umbrella. (The first IAF strike against the Egyptian ground forces in Sinai cost the IAF four aircraft.) Terrain in the Suez Canal area offered no more protection to aircraft than that in Golan. Unlike the situation in Golan, the Egyptians had sufficient SAM-2s and SAM-3s to counter IAF attacks initiated from high altitude.

Despite the extremely formidable aspects of the Egyptian AD system, the pilots of the IAF had learned some lessons in Golan which were to prove decisive. The two primary missions given the IAF on the Sinai front were to support the ground forces and cut the Egyptian bridges across the Suez Canal. Fulfilling the requirements of the second mission demanded that IAF pilots fly directly into the sophisticated Arab air defense system. Although these efforts appeared futile during the war, Egyptian sources later revealed that the IAF had successfully cut all 15 bridges, however each had been repaired rapidly afterwards. The threat of IAF bombing forced the Egyptians to use the bridges only at night for major items of equipment and supplies.

Exact aircraft losses between 6-17 October are unknown, however research indicates that approximately 20 Israeli aircraft were lost in the Sinai campaign compared to 80 in Golan. On 17 October, Israeli Generals Sharon and Adan tore a gap approximately 15 miles wide in the Egyptian AD umbrella. With this corridor open to it, the IAF swiftly destroyed the enemy AD system. Undoubtedly, Israeli ground forces prevented

higher IAF loss rates through their seizure of the west bank of Suez Canal. However, the assistance actually rendered to the IAF by ground forces is often overstated. This is evident when one remembers that the Egyptian missile sites at Port Said were completely destroyed by the IAF by 12 October and those at Kantava were destroyed by 14 October.[5] Of the 40 Egyptian missile batteries destroyed or neutralized on the Sinai front, the IAF was credited with 28, at least half of which were hit before the Israeli ground forces reached the west bank of the canal on 17 October.

The military consequences of the IAF's defeat of the Egyptian AD systems were immediate to Egypt and will not be discussed in this paper. The Soviets had assured the Arabs of the lethality of their AD systems--promising 97 percent effectiveness against the IAF. The Soviets then watched the IAF, with its limited air capability, destroy an air defense system which was more dense than that surrounding Moscow. It must have been unsettling for them. Because the Soviets "lost face" and compromised the secrets of some of their most advanced weaponry, their losses may ultimately prove to be greater than those of the Arabs.

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[5]Chaim Herzog, The War of Atonement (Boston, Mass.: Little, Brown and Company, 1975), pp. 260.

CHAPTER III

ANALYSIS AND OBSERVATIONS

The IAF had met the sophisticated system of air defense which the Soviets provided to the Arabs and the IAF had prevailed. To say that the Israelis "won" the air battle against the Arab AD would be incorrect in that they could ill-afford the loss of 115 aircraft, representing over one-fifth of their total force. The Arabs had started the war with approximately 800 aircraft and during the course of the conflict, received another 172 replacement aircraft. The Israelis downed 514 Arab aircraft during the war, most by air-to-air combat.

The real achievement of the IAF was not in its defeat of the air defense umbrella but in the following facts: Despite several Arab attempts to bomb Israel, the IAF prevented the Arab air forces from penetrating to their targets--not a single bomb fell on Israel during the entire war. When the Arabs, frustrated by their bombing efforts, attempted to strike targets in Israel with Kelt missiles, the IAF shot down 20 of the 25 Kelts launched. An Arab attempt to land helicopterborne troops deep in the Sinai ended in disaster when the IAF shot down 35 Egyptian helicopters. Despite heavy losses, the IAF provided continuous air support to Israeli ground units. Finally, the IAF raids deep into Egypt and

Syria throughout the war required the Arabs to devote their air forces to the defense of their territory. In consideration of these factors, one might argue whether or not the IAF beat the Arab air defenses, but the IAF without question won the overall air battle waged on both fronts against numerically superior Arab forces.

Before analyzing specific areas of the 1973 Mideast air battle, one additional observation concerning the conflict must be made: It is generally acknowledged that the Israeli Army was not a "balanced force" in that tank forces were not adequately supported by mechanized infantry units. This "lack of balance" of ground forces had its parallel in the IAF. The bulk of the aircraft possessed by the IAF were either fighters, (predominantly F4s), or attack aircraft, (A4s). At the onset of hostilities, the IAF had no sophisticated Electronic Warfare (EW) aircraft such as the EA6, which was used with such outstanding success over Vietnam. Israeli strike aircraft were totally dependent upon pod-mounted ECM equipment, and given the threat, there was very little of this equipment. It can be argued that since the guidance frequencies of the SAM-6 were unknown at the time, additional Israeli Electronic Counter-measures, (ECM), capability would not have been a significant factor. This overlooks the fact that the SAM-6 was but one element of a Soviet air defense system about which we know a great deal. There were numerous "weak links" which could have been exploited to degrade the

overall effectiveness of this integrated AD system. Since one of the objectives of this thesis is to produce it as an unclassified, working paper, the discussion of EW and ECM can go no further.

The IAF faced a classic technological challenge: tactical air support against integrated air defense. It is equally evident that in a technological sense, it was a battle between an electronically unsophisticated air force and a highly sophisticated Soviet AD system.

Many writers who cite the technological (ECM) problem which the IAF faced usually attribute the cause of the problem to the mood of overconfidence prevalent throughout the Israeli Defense Forces following the Israeli victory in 1967.[1] Overconfidence in their military capability was a factor which, on the Israeli side, contributed to the technological problem, but this factor alone does not fully explain the situation which developed in 1973.

Israel may have been satisfied with her military forces prior to October 1973; Egypt realized fully the extent of her defeat in 1967 and felt humiliated by it. The Egyptian military leadership sought to improve the quality of their forces and the events of the 1973 Mideast War reflect the success of their efforts. More importantly, however, the Egyptians studied the 1967 campaign, as well as the 1969-1970

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[1] The Yom Kippur War, p. 95.

War of Attrition. They catalogued Israeli tactics, particularly air tactics, and structured their doctrine to defeating Israel. From a military standpoint, one must admire the quantiative improvements which the Egyptian military leaders achieved within their forces. As a result of their efforts, Egyptian forces by 1973 possessed an improved capability in the following areas:[2]

1. Egyptian Air Defense forces could now fill the low-level gap which had existed in the 1967 War. Acquisition of a new family of AD systems coupled with the development of an extensive ground observer corps multiplied the threat to the IAF.

2. Both the mobility and density of AD systems on the battlefield were significantly increased. The SAM-6 and ZSU-23-4 systems were now mounted on tracked vehicles which greatly improved their effectiveness and areas of coverage. (In 1967, AD systems were either truck-mounted or towed.)

3. Innovative ideas to counter the IAF ground attack tactics and the limited IAF ECM capability were developed. For instance, during the 1967 War, the Egyptians observed IAF pilots flying down valleys in their approach to targets. This had offered the pilots the protection of terrain masking and high crossing rates. The Egyptians trained their air

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[2]"Both Sides of the Suez; Airpower in the Mideast," Aviation Week and Space Technology. Special Edition, 1975, pp. 16-19.

defense personnel to position SAM-6, SA-7, and ZSU-23 AD weapons in these air avenues of approach. The Egyptians also claim that they developed an electronic method to deceive Israeli pilots into believing that anti-air missiles had been launched at them. Attempts to prove or disprove this claim have failed.

4. Extensive hardening and camoflauging of all command and control facilities, including radar facilities, was undertaken. A number of dummy installations were built to deceive their opponents. The Egyptians stressed techniques which would prevent detection of the active facilities from the air and would minimize damage from air attacks if they did occur.

The four areas of improvement listed above do not encompass the full range of increased capabilities which the Egyptians achieved. They are those areas which most significantly impacted upon the air war.

Egypt was humiliated by Israel in 1967 and although Egypt was defeated in 1973, the evidence suggests that the Egyptians have a renewed pride in their military prowess. The record also indicates that Egypt is continuing to improve her military capability. Recently disassociated with the Soviets, the Egyptians are currently training pilots in the Dassault Breguet Mirage fighters and France has committed herself to sell Egypt an as yet undisclosed number of Mirages. The Egyptians perceive the Mirage purchase as "going from the

Soviet era of vacuum tubes to the western technology of integrated circuits."[3]

Egyptian generals of the Air Defense Force point out the successes of the air defense system. One Egyptian Air Defense Force commander stated: "Our highest compliment was received on the third day of the war when we intercepted a message from Lt Gen Peled, (Commander, IAF), ordering his pilots not to approach closer than 15 miles to the canal."[4] The Egyptians disagree with the IAF claim that the missiles sites were "destroyed;" the EADF asserts that some SAM batteries remained operational throughout the war. The EADF acknowledges their failure to establish a more mobile missile coverage for the Egyptian Second Army's bridgehead on the east bank of the Suez Canal.

In the last week of the war, the IAF received a new family of SAM suppression weapons which included the Shrike missile, which homes on ground radar signals, the electro-optically guided Maverick missile, and the television-guided Walleye and Rockeye missiles. The missiles listed above are all launched from aircraft, (usually F4s), and although the classification of this paper precludes a detailed description of these weapons, the most significant advantage of them is that they permit aircrews to suppress SAM defenses at stand-off distances which reduce risk to the aircraft. The IAF

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[3]Ibid., p. 30. [4]Ibid., p. 16.

launched heavy attacks against the remaining SAM sites during the last week of the conflict and the EADF admits that this period was their most severe test of the war.[5]

Despite their appreciation of them, the standoff homing missile and airborne ECM equipment continue to be viewed by the Israeli's as "an American solution." A quote from Israeli Brigadier Uzi Eilam typifies this attitude: "Air-to-ground Standoff Homing Missile. These are an example of application of battlefield lessons; an American answer to the problem of attacking the SAM sites, with a low attrition rate, is the highly sophisticated standoff missile, like the Condor, or gliding bombs like the Extended Range Walleye and EOGBs. Using these systems enables the destruction of SAM sites while the attacking aircraft is well out of the defended SAM space."[6]

The Egyptian military leaders, in 1970, foresaw the nature of aerial warfare better than either the Soviets or the Israelis. The Egyptian generals wanted the Soviet AD systems, but they also wanted better fighter-bombers, such as the MIG-23, Phantom, Mirage, or Jaguar. President Sadat's request for advanced Soviet fighter-bombers was denied and the Soviets insisted that air superiority could be achieved and maintained by the Soviet AD systems.[7] Although the Soviet

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[5]Ibid., p. 19.

[6]Military Aspects of the Israeli-Arab Conflict, p. 22.

[7]The War of Atonement, p. 24.

advisors convinced Sadat, the Egyptian Air Force, (notably General Fahmy, Commander, Egyptian Air Defense Force), remained unconvinced. Now that Egypt has procured the Mirage, the EADF has not only significantly improved its air defense capability but has added the option of being able to strike ground targets deep in Israeli territory. This is no longer an exclusive advantage of the IAF.

It becomes apparent that there exists a significant difference in attitude between the Arabs and the Israelis. The Israelis, in general, have sought only tactical solutions to problems confronting them, almost to the exclusion of the technological aspects which impact on the problem. The Egyptians have been remarkable in their ability to analyze their mistakes from both tactical and technological perspectives. In my opinion, herein lies the greatest threat to Israel.

The improved military prowess of the Arabs have caused the Israeli Defense Forces to seek ways to upgrade their own military capabilities. The following paragraphs will discuss those areas in which the IAF is concentrating its capabilities improvement programs.

Lt Gen David Elazar, Chief of Staff of the Israeli Defense Forces in 1973, has stated that "Arab Armies used Soviet equipment according to Soviet doctrine, but the standard of their efficiency was far from what is expected by the Soviets in the operation of their equipment."[8] The EADF

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[8] Military Aspects of the Israeli-Arab Conflict, p. 245.

disputes this view insofar as air defense is concerned, and the Egyptians insist that they made improvements and modifications to the air defense system which significantly improved effectiveness. These improvements were primarily in the areas of communications and electronic counter-countermeasures.

In contrast to the EADF perceptions of the modern air battlefield, the IAF downgrades the effectiveness of the Soviet air defense system and asserts that airpower will continue to play the dominant role in future conflicts.

This view is reflected in the following quotes from Lt Gen Peled: "The Golan Heights. Airpower was undoubtedly not to be measured by the number of tanks we destroyed on the battlefield, but by the fact that after 5:30 AM on Sunday, the Syrian Forces turned back from two key points on the Golan Heights: one leading to the Sea of Galilee to Tiberias, the other leading to Mishmav Hayarden. They turned back--and did not advance in that direction any more. From 5:30 that morning until about 10:30 AM there were no ground forces to oppose them on either of those two routes."[9]

The IAF perception of the SAM threat is revealed by Lt Gen Peled's statement: "A ground-to-air missile is actually a mechanical toy--a very limited robot--the emotional stresses created in Vietnam and later in Israel were far more than was warranted by its capability. The pilot who has an emotional

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[9]Ibid., p. 242.

problem with this snake has no emotional problem in much more difficult and terrible situations. One, he flies into a curtain of flak without thinking about it; second, he is willing to take on 20 enemy aircraft in air combat, when each of them is not a robot but much more dangerous."[10]

Lt Gen Fahmy, now Egyptian Chief of Staff, and Lt Gen Peled agree on one issue: that is that airborne ECM has a low combat value.[11] They differ in their rationale for this conclusion, however, Lt Gen Fahmy's opinion is based on the assumption that ground radar systems will always be able to overpower airborne equipment, therefore airborne ECM isn't worth the expense and effort it requires. Lt Gen Peled believes that tactical aircraft can defeat air defense weaponry using conventional munitions.

The IAF commanders have expressed significant concern about the recent Egyptian purchase of French Mirages.[12] This aircraft, with the Matra Magic dogfight missile, will poise a much greater threat to the IAF than did the MIG family of fighters armed with the trouble-plagued Soviet Atol missiles. The IAF must assume that the Egyptians, (and perhaps the Syrians as well), will overcome the problem of aircraft identification which the Arabs faced in the 1973 War and will

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[10] Ibid., p. 245.

[11] "Both Sides of the Suez; Airpower in the Mideast," Aviation Week and Space Technology, Special Edition, 1975.

[12] Ibid., p. 6.

successfully integrate their new generation fighters into their air defense system. Unless the IAF can achieve qualitative improvements and numerical increases in their fighter/interceptor weaponry, the air superiority which Israel enjoyed on both fronts, Golan and Sinai, may be unobtainable in future conflicts.

If in any future conflict, Israel cannot gain and maintain air superiority, the consequences may well be defeat. The IAF was able to stop the Arab thrust on the Golan front and remass ground units in Sinai, to counter the Egyptians largely because the Israeli's possessed air superiority. One can easily imagine the difficulties attendant to such a large scale redeployment of armored ground forces if the Arabs were able to conduct interdiction missions within Israel.

In central Europe, if NATO forces are faced with an armor-heavy Soviet thrust, the doctrinal requirements of the U.S. Army's active defense suggest that NATO's success is also predicated on friendly air superiority. In the next chapter, the parallels between Israel's air threat and the air threat which NATO forces may face will be discussed more definitively.

The IAF is seeking the means to upgrade their ability to acquire and shoot down low-flying enemy aircraft.[13] In chapter two, Egypt's desperate attempt to blunt the Israeli offensive by committing the Egyptian Air Force was discussed.

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[13]Ibid., pp. 6-8.

Soviet Sukhoi SU-7, MIG-17, and MIL-4 aircraft were targeted against Israeli supply depots, bridges, and armored columns--with disastrous consequences to the Egyptian Air Force. The IAF was forced, however, to dedicate a considerable percentage of their total aircraft assets countering these low-level enemy aircraft because the IAF had insufficient numbers of radar systems and antiaircraft batteries. Israel's low-level threat from the Arabs has been increased recently because both the Syrians and Egyptians have purchased Soviet Frog 7 and Scud A surface-to-surface missiles. The Israelis have indicated a desire to purchase the Grumman E-2C Hawkeye to counter the Arabs' improved capability to penetrate Israeli airspace at low altitudes.

As one might surmise, the IAF is seeking means to deal with the SAM threat which cost Israel so dearly in the first few days of the 1973 Mideast War. In my opinion, the IAF response to the SAM threat is not founded on a proper perception of the problem, however. IAF commanders recognize the fact that Israel lost approximately 100 aircraft to the Arab air defense system, but the majority of Israeli military leaders attribute this loss more to the tactical events which required the IAF to fly CAS missions prior to destroying the SAM batteries rather than attributing IAF aircraft losses to the effectiveness of the Arab air defense system.[14] One IAF

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[14]Louis Williams (Editor), Military Aspects of the Israeli-Arab Conflict, Tel Aviv: University Publishing Project, 1976, pp. 24-241.

general recently stated: "ECM is like giving an infantryman a first-aid kit instead of more bullets for his rifle--the best ECM is often a 250-lb bomb in the right place."[15] This remark reflects the low priority which the IAF places on defeating the Arab air defense guidance systems. To date, the IAF has not purchased nor sought to purchase any sophisticated ECM equipment. The Israelis have followed the development of mini-RPVs (Remotely Piloted Vehicles), as a means of "decoying" SAM batteries, and have expressed interest in several anti-SAM missiles currently under development. But the general consensus of the IAF commanders is that airborne ECM equipment and anti-SAM missiles are too expensive and not necessary.

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[15]"Both Sides of the Suez; Airpower in the Mideast," Aviation Week and Space Technology, Special Edition, 1975, p. 10.

CHAPTER IV

PERCEPTIONS OF THE MODERN BATTLEFIELD

There are a wide variety of opinions about what a modern air battlefield will look like. The perceptions of the future effectiveness of aircraft and the Soviet air defense threat vary greatly from one authority to the next.

The lessons and implications of the 1973 Mideast Air War are valuable, as are the opinions of military leaders on both sides of the conflict. We must, however, exercise caution in transposing the experiences of the 1973 Mideast War onto the situation faced by NATO forces in Europe. The differences in situation far outweigh the similarities.

For example, from a strategic standpoint, Israel was placed in a situation where the Arabs were permitted to make the first move. Then, after that move was accomplished, the Egyptians established a defensive posture in the Sinai forcing the Israelis to assume the offensive in order to regain lost ground. Egypt not only gained the advantage of making the first move, but rapidly gained all the traditional advantages of the defender. Furthermore, upon assuming the defense, the Egyptians had no requirement to displace their air defense systems forward. (As mentioned previously, when the EADF attempted to displace AD systems forward to protect the Egyptian Second Army, the attempt failed.)

The strategic situation faced by NATO forces in Europe is quite different from the events which occurred during the 1973 conflict. If Warsaw Pact/Soviet forces launch an attack, the initial advantages of the defender accrue to NATO. Unlike the Egyptians, Warsaw Pact/Soviet forces will be required to move their air defense weaponry forward and the Soviet AD system will suffer some degradation in this movement.

There are significant geographical differences between the Sinai and European scenarios, both in the size of the front and in the types of terrain encountered. The rugged mountains and deep valleys in the center and southern portions of NATO's front offer excellent low-altitude air avenues of approach to attack enemy forces. It is unlikely that any enemy could cover all these avenues. Lt Gen Peled observed: "The basic characteristic of a very advanced and efficient ground-to-air missile system is that it is finite in numbers because it is almost infinite in cost; as long as money--and intelligent manpower--are short, it will tend to remain finite in number."[1] The terrain considerations in the 1973 Mideast War, all of which favored air defense systems, and the tremendous density of air defense weaponry on narrow frontages, have caused some observers to believe that the IAF faced an air defense threat which will remain unique[2]--and certainly not able to be duplicated in a European scenario. Considering the risks

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[1] Military Aspects of the Arab-Israeli Conflict, p. 243.

[2] The Yom Kippur War, p. 189.

involved, the proper course of action is to assume that Soviet leadership and technology will combine to increase the effectiveness of their Air Defense Forces and NATO air forces will face a threat as great as did the IAF, and in many respects, the threat will be more significant.

The IAF's lack of ECM equipment and anti-SAM weaponry has been discussed previously. Such serious shortcomings in capability had their parallels in the Egyptian Air Defense Forces; and these are capability limitations which the Warsaw Pact/Soviet forces will not have.

The Soviet refusal to provide the Arab forces with modern fighters and interceptors severely limited the effectiveness of the Arab air defense system. Although the Soviets provided the Arabs sophisticated ground weaponry for air defense, the inferior quality of Soviet aircraft degraded the overall effectiveness of the air defense system. Soviet doctrine views tactical fighter-interceptor support as integral to the Soviet air defense system[3]--the Soviet refusal to provide the resources required to implement their doctrine must be interpreted as something more than an oversight. In the event of a Warsaw Pact/Soviet attack on NATO forces in Europe, we must assume that the Soviets would employ/integrate fighters and interceptors in their air defense systems.

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[3]LTC Arthur D. McQueen, Air Defense Magazine, July-September 1976, p. 8.

Differences between the Mideast War of 1973 and the European scenario as it now exists are too numerous to discuss within the scope of this paper. The three examples cited above; strategic situation, geographical aspects, and the nature of the air defense threat, serve only to caution that what was witnessed in 1973 is not directly transferable to Europe, or any place else where a potential confrontation with a Soviet-oriented enemy is anticipated.

Through a number of recent publications, the Soviets have given the West their perception of the modern battlefield and a considerable insight into Soviet tactical doctrine. Coupling this information with the observations of the 1973 Mideast War we can provide a broad overview of how a Soviet/ Warsaw Pact offensive against NATO forces may look.

Military intelligence analysts who are charged with templating enemy intentions, frequently mention that one key to recognizing an imminent Soviet-type attack is when the enemy displaces his artillery (including air defense systems) into forward areas. NATO military leaders are quick to point out that the Warsaw Pact forces and firepower means currently in place could launch a surprise attack against opposing NATO forces. NATO ground forces are so out-numbered, the Soviets may well choose to dispense with both air and artillery preparation in the conventional sense. Soviet military leaders generally acknowledge the qualitative superiority of NATO air forces and will seek ways to neutralize the effectiveness of

these forces.[4] It is unlikely in my opinion, that the Soviets will attempt to do this with direct military action. The Soviets could most easily neutralize NATO air forces by sabotage directed at either aircraft or aircrews within the theatre. The sabotage could take the form of contaminating airbase fuel supplies or better still, contaminating the supply of liquid oxygen utilized in aircrew life support systems. Air forces are extremely vulnerable to simple actions such as these, and to the Soviets, this option would appear more practical than a costly air attack campaign conducted in NATO rear areas.

It appears highly probable that the Soviets will select conditions of poor visibility to launch their ground attack. Improved cross-country mobility of all Soviet ground combat vehicles and the excellent European highway system combine to enable him to achieve his tempo of attack despite adverse weather conditions. Furthermore, an attack in conditions of poor visibility offers a significant degree of protection from NATO air forces and from antiarmor weapons systems. The ability of defending NATO ground units to engage and defeat Soviet armored forces is a function of intercompartment visibility--if adverse weather conditions reduce this visibility to a thousand meters, then that range now becomes the

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[4] International Institute for Strategic Studies, Strategic Survey, 1975, p. 62, London, 1976.

effective range of antiarmor weaponry, and the survivability of Soviet armor increases accordingly. If the weather is not cooperative, the Soviets may choose to establish a smoke screen in such a way so as to degrade a defender's ability to acquire targets yet not impede the attacker's momentum. Antiarmor weapons positions are usually on elevated terrain to improve fields of fire; aircraft equipped with smoke tanks could effectively create a smoke screen twenty feet above the ground to screen an armored column until it had penetrated main defense positions.

Doctrinally, the Syrian thrust in Golan, October 1973, closely resembled a Soviet-type offensive. Several massive armored thrusts initially penetrated Israeli forward defenses; the system attacks were ably supported by both air and artillery. Although Israeli reserves were fed into the battle in a piecemeal manner, the qualitative superiority of individual Israeli tank crews prevailed against overwhelming odds and the Syrian advance was halted. The Syrian Army denied the IAF the airspace over the battle areas initially, and this is in strict accord with Soviet offensive doctrine. A Warsaw Pact/Soviet offensive in Europe will be similar to the scenario described above, but with two important additional characteristics which were not witnessed in Golan.

NATO planners in Europe must not overlook the Soviet electronic warfare capability and the Soviet doctrinal commitment to disrupt rear area operations and facilities. What

would the outcome have been if the Syrians had possessed and utilized EW means to jam Israeli communications in Golan? The Israelis were heavily dependent on radio communications to mass armored units at critical positions in the Golan. Stripped of their communications, the Israeli ability to mass these forces would have been denied or so seriously degraded that the outcome of the Golan battle may well have been different.

Although this researcher found no evidence to indicate that the Arab forces employed electronic warfare against Israeli communications facilities, Soviet doctrine utilizes EW to disrupt enemy communications. It is probable that EW priority will be given to command nets and to tactical fire nets of all types. Our current doctrine, which calls for centralized systems of tactical air support and air defense may not be operable in an active EW environment against a Soviet-oriented force. In modern warfare, the preponderance of firepower is provided by indirect fire means--artillery, missiles, and tactical air support. These means all rely upon communications, usually radio. Electronic warfare has reached a state of art which threatens to totally disrupt effective communications between maneuver units and their indirect fire systems. Our response to the Soviet EW threat must be twofold: We must continue to develop less vulnerable communications and we must develop nonelectronic means to command and control fire support systems.

Contrary to Soviet doctrine, the Syrians did not attempt widespread disruption of Israeli rear areas. This was probably a resource limitation more than a doctrinal oversight, but it is still one more characteristic which NATO must anticipate and which did not occur in October 1973. To speculate further, the Syrians's may not have attempted to introduce large ground forces into Israeli rear areas because of the IAF's aerial supremacy over Israel throughout the conflict. Whatever the reason, however, the Syrians departed from published Soviet tactical doctrine in two significant ways; Warsaw Pact/Soviet forces in Europe are equipped to take full advantage of EW resources and can be expected to introduce major ground forces into NATO rear areas in the event of a European conflict.

U.S. military threat analysts are fully aware of the Soviet capability to attack NATO rear areas--by airborne/airmobile units or by using the relatively new Soviet Naval Infantry forces to spearhead an amphibious assault. This threat is easily perceived; the nature of the Soviet EW threat is not as easily perceived, and EW could produce catastrophic consequences for NATO forces if it is not given the attention it deserves.

The U.S. Army's active defense concept requires a rapid massing of forces to defeat Soviet-type armored forces at a critical place. If the Soviets possess an EW capability as sophisticated as our own, then a Soviet attacker could

reduce battlefield communications to hand-and-arm signals thereby making responsive troop movements extremely difficult. Electromagnetic interference from the use of tactical nuclear weapons may disrupt radio communications as much as EW equipment. Technology and doctrine could do much to decrease the effectiveness of Soviet EW. If NATO forces are to succeed in defeating a Warsaw Pact/Soviet offensive, more attention must be given to the battlefield communications upon which our doctrine depends.

Lt Gen David Elazar's observation that the Arab Armies employed Soviet doctrine is not totally accurate. Arab adherence to Soviet doctrine was significantly limited by Arab capabilities and resource constraints in terms of aircraft, EW equipment, and tactical nuclear firepower. The Arab ground scheme of maneuver was Soviet-inspired, but there were overwhelming deficiencies in the support resources.

A Warsaw Pact/Soviet offensive in the European theatre will be a totally integrated attack designed to optimize Soviet ground superiority through surprise and shock. Several Combined Arms Armies, each consisting of Motorized Rifle Divisions and Tank Divisions, will attack simultaneously along separate axes to seize specific ground objectives. Each division will use multiple routes of advance, and the Soviets will attempt to penetrate NATO ground defenses without massing into units larger than division size.[12] The excellent highway

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[12] V. Ye, Savkin, The Basic Principles of Operational Art and Tactics, Moscow (Pub. U.S. Government Printing Office under auspices USAF, 1972), p. 198.

system in Eastern Europe, the large number of urban areas, and the terrain considerations, will weigh against Soviet employment of multidivision sized forces in a deliberate attack. Soviet military planners will opt for speed and shock and, supported by EW and ground campaigns in NATO rear areas, to include sabotage at major NATO airbases, the attacker will seek a conclusive victory in a short, violent, offensive. The Soviet ground scheme of maneuver may include encirclement of major NATO ground forces; Soviet terrain objectives may be large urban or industrial areas, the seizure of which would provide him with protection against NATO's nuclear threat. In short, the Soviets will attempt to degrade NATO responsiveness and military capability as much as possible to minimize risk to Soviet forces and achieve success. It is unlikely that a Warsaw Pact/Soviet attack against NATO forces will be bound by dogma--the Soviets are masters at land warfare and we should assume from the outset that the offensive will be "tailor-made" just for us. (As the Arab offensive was for the Israelis.)

CHAPTER V

EMPLOYMENT OF TACTICAL AIR SUPPORT

This chapter will discuss the two categories of offensive air operations which most directly support the ground scheme of maneuver. The first category, close air support, is commonly defined by the United States Marine Corps and by the United States Air Force. Both services define close air support (CAS) as air attacks against hostile targets in close proximity to friendly forces which require detailed integration of each mission with the fire and movement of those forces. The second category of offensive air operations which will be discussed is deep air support (DAS). The U.S. Marine Corps defines deep air support as air actions conducted against distant enemy targets which do not require detailed integration of each mission with the fire and movement of friendly ground forces. Deep air support missions may be flown immediately beyond the fire support coordination line or at considerable distance from it, such as U.S. Air Force interdiction missions.

Close and deep air support are those categories which fall most directly under the cognizance of the Tactical Air Coordinator Airborne (TACA) and are those categories which most interest the ground commander. Analysis of Soviet air defense capabilities and observation of IAF experiences in

1973 indicate that these two tactical air missions will probably be the most difficult to successfully fulfill.

Prior to successfully conducting close air support missions or deep air support missions near the FSCL, certain conditions must be satisfied. Technological advances, tactics, and aircrew training may significantly alter the relative importance of each of these conditions and will usually effect the manner in which we achieve them. An expanded discussion of each is offered below.[1]

1. Air Superiority - It is generally acknowledged that air superiority is required to provide security for strike aircraft engaged in CAS. Ground commanders often confuse the term air superiority with air supremacy, a term which suggests absolute dominance of airspace. Antiaircraft weaponry has probably made air supremacy an impossibility in the main battle areas of future conflicts. The relevant question now is: "Do we sufficiently control the airspace to efficiently and effectively conduct CAS and DAS missions?" Depending on the enemy threat, it may be necessary to divert dual purpose aircraft, such as the F4, from CAS missions to provide air-to-air protection for strike aircraft.

2. Suppression of Hostile Air Defense - Because of the application of advanced technology into air defense weaponry, aircraft have become increasingly vulnerable to

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[1]FMFM 5-1, p. 120.

antiaircraft fire. Hostile antiaircraft weapons and their associated radar equipment must be neutralized or destroyed. The density of such air defense weaponry which we can expect a Soviet-type enemy to employ makes this condition extremely difficult to satisfy, although the means available to us are increasing. Electronic countermeasures and standoff homing missiles have been discussed previously. Other methods, air tactics, doctrine, and aircrew training will be discussed in this chapter. The U.S. Marine Corps must develop coordinated suppression doctrine similar to the joint Army/Air Force "SEAD" (Suppression of Enemy Air Defense) doctrine which is currently under development.

The SEAD doctrine envisions the use of all available arms of both the Army and the Air Force to effectively neutralize the enemy's air defenses. The Army's primary aim for this purpose is their field artillery. Since most air defense weapons are extremely vulnerable to any type of fire, the concept is a good one.

The Marine Corps, in addition to its artillery assets, has organic air assets which would enhance the effectiveness of a SEAD campaign. Tactical jet aircraft equipped with sophisticated doppler navigation systems and armed with high-drag area weapons such as rockeye could strike at those air defense systems and facilities beyond the range of field artillery. Tactical jet aircraft also provide the Marine Corps with its best electronic warfare systems. An effective

SEAD doctrine for the Marine Corps will rely heavily on the integration of these airborne EW assets into the SEAD campaign.

In a rapidly moving battlefield environment the TACA may be the best tactician to manage/coordinate the overall SEAD campaign for the maneuver commander.

3. Marking Requirements - CAS missions impose a requirement to accurately mark friendly frontline positions and the ground target. Frontline marking may be done by FAC/TACA briefings, colored smoke, or air panels. Target marking may be accomplished through FAC/TACA briefings, or visual aids such as smoke or white phosphorous delivered by FAC aircraft or artillery FOs. We should think more in terms of target locating rather than target marking if we are to increase aircraft survivability against today's air defense systems. If a method can be devised to accurately locate the target and communicate its location to attacking aircraft so that aircraft exposure is limited to a single pass over the target, we will substantially increase aircraft effectiveness and survivability.

4. Favorable weather - CAS at one time was a "fair weather" resource, however recent developments in radar and aircraft technology permit CAS and DAS missions in marginal weather/visibility conditions. However, favorable weather conditions increase both the effectiveness and number of CAS sorties. The commander who anticipates marginal weather conditions in his area of operations can do much to offset

its effect on air operations. Aircraft with a self-contained bombing capability and terrain-following radar, munitions compatible with low-level delivery techniques, and beacons which can be provided to supported ground units are some of the resources upon which the commander can draw to decrease the impact of unfavorable weather.

5. Flexible control - Centralized control ensures coordination and proper application of available air assets to missions according to priority. This flexibility requires reliable communications among air control agencies and between control agencies and assigned aircraft. In the past, flexibility also entailed matching ordnance to the target, however a Soviet-type offensive may not permit aircraft to be loaded with ordnance after a target is sighted. Modern area munitions such as CBUs and Rockeyes have diminished the importance of this aspect of flexibility, since these munitions are effective against both personnel and armor. Flexibility, through timely and dependable communications, may be extremely difficult to achieve against Warsaw Pact/Soviet forces. NATO is confronted with a potential enemy who has a sophisticated jamming and deception capability which may preclude effective centralized control of air assets. Modern air-control systems must be designed to optimize utilization of aviation resources through centralized control when the situation permits, but the air-control system must also be effective in a situation which demands decentralized control. Soviet jamming

capabilities and doctrine require that we develop a system which will facilitate control of close and deep air support sorties with minimal degradation from enemy communications jamming.

6. Prompt response - U.S. Marine Corps control procedures and methods of employing CAS/DAS aircraft are designed to minimize response time. Requests from supported ground units are expeditiously processed and aircraft are provided either on station and/or on ground alert as the situation dictates. Since Soviet doctrine requires a high degree of "combat activeness" and rapid rates of advance, we must therefore improve our ability to respond to requests for air support.

7. Aircrew proficiency - Multiple mission aircraft have been introduced into the U.S. Marine Corps and the U.S. Air Force. This fact, coupled with the increased complexity of modern aircraft and the increasing Soviet air defense threat, place an unparalled burden upon aviation commanders to ensure adequate pilot training. In view of the current threat to NATO forces in Europe, the degree of training presently obtained by U.S. pilots of all services is questionable.

MGen Binyamin Peled, Commander, IAF, made several observations following the 1973 Mideast War which indicate a general concurrence with the foregoing paragraphs. He emphasized the IAF's requirement for accurate target location

and immediate intelligence; the requirement for rapid, dependable, secure communications means; and the requirement for an air command and control system which is basically centralized but capable of quickly delegating authority to lower echelons for short periods of time.[2]

The seven requirements for close and deep air support are similar to the fundamentals of land warfare in that they have been alternately changed, ignored, redefined, rediscovered, and ultimately evolved into their present state. The field of military aviation generally experiences more technological change than most other military branches, and therefore doctrine changes rapidly. But the emphasis on technology often causes aviators to forget the lessons of the past. For example, a field manual published by the German General Headquarters in 1918 contained these implicit instructions for the employment of aircraft: Assignment of proper targets; accurate information regarding targets; need for familiarity with the terrain; cooperation with the effort of the ground troops; advisability of flying at extremely low altitudes; the assignment of one target at a time; mass attacks repeated at frequent intervals.[3]

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[2] Military Aspects of the Israeli-Arab Conflict, pp. 242-245.

[3] Major Frank D. Lockland, U.S. Army Air Corps, Attack Aviation, 1931 (Published in APDC Course Syllabus, Evolution of Combined Arms Warfare).

The instructions cited above, (circa 1918), are especially interesting for two reasons: They stress the requirement for aviators to know the terrain, and this has particular significance on today's battlefield; and they emphasize the requirements to cooperate with the effort of the ground troops, the importance of which was acknowledged by MGen Peled. MGen Peled has stated that in order for air support to be effective in support of ground operations, the support must complement the ground scheme of maneuver and be delivered in a timely manner--within thirty minutes of target detection. While this time frame is well within the capability of the Marine Air Control System, it may be unobtainable under the current USA-USAF Air Ground Operations System. Both the Army and the Air Force are attempting to correct deficiencies in their joint air control system, however the scope of this thesis will not permit a full discussion of current programs directed to that end.

It is unlikely that any single doctrinal change, control system reorganization, or technological breakthrough will sufficiently counter the potential threat of the Soviet air defense system. Although the present threat can be countered, it is the potential of the air defense threat which must concern us. In actuality, the U.S. Hawk missile system was six to seven times more effective in 1973 than the Soviet surface-to-air missile systems, but Soviet improvements in their air defense weaponry since 1973 have been extremely

impressive.[5] The trend indicates that the Soviets intend to develop an air defense system capable of dominating the airspace above the main battle areas, and providing security against air attacks to their ground forces under all conditions. With the exception of electronic warfare, our technological response to the threat appears to be adequate.

However, developments in air doctrine, tactics, and training have not kept pace with technological improvements and are currently inadequate to counter the potential Soviet air defense threat. The remainder of the thesis will address these doctrinal areas in terms of what our response to the threat should be.

Control of aviation assets is presently centralized in the United States Marine Corps and United States Air Force. While centralized control of some offensive air functions, such as antiair warfare, is highly desirable, the air control system should permit decentralized control of CAS/DAS missions when the situation demands it. The current Marine concept of controlling CAS/DAS aircraft is that a Forward Air Controller, with the approval of the ground commander, will request air support from either a Direct Air Support Center, DASC, or a Tactical Air Control Center, TACC, located in the division rear area. Then the Marine attack pilot will fly to the target area and, following a briefing by the FAC, be controlled

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[5]Rear Admiral Julian S. Lake, USN(Ret.), "Air Electronic Warfare," Proceedings, U.S. Naval Institute, 102, (October 1976), p. 48.

during target engagement. In view of the current Soviet capabilities, a number of questions arise: Given the Soviet capability to jam radio communications, will the air request reach the appropriate air control agency? Soviet ground doctrine indicates rapid rates of advance and massing units on narrow frontages; will the ground FAC, (who is not provided a vehicle), be in the right place to observe the target and control the airstrike? What are the attack pilot's chances of survival if he is required to fly into a battlefield about which he knows little concerning terrain and air defense weapons positioning?

An experienced Tactical Air Coordinator (Airborne) (TACA) could greatly enhance the effectiveness of CAS/DAS missions and the survivability of the attack aircrew. This researcher does not suggest replacing the FACs in each Marine company with a TACA, (as current USA-USAF doctrine prescribes), but recommends that a TACA be assigned to each Marine Infantry Regiment in a mid-intensity environment.

There are several reasons why the TACA would favorably affect our DAS/CAS capability. The TACA has an excellent communications platform. His radios are more powerful, and therefore less susceptible to jamming than those of the FAC or the ground commander. If required, he can overfly those with whom he wishes to communicate, thereby making enemy jamming nearly impossible. The TACA normally has the option of transmitting on secure voice channels, a capability which

further increases his value to the supported ground commander.

The rapid mobility of the TACA enables him to position himself to observe targets and control attack aircraft far better than the FAC. When conditions of low visibility preclude direct ground observation, the TACA can detect targets by other electronic means installed in his aircraft, or request the assistance of other aircraft with more sophisticated detection equipment. The TACA can work in conjunction with a ground FAC to destroy targets which the TACA cannot observe. This technique was used with success in Vietnam during poor weather conditions. Just as a field artillery fire direction officer memorizes the maximum and minimum elevations and left and right deflection limits of his zone of fire, TACAs often memorized their zones of action in terms of radials and distances from fixed navigation devices. Thus a possible enemy avenue of approach might be templated by a trained TACA and accurately located "from the 220° radial at forty-two nautical miles." Then, when he is told by the ground FAC that an enemy tank column is advancing on Route 9, even if the TACA cannot observe the target visually, he can work with the FAC and attack aircraft to effectively bomb through an overcast and destroy the target. Alternatively, the TACA may request a aircraft/munition combination easily capable of dealing with the situation. An example of this would be a flight of A6 aircraft, with sophisticated target acquisition devices, armed with an area munition such as the

Rockeye. The TACA could provide the attack aircraft with the general location of the target and a recommended air avenue of approach which would present minimum risk to the strike aircraft.

The examples cited above are only a few of many which could be discussed to illustrate that the presence of a TACA above the battlefield can significantly diminish the effects of poor weather on CAS/DAS missions.

The TACA can contribute significantly to the survivability of attack aircraft and pilots operating in his assigned airspace. Although it is not feasible for attack pilots to be thoroughly familiar with terrain and troop dispositions throughout the entire area of air operations, the TACA can be cognizant of all terrain and threat aspects in his specific area. He can provide detailed briefings to strike pilots on all aspects of their mission--examples include selecting munitions and fuze setting, prescribing delivery techniques, recommending air corridors for entry and egress, ECM techniques which should be employed, etc. The presence of the TACA will improve aircraft survivability because it will permit attack pilots to utilize advanced delivery techniques such as offset-bombing, lob-bombing, and high-speed beacon bombing. These bombing techniques share the basic advantage of reducing the exposure time of attack aircraft to enemy air defense weaponry.

This researcher does not propose that we change the basic role of the TACA in the Marine Corps, only that we

recognize his potential value in a mid-intensity conflict against a Soviet-oriented enemy. If the enemy targets his EW capabilities against our air control system communication, centralized control of CAS/DAS missions may be impossible. A TACA could prove an invaluable link in conducting effective CAS/DAS missions in a decentralized control situation. The TACA works with immediate target and threat intelligence as a matter of his own survival. He is, therefore, well-qualified to assist in the survivability of those pilots conducting CAS/DAS missions within his assigned airspace.

An issue which often arises is the survivability of the TACA. Although this paper assumes TACA survivability in order to discuss his role on the battlefield, the following remarks are provided to assist in understanding some aspects of the problem.

TACA survivability on a mid-intensity battlefield is partially dependent on the type of aircraft which he will fly. It must be fast, maneuverable, capable of electronic countermeasures, and offer a reduced engine signature to antiaircraft homing missiles. These characteristics are more easily achievable for the TACA's aircraft than for attack aircraft because the TACA has no ordnance-carrying requirement except marking rockets. Aircraft survivability is largely a matter of "trading-off" weapons capability with ECM capability. One could design an aircraft which would optimize survivability and minimize offensive capability. But we must not

adopt the attitude which suggests a technological solution to every aviation problem. There is not an aircraft in production capable of fulfilling the TACA's requirements, although technologically, such an aircraft is within the capability of current state-of-the-art. But machinery alone is not the solution.

The TACA's knowledge of his area of operations may be of greater significance than the characteristics of his aircraft. Let's assume a "worse case" situation for the TACA and discuss how he might handle it. In this instance, we will discuss a scenario wherein a TACA has been attached to work with a Marine Regimental Commander who is defending against a Warsaw Pact/Soviet force. The enemy has established a Soviet type, integrated, air defense system. At this point, the TACA has several "bosses," his squadron commander, the Air Wing commander, the designated air control agency--but among Marine TACAs, there is no doubt about who the immediate commander is--it is always the ground commander to whom the TACA is attached. In all probability, the TACA will first visit the Regimental Commander to receive mission priorities and battlefield intelligence briefings, to include troop dispositions and enemy threat intelligence. In summary, the TACA will learn everything he can about his assigned area prior to flying in the hostile airspace. The TACA, in conjunction with the ground commander, will decide on a method to attack the enemy air defense system.

For discussion purposes, let's assume that the TACA decided to attack several high altitude missile systems in the same valley--the destruction of these systems would establish an air avenue of approach to facilitate the attack of other air defense weapons systems. Marine EW aircraft are targeted against the enemy radar systems and thereby permit attack aircraft to bomb from high altitudes. Destruction probability is increased by selecting precision-guided bombs. Alternatively, the TACA could have selected standoff homing missiles to attack selected SAM batteries, or if terrain considerations permitted, a low level attacks with CBU's or napalm might be chosen. The TACA who is introduced into an area in which the enemy has been permitted to construct his integrated air defense umbrella will face a tremendous challenge. The TACA's ability to regain superiority of the air battlefield will be functions of his training, his ability to discern vulnerabilities within the enemy system, and the accuracy of the intelligence with which he is provided.

The Soviet air defense system decreases in its effectiveness when movement is required. Attacking columns are normally accompanied only by short-range air defense weaponry, however these weapons can be fired "on the move." Medium-to-high altitude systems, (SA-2, SA-3, SA-4), require time to emplace,although we can expect the Soviets to maintain some capability with these weapons by echeloning their displacement. Soviet columns attacking along separate axes, high

rates of advance, and terrain considerations will degrade Soviet air defense communications capabilities and increase vulnerabilities of the air defense system. The ground commander and TACA who are willing to accept the risks involved, can employ CAS/DAS sorties with greater than usual effectiveness. Although information concerning Syrian air defense tactics in the Golan offensive of 1973 is sparse, it is the opinion of this researcher that the Syrian advance outran the protection of the high-altitude SAM batteries, subjecting the Syrian armor to punishing IAF attacks. It is highly probable that terrain constraints also prevented the Syrians from displacing their high-altitude SAM systems. The recent acquisition of tracked launchers for these systems may be a reflection of this assumption.

Although the basic mission of the TACA should remain unchanged, the nature of the modern air battlefield requires an expansion of TACA tasks. The TACA must continue to assist the ground commander in effectively controlling and coordinating indirect fire means of all types to support the ground forces. The TACA must continue to assist the ground Forward Air Controllers in bringing CAS/DAS sorties to bear against selected targets. An important additional task for the TACA concerns his role in the suppression of enemy air defense weaponry and conventional Soviet field artillery. The increased lethality of the modern battlefield coupled with the complexity of all weapons systems will demand that TACA

candidates be selected from the very best pilots available and then given comprehensive training to meet today's challenge. It is not probable that this nation will build up its conventional ground forces to meet the Soviet ground threat. It is, therefore, necessary that we achieve and maintain the capability to effectively employ tactical aircraft in the CAS/DAS role. The achievement of this capability will be expensive in terms of developing more survivable aircraft for the TACA. The comprehensive tactical training required to teach the selected TACAs to deal with the threat will be costly. Despite the expense, we cannot afford to do less.

The centralized air control system presently in existence will be neither responsive nor flexible enough to defeat a Warsaw Pact/Soviet enemy. In fact, considering the EW capability of the threat force, the current air control system may not be operable. The Marine Corps must conceptually view the TACA as an air tactician just as the Battalion Commander is acknowledged to control the maneuver tactics of his battalion. The DASC or TACC should exercise control over the allocation of air assets, but the TACA, working in close coordination with the ground commander must be designated to command and control those assets allocated within his airspace. The ground commander would not attempt to command his unit during combat if he were not present on the battlefield. With the technological gap between aircraft and

air defense weaponry rapidly closing, it is equally ridiculous to assume that tactical aircraft can be effectively commanded and controlled from an agency located thirty kilometers rearward.

The entire trend of Soviet military hardware development provides ample evidence of how the Warsaw Pact/Soviet leaders perceive our military capability. The Soviets respect and fear our tactical air capability, a fact evidenced by the expenditure of vast resources or ground-based and airborne air defense systems and a new generation of attack and fighter aircraft.[6] Soviet developmental trends indicate two clear goals--to neutralize the effectiveness of NATO's tactical aviation resources and to develop on unsurpassed tactical aviation capability to support Soviet/Warsaw Pact ground forces.

The second goal has enjoyed widespread attention, the first has been virtually ignored.

The Soviets have developed aircraft with startling improvements in terms of range, payload, and electronic sophistication. These new generation Soviet aircraft include the SU-17/20 Fitter C, Mig-23 Flogger, SU-19 Fencer, and the controversial Backfire bomber. The SU-19 Fencer has three times the range and twice the payload of the Mig-23 Flogger.

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[6]Terrell E. Greene, "Tacair in the Defense of NATO," Astronautics and Aeronautics, Vol 15, (March 1977), pp. 18-25; LTC B. E. Blunt, Royal Artillery, "The Philosophy of Battlefield Air Defence," British Army Review, No. 54 (December 1976), 34-38.

The threat presented by these new Soviet aircraft have obvious implications for NATO, but sufficient attention is being directed in this area. The greater threat is represented by the first Soviet goal cited above--the clear intent to neutralize the effectiveness of NATO's tactical aviation resources. Let's try to approach this problem from the Soviet perspective.

The possibility of sabotage at major NATO airbases has been discussed previously. This would serve to cripple the enemy capability directly, which from the Soviet view, would be the most desirable course of action. Since it is unlikely that the Soviets would totally depend on the success of a single act, they would seek other vulnerabilities to exploit. Western and European forces (to include United States forces) depend heavily on radio communications and we have structured centralized command and control systems employing primarily radio communications. The Soviet expenditure of resources on the development of electronic warfare systems indicates that he views our reliance on radio communications as a major vulnerability. The role of a Soviet electronic warfare campaign may be of as much significance as the Soviet air defense campaign, and it will seek the same result--the neutralization of NATO tactical aviation.

The objectives of electronic warfare are not easily presented and are seldom discussed. No land campaign has been fought between two combatants each of whom possessed

sophisticated electronic warfare capability. Naval campaigns in World War II and Korea were to some degree characterized by electronic sophistication, but the state-of-the-art has advanced so much recently that these examples are unsuitable for our examination.

The goal of the air tactician is to achieve a degree of aerial superiority which will permit his use of aviation assets and deny use of air firepower to his enemy. The goal of the electronic warfare tactician is to ensure his use of electronic resources, to include communications means and target acquisition equipment, and deny the use of electronic systems to his enemy. In a futre conflict between two combatants with sophisticated EW resources, the results may be: Complete electronic communications silence or total communications confusion; complete or partial neutralization of all electronic target acquisition, guidance, and sensor devices, Lacking historical precedent, we can only speculate on the impact of modern electronic warfare means.

If communications are extensively disrupted, our present centralized air control systems will not function. Tactical aviation assets may still be employed effectively by the TACA, If necessary, the TACA could brief attack pilots by hand signals between cockpits, by marking targets with smoke rockets, or by leading the attack aircraft onto the target.

If electronic target acquisition and guidance systems are neutralized by the enemy, the TACA can visually acquire

enemy targets. The close working relationship between the TACA and the supported ground commander could facilitate non-electronic methods of communications. Priority targets could be designated by artillery-delivered colored smoke. (At night, illumination rounds could be used.) Air-panels or lights could be used to indicate target location to the TACA.

The presence of the TACA on the battlefield provides us the option of effectively utilizing tactical aviation assets in an intense EW environment. There are few instances of ground Marines failing to fight simply because they had lost contact with their parent unit. Similarly, Marine aviators do not require radios to identify and attack enemy targets. The increased lethality of Soviet-type air defense weapons and the effectiveness of present-day electronic warfare require the presence of an air tactician, however.

The single, most dramatic lesson to be drawn from the 1973 Mideast War is, in my opinion, the requirement to suppress or destroy enemy air defenses. If possible, we should prevent the enemy from constructing an integrated air defense system. Considering the military capabilities of our potential adversary, especially his electronic warfare capability, we must develop doctrine and train tacticians to meet the problem. The selection and training of a cadre of highly-skilled TACAs may well be the best solution currently available.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

An analysis of the events of the 1973 Mideast War, Soviet doctrinal publications, and the current trend of Soviet military equipment development indicate that a Soviet-type attack is characterized by surprise, shock action, mass armor accompanied by air defense weaponry, and rapid rates of advance. These factors will test the command capacity of ground commanders at all levels as they attempt to manage their maneuver units to bring direct fire weapons to bear on an array of enemy targets. The traditional role of the TACA, as a coordinator of indirect firepower and tactical aircraft, assumes increased significance in an intense EW environment.

In light of their ever increasing lethality, Soviet air defense weapons must be suppressed or destroyed as rapidly after detection as possible. Effective utilization of tactical aircraft in CAS and DAS missions requires neutralization or avoidance of enemy air defense weapons. The mobility of current Soviet weapons requires the presence of an air tactician who can remain thoroughly knowledgeable of enemy troop dispositions and AD weapons locations within his area of operations. The TACA most closely approximates this requirement.

The technological gap which once existed between aircraft and air defense weaponry has become much smaller recently. Attack aircraft will require assistance to perform CAS/DAS missions with an acceptable degree of survivability. Although technological improvements in aircraft and aircraft systems may once again provide tactical aviation with the advantage, we must seek improvement in the areas of tactics, training, and doctrine. Our system of aviation command and control must provide for effective decentralized CAS/DAS operations.

The TACA could be instrumental in the following areas:

a. Suppressing or destroying enemy air defense systems.

b. Degrade the effectiveness of enemy electronic warfare.

c. Providing immediate intelligence to the supported ground commander.

d. Engaging enemy targets with indirect fire and aircraft as far forward as possible.

e. Promoting the survivability of attack aircraft and pilots.

RECOMMENDATIONS

Air tactics and doctrine must change to keep pace with technology and the potential Soviet threat. The traditional view of the TACA, that of a coordinator, must be

significantly expanded to meet the challenges of today's battlefield. If the Marine Corps conceptually views the TACA as an air tactician, charged with the command and control of CAS aircraft, with management of the SEAD campaign and with supporting his ground commander by any means available to him, we will have taken the first step in meeting the realities which face us.

A follow-on study conducted by the U.S. Marine Corps which is predicated on the Soviet threat and the conceptual view of the TACA as discussed above is strongly recommended.

Pending the results of the study, it is recommended that the U.S. Marine Corps screen its aviation officers for TACA assignment and training. Those officers selected should be given intensive training in Soviet air defense systems, Soviet tactics, suppression of Soviet air defense weaponry and field artillery, and control of all friendly indirect fire means to include tactical aviation. In summary, TACA's should be trained to perform the principal functions of a fire direction center from a tactical jet aircraft. Emphasis during this specialized training cycle should be on non-electronic means of control and communication between aircraft and also between aircraft and ground units.

Qualified and fully trained TACAs should be assigned to each Marine Infantry Regiment for periods of up to two years which include at least three major exercises. The principal functions of the TACAs at each regiment would be to

develop non-electronic methods of air-to-ground communications and target designation for inclusion in the ground unit's standard operating procedures, and to conduct detailed training on the employment of CAS/DAS aircraft within the regiment. It is recommended that TACAs be required to fly a minimum of twenty hours per month, half of which should be dedicated to the control of tactical aircraft, field artillery, and naval gunfire. This measure would ensure that TACAs assigned to regiments would retain a moderate level of proficiency.

As a final comment, this writer would like to state that no concept, doctrine, or study should ever be viewed as perfect. The broad scope of the subject of this paper, the desire to write it as an unclassified working document, and the limited amount of detailed information (such as IAF delivery techniques and munitions in Golan), significantly constrained the content.

The military professionals of the United States will meet today's challenges, as in the past. It is hoped that this paper contributes in some small way in that effort.

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