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ARMY ROTARY-WING AGGRESSORS: THE KEY TO COUNTER-HELICOPTER TRAINING

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

MASTER OF MILITARY ART AND SCIENCE

by

GREG R. HAMPTON, MAJ, USA
B.A., Colorado State University, 1977

Fort Leavenworth, Kansas
1990

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This study is a comprehensive analysis of the U.S. Army's combined arms, counter-helicopter training conducted at the Combat Training Centers (CTC's). It examines, through historical analysis, the factors that have resulted in the current status of Army counter-helicopter training and compares the Army's current helicopter OPFOR to the reality of the Threat. It concludes that there is a counter-helicopter training shortfall at the CTC's. It recommends the creation of three specialized OPFOR helicopter organizations which should utilize a mix of Air Force HH-3, Army AH-64 and OH-6 helicopters to train the combined arms team at the CTC's and home station unit training within regional areas.

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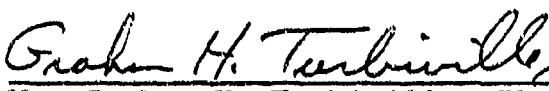

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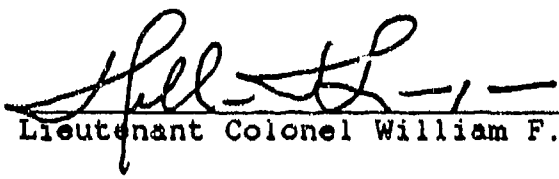

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the view of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the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

ABSTRACT

ARMY ROTARY-WING AGGRESSORS: THE KEY TO COUNTER-HELICOPTER TRAINING, by Major Greg R. Hampton, USA, 229 pages.

This study is a comprehensive analysis of the U.S. Army's combined arms, counter-helicopter training conducted at the Combat Training Centers (CTC's). It examines, through historical analysis, the factors that have resulted in the current status of Army counter-helicopter training and compares the Army's current helicopter OPFOR to the reality of the Threat. It concludes that there is a counter-helicopter training shortfall at the CTC's. It recommends the creation of three specialized OPFOR helicopter organizations which should ~~utilize~~ a mix of Air Force HH-3, Army AH-64 and OH-6 helicopters to train the combined arms team at the CTC's and home station unit training within regional areas.

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CHAPTER I

INTRODUCTION

Fear kills more people than death.<1>

George S. Patton Jr.

The intermittent snow and fog that blew across the Steppes were well-known forerunners to the Russian winter. A cold predawn darkness offered nothing new to end the monotonous routine of the soldiers of the Third Rumanian Army. They had long been guarding the northern flank of the German forces that were locked in the death throes of wresting control of the metropolis of Stalingrad from the Red Army. The Rumanians were about to become the goat of the battle that turned the tide of the Second World War.

At precisely 0730, on 19 November 1942, a rolling artillery barrage signaled the beginning of the end of the Third Reich. Operation Uranus, the Soviet offensive aimed at encircling the Nazis attacking the city on the Volga, had specifically targeted the poorly-trained and inexperienced Rumanians for destruction. Eighty minutes of concentrated artillery bombardment were only a prelude to the armored onslaught. When the roar of the guns ceased, the ominous sound of tank engines and creaking tracks of the Russian Fifth Tank Army could be heard in the straw-lined Rumanian

trenches. The initial waves of Russian infantry were adequately dealt with, but as the first T-34's burst out of the grey mist, the Rumanians soon found themselves in a situation for which they were not in any way prepared.

As the Russian armor began to make headway, the cry of "tanks in the rear!" spread like wildfire through the Rumanian trenches. Great numbers of Rumanian soldiers succumbed to a phenomenon known as "tank fright"; a panic that seized entire units inexperienced in operations against armored attack. Hysterical Rumanians leaped from their trenches and prepared positions, screaming that Russian tanks were hot on their heels. This hysteria conveyed itself like a row of dominoes up and down the lines and soon destroyed any semblance of order in the Axis front. The organized line of resistance crumbled as the massed Russian armored formations sped on to their objectives far into the German rear.<2>

History was in the making. Within two months, an entire German Field Army was reduced to ashes in the ruins of Stalingrad. For the lack of proper training of one unit against the dominant maneuver weapon system of the era, Nazi Germany suffered one of the most humiliating defeats in the annals of military history. To be sure, the Nazi regime would have been crushed sooner or later, but at that moment, at that particular place on the wind-swept plains of central Russia, a military organization succumbed to fear and confusion through inexperience and failed in its mission;

failed for the lack of having adequate training against the type of force that they were expected to fight in combat.

Times change but soldiers remain the same.

The mechanized columns of General Menachem Einan's division had been slogging their way up the Bekka Valley for four days. Operation "Peace for Galilee," the Israeli offensive into Lebanon, was running into stiffer resistance daily with the well-equipped Syrian Army acting as the opposing force. The afternoon of 8 June 1982 saw a new, unfamiliar weapon make its battlefield debut in an attempt to halt General Einan's column--French-manufactured GAZELLE combat helicopters carrying HOT antitank missiles with a range of more than four kilometers. It was the first time the Arabs had ever employed helicopter gunships against Israeli forces.<3>

The first Syrian GAZELLE appeared at 1530 just south of Ein Zehalta (35 km southeast of Beirut). The Israeli tank crews never saw their attackers' approach but felt their sting when a GAZELLE unmasked, fired two missiles, and stopped the lead company in its tracks. The first two M-60 tanks erupted in flames. As the Israelis attempted to extract the wounded crews, another GAZELLE popped up and sent two missiles into the column, knocking out still two more tanks.<4>

The Israeli column quickly began to resemble a scene out of Dante's Inferno. The company commander of the lead unit recalled the situation as "utter confusion...(being)

unable to spot the source of the incoming antitank missile fire and not knowing what to do in response."<5> The tankers became totally unnerved and began to shoot their main guns wildly in a vain effort to extract themselves from the deadly ambush. The column was totally disrupted by the GAZELLEs, who, after dispatching the unprepared Israelis, conducted a leisurely withdrawal up the valley. As a consequence, General Einan's advance was halted for over six hours; six hours that allowed the Syrians to reconstitute the next set of defensive positions.<6>

Not to be outdone, the Israelis also employed attack helicopters during the "Peace for Galilee" operation. The Israeli Air Force skillfully utilized U.S.-supplied AH-1S COBRA and Hughes 500 DEFENDER attack helicopters to neutralize Syrian armored formations. These aircraft alone accounted for the destruction of 28 tanks, 16 armored personnel carriers, and 13 other vehicles while losing only four attack helicopters in the process.<7>

Both sides of the 1982 war in Lebanon identified with the concept of "Helicopter Fright." Both sides had witnessed the wholesale destruction of their armored formations by a weapon that moved about the battlefield like a demon in the night. The attack helicopter became a threat, an ally, and a nightmare to all who fought on the battlefield.

PURPOSE.

This thesis evaluates the effectiveness of the U.S. Army's existing combined arms counter-helicopter training. It compares existing and forecasted Army Opposing Forces (OPFOR) helicopter concepts and organizations with the present and projected world combat helicopter Threat. It identifies strengths and shortfalls within the established Army training system, and recommends corrective measures which the Army can implement within the next ten years or less.

THESIS.

This thesis addresses the following question: Does the Army adequately portray the Threat combat helicopter force to the combined arms team during collective unit training?

To fully answer the thesis question, several subordinate questions will be addressed. Specifically:

(1) What kind of threat does the attack helicopter pose to the combined arms team?

(2) How does the Army organize and train combined arms units?

(3) What weapons and force structure will the Army employ in counter-helicopter operations?

(4) What training requirements have already been addressed in the Army to counter attack helicopters?

(5) What experiences have the Army's sister services had in dealing with similar circumstances?

BACKGROUND.

The Army's AirLand Battle Doctrine mixes horizontal and vertical maneuver forces into a fluid and flexible combat team capable of waging war throughout a wide spectrum of potential conflicts. This new maneuver-based doctrine relies heavily on agility, synchronization, depth, and initiative to direct soldiers to win while fighting outnumbered. At the forefront of this warfighting concept of warfighting stands the concept of "air mechanization," the use of vertical maneuver, made possible by the modern attack helicopter. This maneuver warfare concept has so revolutionized the Army's force structure that the Army today possesses over 9,000 aircraft, second only to the Soviet Air Force.<8>

However, the U.S. was not the only nation to realize the effectiveness of the modern attack helicopter. The Warsaw Pact forces simultaneously developed a combat rotorcraft array to exploit the vertical dimension of the battlefield. Other nations have come to the same conclusion. Today, the World possesses a vast spectrum of attack and multi-purpose helicopters which stand ready to be employed in any conflict.

The helicopter's success on the modern battlefield can be attributed to its ability to operate in what is

called the "terrain flight environment." In this airspace dominated by terrain and vegetation, attack helicopters use the protection that the terrain offers, yet are unencumbered by the terrain's maneuverability restrictions. Consequently, attack helicopters possess maneuverability heretofore unknown on the modern battlefield. As noted earlier, the Israelis have experienced this and describe the attack helicopter's fluid nature as "the quicksilver of the battlefield."<9> The attack helicopter's tremendous maneuver potential, throughout all four dimensions on the battlefield (depth, width, height, and time) place it in a unique position to dominate the other two-dimensional (depth and width) battlefield players.

The attack helicopter represents a true paradox on the modern battlefield. In many ways it is analogous to the medieval archer. Both bowman and attack helicopter are relatively unprotected, being vulnerable to weapons of many types, necessitating the use of cover, concealment, and stealth to engage the enemy. Conversely, both need to maximize the standoff capabilities of their weapons.

Thus, just as the longbow dominated the armored knight on horseback during the battle of Agincourt in 1415, so the modern attack helicopter dominates the tank today. As a result, the armies of the world have struggled to find a solution to this menace that threatens the principal ground combat system of today...the tank. The Soviets, in particular, have written a great deal on the subject of

attack helicopter operations and counter-helicopter operations. In fact, some Soviets have gone so far as to relegate the tank's relative worth in comparison to the attack helicopter by ascribing the tank as a "diesel dinosaur."<10>

Therefore, we must counter the attack helicopter Threat by developing doctrine and materiel requirements, but more importantly our training, for here an army hones its fighting edge. Only by training relentlessly against a realistically portrayed and equipped helicopter force can we gain the experience in peacetime of how to fight one of the battlefield's most destructive and elusive enemies...the attack helicopter.

SIGNIFICANCE OF THE STUDY.

Given the lethality that we ascribe to the attack helicopter on the modern battlefield, solutions must be found to counter these platforms if we are to be successful in future battles. This document investigates the various aspects of counter-helicopter operations. It reviews the Army's budget-constrained training system and addresses how the Army can quickly develop the necessary training for the combined arms team to kill attack helicopters.

The U.S. Army today must be prepared to win the first battle of the next war. Historically, the Army has not had a good track record in its first battles (five wins and five losses since 1776).<11> Countering the attack

helicopter Threat in the next war will be critical to the Army's success. To date, the Army has conducted only minimal counter-helicopter training for maneuver units at its Combat Training Centers (CTC's). A force of only four enemy helicopters is all the Army has with which to train. There have been many conflicts around the world where attack helicopters have played a major role. The attack helicopter Threat can no longer be taken lightly in our training.

"When there is no vision, the people perish."<12>

THESIS ORGANIZATION.

Chapter II reviews the literature by summarizing the research conducted in preparing this thesis. It provides a brief overview of each book, government document, article and periodical, videotaped presentation, personal interview, and unpublished document, and assesses its relative worth and credibility. I offer this chapter as a guide to those who wish to conduct further research on this topic.

Chapter III addresses the historical development, composition, and nature of the Soviet/Warsaw Pact helicopter Threat. This chapter addresses the fundamental underpinnings of the development of the vast array of Soviet-designed attack helicopters, primarily focusing on the MI-4 through MI-24 series aircraft. It emphasizes recent developments which have been made available by the

spirit of glasnost, or openness on the part of the Soviet Union.

Chapter IV examines the future combat helicopter Threat. Here, the next generation of Soviet special purpose gunship designs and the existing and projected Third World combat helicopter Threat to the year 1996 are discussed.

Chapter V addresses the Threat combat helicopter employment doctrine, tactics, and force structures. This discussion acquaints the reader with the "how" and "how many" of the Threat combat helicopter force. Special attention is placed on identifying those characteristics that must be replicated in training.

Chapter VI provides a developmental history of the Army's Combat Training Centers (CTC), their training focus and methodology used to prepare tactical units for war. The focus of this chapter is placed on providing the reader with an understanding of how the CTC concept came about and where the program is going.

Chapter VII examines the Army's existing opposing forces program. The composition and historical development are reviewed to provide a background on the development of the Army's professional OPFOR. Special attention is given to the National Training Center's OPFOR Air Detachment, highlighting its development, capabilities, and limitations.

Chapter VIII compares the actual Threat combat helicopter force capabilities with existing and planned Army helicopter OPFOR detachments. Those differences which

impact upon combat readiness training will be identified, thus providing the reader with the necessary background to assess the relative worth of the current helicopter program.

Chapter IX will address the search for alternatives to the existing counter-helicopter training shortfall. A historical analysis of the Army's sister services opposing forces programs examines the current dilemma. Finally, a cost-effective series of alternatives will be examined to fill the training gap.

Chapter X offers conclusions and recommendations and answers the thesis question.

METHODOLOGY.

This study is investigative, drawing upon both written and oral expertise to make conclusions to the thesis question. The product of this research is intended to be disseminated to the principal decision-makers within the Army who can implement the recommendations made by this thesis. To this end, the study pursues a methodology that traces the historical underpinnings of the various aspects of the thesis question, not only in order to frame a common understanding with the reader, but to provide a glimpse into the future solutions available. From this common base, the reader will be taken through a side-by-side comparison analysis to find an answer to the thesis question and to judge the validity of the conclusions and recommendations.

ASSUMPTIONS.

The following assumptions were made:

1. The U.S. Army will continue to utilize the Combat Training Centers to conduct combined arms unit training through the turn of the century.

2. Existing Army counterair doctrine will remain fundamentally unchanged through the turn of the century.

3. The world-wide attack helicopter Threat will continue to expand from today's levels, both numerically and qualitatively, through the turn of the century in spite of ongoing conventional arms reduction discussions.

4. The U.S. Armed Forces will be faced with yearly budget cuts as a consequence of the Gramm-Rudman deficit reduction program.

LIMITATIONS OF THE INVESTIGATION.

This thesis is limited to the use of unclassified information. Consequently, the thesis may sacrifice details in specific Threat helicopter performance analysis. This limitation is offset by the new openness on the part of the Soviet Union to discuss its attack helicopters with Western specialists and the media. Many previously classified details are now being discussed by the Soviets, thus allowing a reasonably accurate discussion of their helicopters.

Another limitation to this thesis is the lack of authoritative research material concerning the sweeping

military changes within the Soviet Union and Warsaw Pact and the uncertain direction of these changes. The potential evaporation of the Warsaw Pact Alliance will have, of course a decided effect on the future composition of the combat helicopter Threat. While this has been taken into account in the course of the research, the principal methodology of historical analysis remains unchanged.

ENDNOTES 1

1. Porter B. Williamson, Patton's Principles (Tucson, AZ: Management and Systems Consultants, 1979), p. 9.

2. William Craig, Enemy at the Gates (New York, NY: Ballantime Books, 1973), p. 169.

3. Zeev Schiff, Israel's Lebanon War (New York, NY: Simon and Schuster, 1984), p. 160.

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5. Department of the Army, Israeli/US Aviation Symposium 8-12 December 1986, (Conference transcripts, United States Army Aviation Center, Fort Rucker, Alabama, 3 February 1987), p. 53.

6. Richard A. Gabriel, Operation Peace for Galilee (New York, NY: Hill and Wang, 1984), p. 102.

7. Stephen Zaloga and George Balin, Anti-Tank Helicopters (London: Osprey Publishing, 1986), p. 34.

8. Ibid., p.19.

9. Israeli/US Aviation Symposium, p. 19.

10. Ed Bavaro, quoting Colonel M. Belov, Soviet Helicopter Air-to-Air Aviation Digest (March, 1988), p. 3.

11. Charles E. Heller and William A. Stofft, America's First Battles (Lawrence, KS: University Press of Kansas, 1986) p. 329.

12. Holy Bible (New York, NY: Thomas Nelson Publishers, 1984), Proverbs 29:18.

CHAPTER II

REVIEW OF LITERATURE

The warrior's is the twofold Way of pen and sword.<1>

Miyamoto Musashi, 1645

This chapter reviews the research literature used in this thesis. The documents used include: books, articles and periodicals, government documents and studies, unpublished documents and interviews. Because many existing opposing forces (OPFOR) programs are over twenty years old, a good deal of historical information is available on the precedents which led to the creation of various aggressor detachments within the Department of Defense (DoD). Recent developments within the Soviet Union's once-closed society have led to the release of many details pertaining to Soviet combat helicopter capabilities. Therefore, the thesis can proceed without using classified information. The summary below highlights the sources used and addresses gaps in the literature.

BOOKS

Several general reference books document the establishment and use of OPFOR training within the DoD. Some are highly informative, drawing upon primary sources,

while others are extremely superficial and are only meant to entertain.

Dragons at War (1986), by Captain Daniel Bolger, an Infantry company commander during a unit rotation at the NTC, is a superb account of how the NTC functions. Captain Bolger's analysis of how his battalion survived its 1982 Fort Irwin training rotation is rivetting. His unique insight into the reasons why the OPFOR at the NTC came into existence provided an excellent beginning to the development of this thesis.

Helicopter Construction in the USSR (1986), by Lev Chaiko, is an inside account of the workings of the Mil Helicopter Design Bureau, which is responsible for most helicopters now flying in the Soviet Union. Mr. Chaiko offers an insider's view of the Soviet helicopter design, fabrication, and testing environment. Of particular note is his discussion of the design philosophy that drove development of the MI-24 HIND and MI-28 HAVOC attack helicopters.

On War (1984), the work of Carl von Clausewitz, provided many theoretical insights on providing realistic training for armies in peacetime. His observations led directly to the writing of this thesis.

Soviet Helicopters (1988), by Mr. John Everett-Heath, is the definitive history of the development of the Soviet helicopter industry. This updated version (from the 1984 original) is one of few books that describes

the doctrinal drivers behind the Soviet combat helicopter force.

Tatika (1987), written by General V. G. Reznichenko, et al., provides the "hands-on" tactical philosophies of the Soviet Army. However, since this document frequently describes tactical concepts in the light of the "foreign military press" it is difficult to fully separate what Soviet thought really is. General Reznichenko's comments regarding the employment of helicopters are, nevertheless, reflective of Soviet doctrine and his book is an excellent primary source.

Mr. Richard Simpkin's two excellent works, Antitank: An Airmechanized Response to Armored Threats in the 90's (1982) and Race to the Swift (1985), provide an in-depth look into the future of the battlefield use of the helicopter. Simpkin's research of Soviet writings pertaining to the use of deep battle tactics reveals a great deal of insight on the probable future course that the Soviet Union will take in the use of combat helicopters.

Anti-Tank Helicopters (1986), by Stephen Zaloga, is a very well-organized treatment of what constitutes the world antitank helicopter force. Of particular note is the treatment he gives to recent combat operations undertaken by antitank helicopters and an analysis of their impact upon the battlefield. His description of the "Peace for Galilee" operation in Lebanon is very detailed.

Three books published and produced by the Presidio

Press deal directly with the primary OPFOR programs in use within the DOD. Top Gun, the Navy's Fighter Weapon System (1987),by George Hall; Red Flag, Air Combat for the '80's (1984), by Edward Sims; and NTC, A Primer of Modern Land Combat (1989), by Hans Halberstadt, all provide an overview of the three services' training centers. Full of photographs and drawings, these three books are very short on actual documentation.

Victor Suvorov's (pseud), first two works published after his defection: The Liberators (1981), and Inside the Soviet Army (1982), provide only limited information about the Soviet combat helicopter force. The works are useful, though, in the discussions of the Soviet military "mind set."

GOVERNMENT DOCUMENTS

Joint Chiefs of Staff Publication, JCS 26, Joint Doctrine for Theater Counter Air Operations (1986), provides basic counter-helicopter doctrine to the Army. This document also prescribes the use of helicopters to counter enemy helicopters.

TRADOC Pamphlet 525-53, Army Counter Air Operations (1988), describes the Army counterair program and describes the roles and missions of the various branches of the Army for counter-helicopter operations.

FM 100-5, Operations (1988), provides the Army with its basic airland battle warfighting doctrine. It describes

those actions recently to integrate the air and land battles into a unified scheme of maneuver.

FM 1-107, Air Combat Operations (1989), outlines the participation of the Army's Aviation Branch in the counterair operations. This manual provides a detailed vision of how the low-altitude helicopter vs. helicopter air fight over the airland battlefield will be conducted.

FM 44-100, Air Defense Operations (1989), is the capstone air defense manual for airland battle operations. This document forms the basis for all air defense operations and prescribes general concepts for weapons employment.

Army Regulation 350-2, The Army OPFOR Program (1983), is the governing regulation which requires the Army to devote assets to providing an enemy force for all major training events.

Soviet Military Power (1985-1989), provides a limited amount of unclassified data on the Soviet combat helicopter Threat and developmental trends of its rotary-wing force.

ARTICLES AND PERIODICALS

There is a wealth of information pertaining to Soviet helicopters, sister services training organizations and concepts, and the NTC in many periodicals.

Army Magazine, published monthly by the Association of the United States Army, is an excellent source of information on the developmental history of the Army's

Combat Training Centers (CTC), the OPFOR at the NTC, and weapons development for the counter-helicopter mission.

Defence Helicopter World, published bi-monthly, and Rotor and Wing International, published monthly, are helicopter-oriented journals which provided many articles on helicopter aerial combat operations, Soviet helicopter development, and helicopter training in general.

Janes' Soviet Intelligence Review, published monthly, is the key source of information pertaining to recent developments in the Soviet attack helicopter fleet. Of particular note was Stephen Zaloga's report of the MI-28 HAVOC, shown at the 1989 Paris Air Show.

Armor and Aviation Digest magazines, published bi-monthly, provide numerous Threat update articles as well as several discussions of the problems with the OPFOR at the NTC.

Interavia, published monthly, along with Aviation Week and Space Technology, published weekly, provide much of the late-breaking information released by the Soviet Union on combat helicopter capabilities and developments.

Red Thrust Star, published monthly along with the Air Defense Artillery magazine, were the key documents which outlined the present structure and capabilities of the UH-1H OPFOR section at the NTC. The Armed Forces Journal International magazine is a well-balanced periodical which provided several insights into the development of the Top Gun and Red Flag series of exercises.

UNPUBLISHED MATERIAL

Numerous reports are available on training in the Armed Forces. Many of the sources, while seemingly promising in title, ended up being totally unrelated to the development of this thesis. However, a few golden nuggets emerged during the research.

The Army Rotary Wing Adversary Aircraft (ARWAA) Study (1988), conducted by the Westar Corporation for the United States Army Aviation System Command, investigated the specific aircraft candidates for use as a Threat helicopter training surrogate. This report's analysis of the nature of the world helicopter Threat and its assessment of the capabilities of several Western helicopters to mimic the Threat in a training role were key to this thesis.

The Army Rotary Wing Adversary Aircraft Operational and Organizational Plan (1987), produced by the United States Army Aviation Center, laid down a requirement for an Army owned and operated rotary wing aggressor unit.

The Missile and Space Intelligence Command (MSIC) studies XMHDN and XMHAV investigated the possibilities of creating specific Threat helicopter surrogates for use in Test and Evaluation events. The XMHDN study looked specifically at converting either CH-3/S-61 or UH-60 helicopters into MI-24 HIND surrogates. The XMHAV similarly investigated the possibility of using the CH-3 or the AH-64 to emulate the MI-28 HAVOC. Both studies utilized classified and unclassified data. Only unclassified data

and results were utilized for this thesis.

INTERVIEWS

Mr. Nick Lappos, a test pilot with Sikorsky Aircraft, was an invaluable source of information on helicopter air combat and general Threat information.

Mr. Charles C. Parlier, of McDonnell Douglas Helicopters, similarly is a renowned expert in the field of helicopter air combat and has conducted extensive interviews with Soviets involved in the design of the MI-28 HAVOC.

CW4 William Butts, of the National Training Center's OPFOR Air Detachment, was an invaluable source of information about the creation of the helicopter OPFOR at the NTC.

Mr. James L. McElwain and Mr. Don Wheeler, of the Missile and Space Intelligence Center, provided reams of data on their work in converting the Air Force's HH-3 JOLLY GREEN GIANT helicopters for use as high-fidelity Threat surrogates.

Mr. Ed Cighan, of the Air Force's Air Logistics Command, provided a great deal of information about the ongoing HH-3 retirement program and also detailed the current status of the JOLLY GREEN GIANT fleet.

GAPS IN THE LITERATURE

A significant gap exists in the literature concerning the development, composition, and capabilities of

the Army's OPFOR helicopter detachment located at the NTC. The documentation which created the detachment has seemingly vanished and only one article, published in the Air Defense Artillery Journal, adequately describes the detachment's existence and capabilities. Additionally, there is a void in the literature dealing with combat helicopter force structures, doctrine, and tactics used by many Third World countries. As a result, emphasis was placed on conducting personal interviews with subject-matter experts who have had direct contact with areas with literature voids.

SUMMARY

Sufficient information is available to complete this study in the unclassified form originally envisioned.

ENDNOTES 2

1. Miyamoto Musashi. A Book of Five Rings. Translated by Victor Harris. (Woodstock, NY.: The Overlook Press, 1982), p. 37.

CHAPTER III

THE THREAT

> The armed helicopter may turn out to be a means of fundamental change in the nature of ground combat. Although the helicopter is not ideally suited to this role, it nevertheless possesses those characteristics which most ensure superiority in mobility.<1>
>
> General V. Savkin

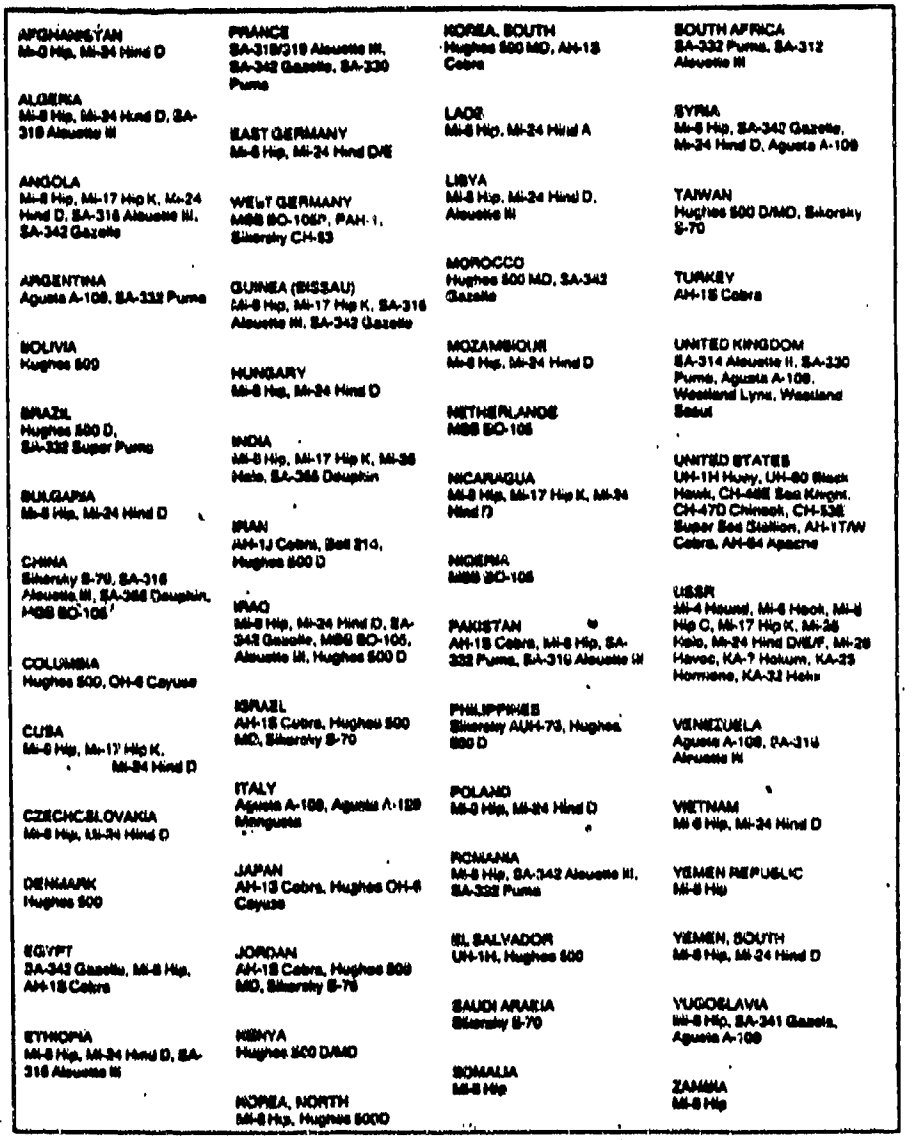
Upon initial examination, the helicopter appears to be a lost stepchild to the sleek and sophisticated world of modern aviation. The helicopter appears to be an ungainly beast, devoid of any of the attributes of a true flying machine. It cannot blast across the sky at high speeds; it generally cannot carry heavy loads for any kind of real distance, and it is an expensive and complicated machine to operate and maintain. What makes it special are just three characteristics: it can take off vertically; it can hover; it can land vertically.<2>

The helicopter was originally used only for rescue, resupply and casualty evacuation operations. However, the combat helicopter came of age during the Vietnam War in the mid-1960's, where it produced an explosion in the mobility of ground forces which had been previously unknown. In addition to its previous functions, the combat helicopter took on the missions of providing aerial fire support for ground operations, armed escort for aerial assaults, reconnaissance operations and finally, toward the end of the conflict, dedicated antitank operations. From this point,

it became common practice to equip helicopters with ever-increasing types of weapons to undertake an even wider variety of battlefield tasks.<3>

Today and in the future, the principal armies of the world will maintain a vast array of armed helicopters for employment in a range of conflicts. (Figure 1).

FIGURE 1



AFGHANISTAN
Mi-8 Hip, Mi-24 Hind D

ALGERIA
Mi-8 Hip, Mi-24 Hind D, SA-316 Alouette III

ANGOLA
Mi-8 Hip, Mi-17 Hip K, Mi-24 Hind D, SA-316 Alouette III, SA-342 Gazelle

ARGENTINA
Agusta A-109, SA-332 Puma

BOLIVIA
Hughes 500

BRAZIL
Hughes 500 D,
SA-332 Super Puma

BULGARIA
Mi-8 Hip, Mi-24 Hind D

CHINA
Sikorsky S-70, SA-316 Alouette III, SA-366 Dauphin, MBB BO-105

COLUMBIA
Hughes 500, OH-6 Cayuse

CUBA
Mi-8 Hip, Mi-17 Hip K,
Mi-24 Hind D

CZECHOSLOVAKIA
Mi-8 Hip, Mi-24 Hind D

DENMARK
Hughes 500

EGYPT
SA-342 Gazelle, Mi-8 Hip, AH-1S Cobra

ETHIOPIA
Mi-8 Hip, Mi-24 Hind D, SA-316 Alouette III

FRANCE
SA-315/316 Alouette III, SA-342 Gazelle, SA-330 Puma

EAST GERMANY
Mi-8 Hip, Mi-24 Hind D/E

WEST GERMANY
MBB BO-105P, PAH-1, Sikorsky CH-53

GUINEA (BISSAU)
Mi-8 Hip, Mi-17 Hip K, SA-316 Alouette III, SA-342 Gazelle

HUNGARY
Mi-8 Hip, Mi-24 Hind D

INDIA
Mi-8 Hip, Mi-17 Hip K, Mi-35 Hate, SA-366 Dauphin

IRAN
AH-1J Cobra, Bell 214, Hughes 500 D

IRAQ
Mi-8 Hip, Mi-24 Hind D, SA-342 Gazelle, MBB BO-105, Alouette III, Hughes 500 D

ISRAEL
AH-1S Cobra, Hughes 500 MD, Sikorsky S-70

ITALY
Agusta A-109, Agusta A-129 Mangusta

JAPAN
AH-1S Cobra, Hughes OH-6 Cayuse

JORDAN
AH-1S Cobra, Hughes 500 MD, Sikorsky S-76

KENYA
Hughes 500 D/MD

KOREA, NORTH
Mi-8 Hip, Hughes 500D

KOREA, SOUTH
Hughes 500 MD, AH-1S Cobra

LAOS
Mi-8 Hip, Mi-24 Hind A

LIBYA
Mi-8 Hip, Mi-24 Hind D, Alouette III

MOROCCO
Hughes 500 MD, SA-342 Gazelle

MOZAMBIQUE
Mi-8 Hip, Mi-24 Hind D

NETHERLANDS
MBB BO-105

NICARAGUA
Mi-8 Hip, Mi-17 Hip K, Mi-24 Hind D

NIGERIA
MBB BO-105

PAKISTAN
AH-1S Cobra, Mi-8 Hip, SA-332 Puma, SA-316 Alouette III

PHILIPPINES
Sikorsky AUH-76, Hughes 500 D

POLAND
Mi-8 Hip, Mi-24 Hind D

ROMANIA
Mi-8 Hip, SA-342 Alouette III, SA-332 Puma

EL SALVADOR
UH-1H, Hughes 500

SAUDI ARABIA
Sikorsky S-70

SOMALIA
Mi-8 Hip

SOUTH AFRICA
SA-332 Puma, SA-312 Alouette III

SYRIA
Mi-8 Hip, SA-342 Gazelle, Mi-24 Hind D, Agusta A-109

TAIWAN
Hughes 500 D/MD, Sikorsky S-70

TURKEY
AH-1S Cobra

UNITED KINGDOM
SA-314 Alouette II, SA-330 Puma, Agusta A-109, Westland Lynx, Westland Sea ut

UNITED STATES
UH-1H Huey, UH-60 Black Hawk, CH-46E Sea Knight, CH-47D Chinook, CH-53E Super Sea Stallion, AH-1T/W Cobra, AH-64 Apache

USSR
Mi-4 Hound, Mi-6 Hook, Mi-8 Hip C, Mi-17 Hip K, Mi-26 Halo, Mi-24 Hind D/E/F, Mi-28 Havoc, KA-? Helix, KA-25 Hormone, KA-32 Helix

VENEZUELA
Agusta A-109, SA-316 Alouette III

VIETNAM
Mi-8 Hip, Mi-24 Hind D

YEMEN REPUBLIC
Mi-8 Hip

YEMEN, SOUTH
Mi-8 Hip, Mi-24 Hind D

YUGOSLAVIA
Mi-8 Hip, SA-341 Gazelle, Agusta A-109

ZAMBIA
Mi-8 Hip

SOURCES: The Military Balance 1986-87, International Institute for Strategic Studies, 1987. Defense Helicopter World, "The Military Balance 1986," Vol. 1 No. 2, April-May 1986

(Source: Greg R. Hampton, "Aggressor Helicopter Training Unit," Aviation Digest (November, 1987) p. 3.)

Both the North Atlantic Treaty Organization (NATO) and Warsaw Pact (WP) have embraced the concept of using combat helicopters in all forms of military operations throughout a wide spectrum of potential conflicts. The helicopter, specifically the armed attack helicopter, is a threat force that must be understood, countered and destroyed if success is to be achieved in any future battle.

THE SOVIET APPROACH

> It is currently impossible to imagine a modern combined arms battle without the use of combat helicopters.<4>
>
> Lt. General Sodovnikov

In order to understand the characteristics and components of the Soviet/WP helicopter force and to be able to predict its future course of development, we must thoroughly understand the Soviet perspective or way of approaching problems, as it differs significantly from that of the West. As one Western specialist described it:

> Soviet military science is based upon a rigorous and scientific study of the nature of the future battlefield. Utilizing their own wealth of military-historical experience as well as the results of exercises and experiments and analysis of other nations' military experience, Soviet military theorists derive operational and tactical concepts, force structure and technology to address what they perceive to be the challenges of modern combat. In the Soviet view, no modern conventional system has had such a profound effect on the nature of combat as the helicopter. This effect has been accelerating in recent years due to the proliferation of rotary-winged aircraft throughout the armed forces of the world, notably within NATO and the Warsaw Pact. From a Soviet perspective this is a logical outcome of the laws of ialectics which govern all development, especially military development.<5>

"War," said Lenin, "is a tool of policy" and as

such, it is the function of Soviet military doctrine to produce the military organizations capable of implementing Soviet policy through armed conflict. Consequently, Soviet military doctrine serves to determine the size and shape of the armed forces and to ensure the total integration of organization, tactics, training, and equipment to enable the armed forces to support those goals that the Communist Party directs.<6>

Soviet military art is not a simple set of tactical regulations. It is an all-encompassing military philosophy which is applied to the whole military system as the military element of Marxist-Leninist doctrine. Thus, the priciples of Soviet military art, its selective use of historical example, the research methodology (including its own attitudes, prejudices and ethnocentricisms) are all applied consistently and uniformly across the whole spectrum of military affairs. The principles of war which young officers learn at military schools are not only the same for all branches and arms of the services, but they are also the same principles that are taught to weapons designers or research staff in academic institutions, or made available to members of the Central Committee of the Communist Party, or taught to all sixteen year-olds in every school in the USSR as prescribed for mandatory pre-service military training.<7>

The effect of this military art on the Soviet Armed Forces is often misunderstood in the West. Soviet military

thought is widely regarded as being rigid and restrictive in nature, therefore inhibiting innovation and initiative. On the contrary, however, this system allows the Soviets to exploit their centralized socio economic system's capabilities. The Soviets firmly believe their system of centralized control and automatic by-the-numbers execution of orders by subordinates will produce swift victory in war. Above all, military development within the Soviet Union is directly proportionate to the effect that the Russian environment and historical experiences have produced. The Soviet system is influenced profoundly by the past.<8>

The sheer size and scope of the European portion of the USSR has by far had the most impact on the Russian military experience. Russian and Soviet tactics have been developed over centuries of war specifically designed and suited to the Russian terrain. The shared experience of years of fighting over the flat plains of northeast Europe goes far in explaining the uncanny consistency in the Russian warfighting style over the years.<9>

The two principal features of the European portion of the USSR that have dominated military thinking are its extreme size--an area equal to that of the rest of Western Europe, and the extreme flatness--an area devoid of significant vertical terrain relief that forces an army to contend only with wide, slow-flowing rivers as an impediment to movement and defense. The flatness of the terrain, added with its size and lack of major terrain obstacles has led to

requirements for the Russians to maintain large standing armies. These armies had to have the ability to rapidly maneuver over great distances, to concentrate quickly and destroy the enemy threat before the vastness of the terrain dispersed the enemy's force. The ability to move, mass and attack on a large scale became extremely important to both Russian Imperial forces and the Soviet Army.<10>

The most significant consequence of this experience has been on the organization of the Soviet Army. Armies had to be highly mobile to realize an operational advantage over an enemy. This meant that armies had to be structured in order to ease movement. Weapons and vehicles had to be designed and constructed with mobility in mind. Large logistics trains and long supply lines had to be tailored in order to free the troops to exploit the mobility provided by the vehicles and weapons. All of these features have led to the development of a highly-mobile fighting force, oriented strictly on the offensive promulgation of war. Given the Russian heritage, it is hardly surprising that Soviet military art has emphasized the concept of the mobile, offensive way of war, even in situations where strategic defense would be warranted.<11> This concept may be altered in light of the sweeping changes throughout Eastern Europe to a more defensive concept. Only time will tell if the leopard has really changed his spots.

Another facet of the Russian experience has been that the concentration of these highly-mobile combat

formations in the hands of operational commanders gives the Soviet Army an extremely high degree of operational flexibility; that is the rapid switching of effort from one axis to another when enemy resistance impedes the attainment of objectives. Soviet military art, therefore, teaches the operational commander to maneuver and overwhelm his enemy with the utmost speed, relying upon the rote execution of his subordinates to maintain the tempo of the battle. As a result, the Soviets see speed and surprise as the critical elements of warfare at the operational level. To this end, the Soviets have consistently designed their weapon systems to execute a specific mission on the battlefield to achieve both the attributes of surprise and speed. "The Soviet experience has never shown a need for versatility, either in weapon systems or Army organization or even in the abilities of the common soldier."<12> Above all else however, "Mobility is the first principle of operational art and tactics."<13>

Technology has always been of great importance to Soviet military planners. This is probably due to the relative backwardness of the Soviets over the years in relation to the West. The Soviets have longingly gazed westward in awe of the Western world's development of military-related technology. This has not been just a recent event but has transpired from the time of Peter the Great (who actively sought Western arms and warfighting techniques). Soviet military planners have been consistently

obsessed with the West's technological innovations which could undermine their defense effort. It is not surprising that the Soviet defense establishment receives the highest priority for the development of new weapons and means of transport. Often Western breakthroughs are stolen, studied and copied in the all-out effort to maintain parity in the arms race. However, this "sincerest form of flattery" is not without a plan. The Soviets will only place into service those Western items it feels will benefit its own military needs.

The actual Soviet military design system can be characterized by centralized management. Production performance is measured primarily by volume with very little technological innovation and efficiency. What is consistent in the system is a reliance upon what has worked in the past, what systems and concepts have proven successful and to those winning ideas the Soviets tend to add improvement to rather than jump to something new.

The Russian mentality stresses cleverness over original thought. The ability to squeeze the maximum value from a weapon system has been a Russian way of life. One observer noted that, "The same quality of mind shown by the Russian peasant of 19th century literature, whose cunning and ability to 'get a quart out of a pint pot,' particularly when under pressure" has been a legendary trait.<14> To this end the Soviet Army rarely retires older, proven weapon systems, keeping in service antiquated weapons that the

Western armies would have thrown away years ago. As a result, there is a great degree of ingenuity and continuity in design practices within the Soviet Union. The "if it's not broken, don't fix it" mentality is the byword of the Soviet system and, consequently, one often sees antiquated equipment married to new, refined weapons systems. Soviet tanks designed and built during the 1950's have been continuously upgraded with just enough technology to keep them viable on the battlefield. In the Soviet Army, weapons are used until they fall apart; nothing is thrown away.

Another Soviet quirk that influences weapons design within the Soviet system is the nature of the personnel who man the weapons. Most Soviet military personnel are conscripts, serving two-year tours on active duty, then reverting to reserve status until the age of 55. In order to ease the training problem for the reservist portion of the manpower pool, the Soviets attempt to keep the equipment that the soldiers and airmen have to use in the same basic configuration through the years. As a result, a conscripted soldier who entered the Army during the 1960's as a member of the tank branch (qualified on the T-62 tank) if called back to duty today, would find the T-80 tank to be a relatively easy weapon system to retrain in, as the newer tank retains many of the features of its earlier model. Additionally, these reservists, in all likelihood, would probably be operating the equipment they originally trained on twenty years before. The entire concept supports total

mobilization for war, and as discussed previously, enables a rapid transition.<15>

The Soviet respect (or perhaps fear) of authority toward an individual's culpability for failure of men or machines under one's command has had a marked effect upon weapons design. If a Soviet soldier damages equipment which he has been instructed on how to operate correctly, either through negligence or carelessness, he or his officers will be punished or made to pay for repairs. Soviet soldiers, therefore, concentrate heavily upon mastering the basic skills of operating simple weapon systems with many rote memorization steps. With such a system, the Soviet designer will be reticent to increase the complexity or technological risk of the weapon system even if it would ease the operator's tasks, for even the designer may be held liable for a failure in design.<16> The bureaucratic response to a design problem, therefore, rewords the "cautious Soviet bureaucrat who prefers slow progress through improvements in materials to the risk of bold research and development."<17>

Lastly, the experience of the Second World War has left a marked impact on the Army. The weapons design lessons of the "Great Patriotic War" are still fresh in the minds of the Soviets. This Soviet portion of the war, a large-scale land conflict, paid little attention to large-scale strategic air and sea operations. Contrary to the other Allied Powers (U.S. and England) all of the Soviet

Union's crucial battles were large-scale land battles, where air and naval operations played only a secondary role. There was no climactic "Battle of Britain" or "Battle of Midway" in the Soviet experience. The gigantic land engagements dominated the Soviet view of war and as a consequence, the priorities of land combat dominate both the Navy and more importantly, that of the Air Force. The air arm of the Soviet Union's Armed Forces never went through the renaissance of being transformed into an independently operating service like those of the West. The Air Force exists principally today to do the job it performed during the Second World War...that of supporting the Army. Therefore, the design priorities for the MI-24 HIND helicopter, the BMP infantry fighting vehicle and the KASHIN class destroyer exhibit a remarkable similarity.<18>

In conclusion, then, the Soviet experience is the progenitor of what the Soviets are today. The effects of the Second World War, the geography of their country and their socioeconomic system all have had a pervasive and unique impact on how the Soviets view the world and conduct themselves. The Soviets must be judged within the context of their own experience, and now armed with a common understanding of their methodology, the reader can now be prepared to discuss the origins of the Soviet combat helicopter force.

THE ORIGINS OF THE SOVIET COMBAT HELICOPTER FORCE

Over fifty years have transpired since the first

Soviet helicopter took to the air. During the intervening years, the Soviets designed, built and fielded a vast array of helicopters which include not only the four largest helicopters ever built but also the two most heavily-armed combat helicopters in the world.<19> With the sole exception of the KA-26 HOODLUM (an agricultural aircraft) every helicopter designed and produced by the Soviet Union was specified for military service. Even when pressed into civil service under the control of the state airline Aeroflot, the Soviets can rapidly get their hands on over 2,000 military-designed helicopters to support combat operations. Strangely enough, it is not surprising that Aeroflot is "managed" by a Colonel General of aviation who formerly commanded Transport Aviation within the Soviet Air Force.<20>

The Soviets initially saw the helicopter as being ill-suited for modern war. To be sure, it could function in secondary battlefield support roles but was far from being seen as an aerial combat platform. However, this way of thinking was radically altered by the events which transpired on a rocky, windswept penninsula in Asia during the early 1950's.

According to a Soviet engineer who worked for the Mil Design Bureau, the development of the first principal Soviet combat helicopter, the MI-4 HOUND, was begun in response to the United Nations Forces use of helicopters in the Korean War.<21> Joseph Stalin was enamored with reports

of how U.S. and Commonwealth Forces used helicopters to rapidly move reinforcements and supplies about the Korean battlefield. Consequently, Stalin rallied his two principal helicopter designers, Mikhail Mil and Alexandr Yakovlev, to produce a vertical flight machine which would give the Soviet Air Force the same capability as the Americans. Stalin's edict had an extreme sense of urgency attached to it, as both prototypes were to fly within 12 months.<22> The Soviets were behind and were going to catch up.

Mil's aircraft, the MI-4, (Figure 2), was rapidly pressed into service with the Red Air Force in August of 1953. To make this happen, Mil avoided the prototype stage of development altogether, pressing the first pre-production models into acceptance testing in just seven months.<23> This fantastic crash effort on the part of the Mil Bureau had gotten the Soviets back into the game quickly.

FIGURE 2

(Source: Defence Helicopter World, "Defense Specifications," (December 1989-January 1990) p.100.)

The MI-4 was a typical product of the Soviet aircraft design system. It was a large, highly-powered

aircraft that possessed a unique Soviet design philosophy: "Make it simple, make it reliable, make it rugged and make it work."<24> The MI-4 quickly laid claim to a number of helicopter flight performance records which astonished many Western observers.<25> The Soviets were rightly proud of their achievement. Mil himself best described how the Soviets felt about his creation:

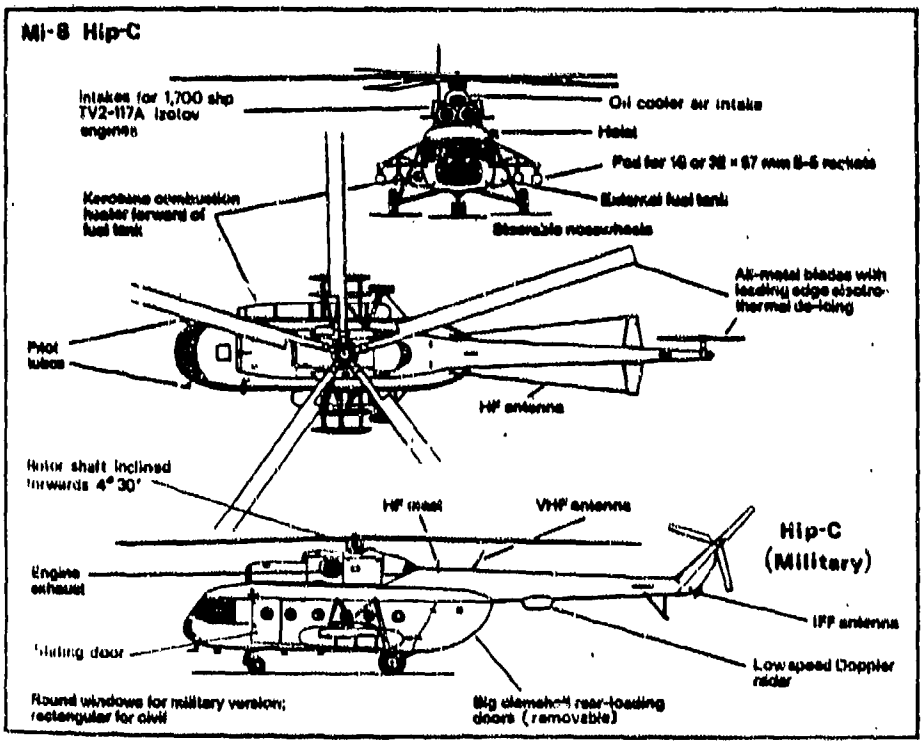
> Possessing equipment for blind and night flights, an anti-icing system and hydraulic servo-controls, the MI-4 helicopters have no equals and have left foreign construction several years behind. They again brought our country to leading positions in this field of engineering.<26>

During the early 1960's there was a degree of experimentation with basic helicopter gunship concepts in the Soviet Union. Again, the Soviets had seen world developments in the use of helicopters. The French ad hoc use of armed helicopters during the Algerian wars provided the impetus to adapt armaments to the MI-4. The MI-4A helicopter was developed during this period, mounting a single machinegun in a gondola below the fuselage.<27> Later in the decade, a close-air support version of the HOUND, mounting air-to-surface rockets and missiles, was added to the Air Force and was successfully demonstrated in a close-air support and air assault exercise during the Dnepr maneuvers in 1967.<28>

The advances made in the development of the turbine engine, offering more power than conventional piston power plants, soon provided the technology necessary to build

bigger and more efficient helicopters for the Air Force. A successor was needed for the MI-4 and as a consequence the Mil Design Bureau conceived of and built the MI-8 HIP helicopter in 1960. The MI-8 (Figure 3) was designed to move 28 fully-equipped combat troops over a distance of 300 kms.<29> The first prototype, equipped with a single turbine engine, flew publicly for the first time on 3 July 1961. This earlier variant soon gave way to the more powerful twin-engined HIP-C model which was introduced in 1962.<30>

FIGURE 3



(Source: John Everett-Heath, Soviet Helicopters (Coulsdon, UK, Jane's Information Group, 1988) p.97.)

Following the Western practice of "strapping on" weapons packages to existing transport helicopters during this timeframe, the HIP-C was fitted with an outrigger

structure allowing for the attachment of a variety of air force armaments. The typical armament mix for the HIP-C consisted of four 16 or 32-round 57 mm rocket pods and/or a mixture of free fall bombs (up to 250 kg). The armament capacity of the HIP grew progressively with the advent of the HIP-E in 1977. This aircraft added two more rocket pods to the existing four and mounted four antitank-guided missiles on the upper ends of the outriggers. To assist in target coverage, a 12.7 mm steerable machinegun was mounted in the aircraft's nose. The end result was a perfect marriage of Russian design--a large lumbering weapons platform which still holds the distinction of being the most heavily-armed helicopter in the world Even when fully armed and fueled the HIP-E can still lift 12 to 14 troops.<31>

The HIP-F, essentially an export version of the HIP-E, was introduced into the East German Air Force in 1977. This variant, in service with many nations of the world today, mounts six of the less-sophisticated SAGGER antitank missiles in lieu of the four smaller missiles of the HIP-E.

The HIP's final variant is in the form of the MI-17, (Figure 4). This aircraft, in its outward appearance, is hardly distinguishable from its predecessors. Like the HIP-E and F, the MI-17 has three pylons on outriggers on each side of the fuselage and carries rockets, bombs and machineguns. What is different is found inside the aircraft

engine compartment when a substantial upgrade in engine performance has been installed. Additionally, an ad hoc system of Aircraft Survivability Equipment (ASE) has been added to allow the aircraft to survive the battlefield threats of the 80's. Specifically, a decoy flare dispenser, an Infrared (IR) jammer and a set of engine exhaust suppressors (to defeat shoulder-launched IR homing missiles such as the SA-7 and STINGER) are clearly evident in photographs of the aircraft. Armor-plating has also been "bolted on" to the exterior and interior of the aircraft to defeat small arms attacks and protect the pilots.

FIGURE 4

(Source: John Everett-Heath, Soviet Helicopters (Coulstdon, UK, Jane's Information Group, 1988) p. 106.)

The improvements shown on the MI-17 are all undoubtedly a result of lessons learned through the operational history of the HIP series of helicopters. HIPs have been used in many Warsaw Pact exercises since 1967 but

also have seen combat. The 1973 Yom Kippur War saw the extensive use of the HIP by the Egyptians to conduct commando raids, direct attacks on Israeli positions with rockets and bombs and even limited antitank operations from altitude.<32> Following the Yom Kippur War, the HIP saw extensive use throughout the world, most notably in Afghanistan, Angola, Chad, Iran/Iraq, Mozambique, Nicaragua and in the Ogaden War between Ethiopia and Somalia. The HIP has won grudging respect by both sides in these regional conflicts primarily due to its rugged dependability and operational usefulness.<33> In all, over 10,000 MI-8 and MI-17 HIPs have now been built.<34>

The MI-8 and MI-17 series of helicopters, however, are basically just armed troop carriers. While being able to carry great loads of weapons and personnel, they are slow and highly-vulnerable to weapons of all types. With a history of fighting on the barren steppe of northern Europe, the Soviets felt the need early on for the use of a battlefield helicopter that could move more rapidly than the HIP and be able to survive the rigors of the modern battlefield. Disdaining the Western concept of Nap-Of-the-Earth (NOE) flight profiles (utilizing hovering, sneak-and-peek types of flight tactics), the Soviets wanted a modern helicopter version of their World War II Ilyushin IL-2 ground attack bomber with armor-plating and speed for protection.<35> This "flying tank," a new helicopter optimized for providing fire support, was seen as the new

key to mobility on the battlefield. By being able to operate with the ground troops, the Soviets found a new tool which would offer a leap in operational mobility--the attack helicopter.

The concept of the attack helicopter was initially a Western concept. "The idea of a helicopter gunship that could be used against tanks...(was an) idea (that) originated in the West, but was later taken up in the Soviet Union."<36> The impetus to build a dedicated attack helicopter was again spurred by the developments in a foreign war. The U.S. introduction of the AH-1 COBRA gunship into Vietnam in 1967 greatly impressed the Soviets, who were constantly receiving reports from the North Vietnamese and their Viet Cong counterparts, that the attack helicopter constituted the most deadly threat on the battlefield.<37> Additionally, the Soviets became enamored with the ongoing U.S. development of the AH-56 CHEYENNE and the S-67 BLACKHAWK advanced helicopter gunships which were vying for being selected by the U.S. Army as a follow-on to the COBRA. As a result, the decision was made, and during the summer of 1968 the Soviets embarked upon designing their first attack helicopter.

The crash program to build a helicopter gunship had an air of urgency behind it.<38> As a result, the Mil Bureau made the conscious decision to adapt or modify parts from the MI-8 helicopter to speed production. A "low risk" design was chosen. The rotor system and basic drivetrain

were initially utilized along with many Western helicopter design concepts to build the first prototype. Again, the Soviets utilized their unique system of design and problem-solving. As Lev Chaiko pointed out about the design work that took place during this period:

> Western ideas provided a powerful stimulus for research and development. One of the major sources of information about attack helicopters was the helicopters brought from Vietnam. Throughout the Vietnam War, parts and units of downed American helicopters, as well as whole machines were delivered to the Mil plant in Moscow; some were in good operational condition.<39>

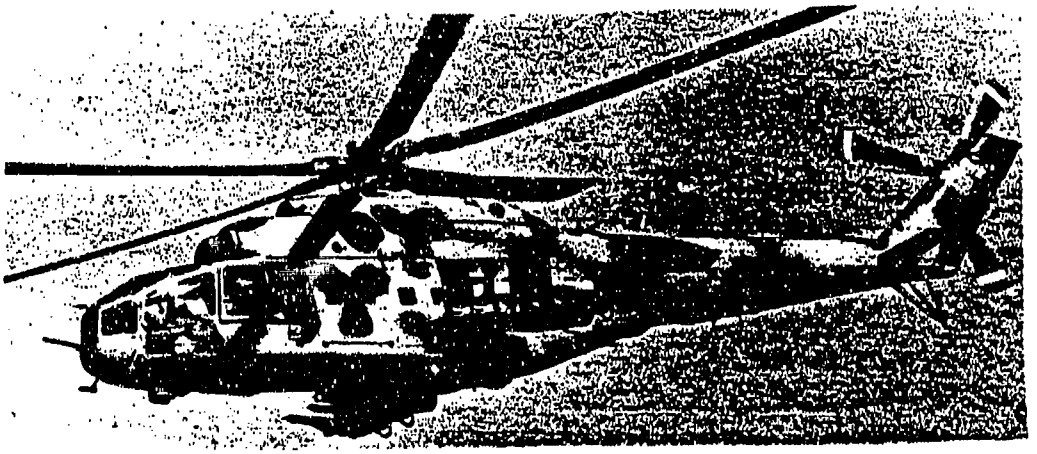
As a result, the first MI-24 gunship prototype was designed in two variants: one utilizing a standard Soviet design and another incorporating Western design fenestron (open fin) tail rotor.<40>

The first prototypes of the MI-24 flew in 1970. These aircraft reflected a combination of the characteristics of both a gunship and of a transport helicopter. Both had the external wings for mounting armaments and incorporated rounded aerodynamic shaping to facilitate high-speed flight. Yet these prototypes retained a troop-carrying cargo compartment, capable of holding a squad of eight fully-armed soldiers.<41> It seems in retrospect that there was a compromise between a true, dedicated gunship and a multi-purpose assault aircraft in the requirements documentation for the MI-24 helicopter.

It was not until late 1971 that the world got wind of the MI-24.<42> The effort was truly a surprise to many

Western intelligence officials who had not forecast such a speedy reaction to the West's helicopter gunship supremacy.<43> The two prototypes that were noticed by the West were quickly codenamed "HIND-A" and "HIND-B" respectively. Of these two designs, the HIND-A, (Figure 5), eventually reached initial operational capability, was produced in 1972 and entered service in 1973. By Spring 1974 two regiments of 50 HIND-A helicopters became operational at Parchim and Stendhal Airfields in East Germany where, so far as is known, the first photography of the aircraft reached the West.<44>

FIGURE 5



(Source: Mike Spick, Mil MI-24 HIND (London, Osprey Publishing, 1988), p. 11.)

The HIND-A was built for speed. This was clearly shown by the absence of a traditional set of fixed landing gear which causes a great deal of drag on most helicopters. The stub wings of the aircraft also contribute to the speed of the aircraft. The thick airfoil section and span of the wing act to provide lift for the aircraft at high airspeeds.

thereby allowing the rotor to provide more impetus for forward momentum. In high-speed forward flight, the wing provides almost 25% of the total lift generated.<45> The Soviets themselves describe the HIND-A as:

> resembling the latest modification supersonic MIG. The resemblance was enhanced by short wings carrying special grips for on-board weapons...Everything about the aircraft points to its high speed characteristics, maneuverability, and perfect aerodynamic shape.<46>

These features, together with over 4,200 shaft horsepower provided by two Izotov TV3-117 engines powered a specially modified HIND-A (called A-10) to a world helicopter speed record of 334.461 kph on 18 July 1975.<47>

The features that provided this speed also hindered the HIND's performance. As typical with most helicopters, any aerodynamic force tends to have an adverse effect on the opposite end of the aircraft's performance spectrum. In the case of the HIND, hover performance was sacrificed for raw speed. When hovering, the HIND loses significant lift due to the wing's interference with the rotor's downwash. To compensate for this, the Soviets built in 16 degrees of anhedral into the wings, thus providing the aircraft with its most distinguishing feature.<48>

The wings of the HIND-A also serve the purpose of supporting the weapons stores. The first models of the HIND carried four of the radio-guided Falanga AT-2 "SWATTER" ATGM's on the outboard wing stations and four 32-shot 50 mm rocket pods on the inboard stations.<49> Like the MI-8, a steerable 7.62 mm machinegun was mounted in the nose, being

fired by the navigator sitting forward of and between the pilot and co-pilot. Complementing the armament, the crew was protected from enemy fire by 5 m/ of armor-plating along the bottom of the fuselage. All in all, the MI-24 HIND-A truly represented a "flying tank" and posed a serious threat to those who faced it.

While the HIND-A possessed a wide variety of mission capabilities, it also possessed a design which had inherent compromises that limited its effectiveness. Its troop-carrying capacity was really too small to realize the grand scale of Soviet air assault operations. Additionally, it was still vulnerable to a wide variety of small arms fire. Lastly, the design really was not optimized as a true tank killer, as its crew station alignment did not provide the visibility of the pilots and weapons operator.

Perhaps what was needed to support the Soviet gunship concept was a new dedicated attack machine, capable of performing the missions of close fire support and antitank operations. The Western world would certainly see it this way but Soviets saw things differently. They possessed the world's fastest helicopter in the original HIND-A design. They had an excellent array of antitank guided-missiles (ATGM's) on hand and under development. More importantly, they lacked the high technology of the West and the time to catch up to the level of the West's current fleet of swift and nimble attack helicopters (AH-1S COBRA, BO-105). If a new capability was to be achieved, the

last thing Soviets wanted to do was to scrap the existing design and leave a gap in the inventory.

Consequently, a new model would have to be made.<50> The major redesign of the MI-24 HIND was begun in 1972 with the aim of turning the HIND into a highly survivable, mission-optimized gunship. Again, utilizing captured U.S. helicopter components and whole aircraft obtained from the North Vietnamese, Marat Tishchenko, Mil's successor at the design bureau, set to work to produce the original design.<51>

The aim was to make the HIND virtually immune to small arms fire, resistant to heavy machinegun fire and tolerant of 20 mm munitions. The hardening effort was begun by grafting a completely new nose section on the aircraft, turning the previous design housing three crewmembers into a two-seat, tandem configuration, much like the existing AH-1 COBRA and AH-56 CHEYENNE.<52> Armored glass was placed in front of both crewstations while an armored "bathtub" of 8 mm of titaniun armor surrounded the pilot and co-pilot from the sides and below.<53> The new stepped tandem crewstation layout, with the pilot seated above and behind the gunner/co-pilot, greatly aided crew visibility and workload division. The gunner/co-pilot had the best field of view forward consistent with his job of firing the main antitank weapons, while the pilot had the best view to the sides and overhead, as to be better able to fly the aircraft.

The new model, designated "HIND-D" by the West,

(Figure 6), began production in 1975. The aircraft was fielded in the Group of Soviet Forces Germany (GSFG) in 1976, supplementing the existing attack regiments at Stendhal and Parchim Airfields. The HIND-D soon earned the nickname Gorbach (Hunchback) due to its distinctive profile and immediately qualified itself as perhaps the ugliest flying machine of all time.<54>

A new helicopter-launched antitank missile was developed for the HIND-D. An upgraded version of the AT-2 SWATTER missile, utilizing the Semi-Active Command Line of Sight (SACLOS) guidance was fitted to the HIND-D to increase the accuracy and survivability of aircraft in its antitank role. This new missile system, codenamed SWATTER-C by NATO has a range of 3.5 km and a time of flight of 23 seconds at maximum range.

FIGURE 6

(Source: Stephen J. Zaloga and George J. Balin, Anti-Tank Helicopters, (London, Osprey Publishing, 1986) p. 20.)

The most pronounced outward change to the HIND's weapon suit was the addition of a turret-mounted four-barreled 12.7 mm Gatling gun mounted under the nose of the aircraft. No doubt influenced by similar turreted guns mounted on the COBRA and CHEYENNE, the 12.7 mm gun on the HIND-D fires at very high rates (4,200 spm) and possesses a wide field of fire (+15 degrees elevation to -60 degrees depression and 140 degrees travel off longitudinal axis).<55>

The redesign of the HIND created a larger and heavier aircraft which necessitated larger engines to get it off the ground and a camouflage paint scheme to hide it from visual acquisition. All of the weight of the additional armor deeply cut into the aircraft's performance even with the engine upgrade, as the weight increased by 30% while the horsepower available increased only by 8%.<56> The paint scheme is said to work very well in reducing visual acquisition. However, the design was still not what the Soviets wanted.

In late 1979, NATO designated still another variant of the MI-24: the HIND-E, (Figure 7). This aircraft was initially seen on Soviet television in 1977 and probably entered service in 1978.<57> The HIND-E possesses a new electronics package under the nose, an enlarged radome/radio transmitter, and a new antitank missile launcher which allows it to fire the AT-6 Kokon (NATO designated SPIRAL) missile.

FIGURE 7

(Source: John Everett-Heath, Soviet Helicopters (Coulsdon, UK, Jane's Information Group, 1988) p. 132.)

The SPIRAL is a tube-launched ATGM with folding fins and a supersonic speed of at least 500 meters/second and a range of at least 5,000 meters.<58> This new missile system provides the stand-off ranges that the Soviets need to neutralize the air defense systems currently employed by the West, but more importantly, it also provides a greater stand-off range against the ATGM's mounted on the majority of Western antitank helicopters that are considered to be a new threat to the HIND. At its maximum range, the SPIRAL can achieve a hit probability of 90% and is assessed to have a dual antitank and anti-helicopter capability.<59> Later variants of the HIND-E have been seen carrying up to 16 SPIRAL missiles in lieu of the standard 57 mm rocket pods, making this aircraft the rough equivalent to the U.S. Army's AH-64 APACHE in terms of antitank firepower.<60>

The first HIND-E's kept the 12.7 mm turreted gun, but during the Druzhba exercises in 1982, variants of the

E-Model were seen mounting a new twin-barreled 30 mm cannon attached to the aircraft's right side in lieu of the turret. The new cannon has an effective range of up to 2,000 meters. This new model of the MI-24 was given the designator of "HIND-F" in 1986, although it probably went into service during 1980 or 1981.<61> The HIND-F, (Figure 8), represents the final antitank modification to the MI-24 series gunship. With the repeated modification, the aircraft has grown to a maximum gross weight of some 25,353 lbs. which stresses the drivetrain components (engine, transmissions and rotor systems) to their maximum capability.

FIGURE 8

(Source: John Everett-Heath, Soviet Helicopters (Coulsdon, UK, Jane's Information Group, 1988) p. 133.)

A final variant of the MI-24 is the HIND-G reconnaissance helicopter which was first seen in 1987. This aircraft is essentially a HIND-D without ATGM's and is used to provide timely combat reconnaissance to the ground commander.<62>

In all, the existing fleet of Soviet combat rotorcraft comprises over 4,400 machines, with over 1,400 being HIND-E, F models--a formidable force which must be considered in all tactical situations.<63> What does the future hold for this vertical maneuver arm of the Soviet ground commander? Chapter IV will delve into this question and will discuss the future Soviet combat helicopter Threat.

ENDNOTES 3

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42. Ibid., p. 9.

43. Davis, p. 20.

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45. Ibid.

46. Everett-Heath, p. 119.

47. Davis, p. 18.

48. Carter Meyers, "The MI-24 HIND: A Potent Adversary," Armor (March-April 1987), p. 9.

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CHAPTER IV

THREAT: THE FUTURE AND THE THIRD WORLD

> Look at things objectively, from the viewpoint of laws of the world, see various doctrines departing from the true Way. Know this spirit...with forthrightness as a foundation.<1>
>
> Miyamoto Musashi

> The primitive can also be a weapon.<2>
> General Adolph Galland

The demonstrated combat effectiveness of the attack helicopter has undoubtedly garnered a great deal of respect among the leadership of the Soviet Armed Forces. The recent war in Afghanistan, as well as the Arab-Israeli and Iran-Iraq wars of the Middle East, witnesses the successful use of attack helicopters making first strikes, usually from ambushes within the embrace of terrain. These successes against tank forces, estimated by several Soviet authors at 10 to 20 times that of ground-based antitank systems, caused the Soviets to re-evaluate their concepts of attack helicopter warfare.<3> The Soviet experience in Afghanistan and improvements in NATO's anti-helicopter defenses, specifically the West's concepts of helicopter air-to-air combat, made the need for a new series of attack helicopters very urgent. The HIND helicopter could not compete with the likes of the then on-the-drawing-board AH-64 APACHE and Agusta 129 MONGOOSE. The Soviets were again behind the Western powers.

As a result, four new Soviet combat helicopters, the

MI-28 HAVOC, the Kamov HOKUM, the MI-34 HERMIT, and the MI-38 all have been in development since the late 1970's and are expected to enter service during the 1990's.<4> The MI-28 HAVOC represents the third generation of Soviet attack helicopters and bears a striking resemblance to both the AH-64 APACHE and A-129 MONGOOSE. The Kamov HOKUM on the other hand, represents a revolutionary Soviet response to NATO's attack helicopter force, being optimized to acquire, engage and kill low-altitude, rotary-wing targets that are capable of impinging the success of the Soviet armored forces. The MI-34 HERMIT and MI-38 helicopters will supplement and replace the existing fleet of combat rotorcraft and will modernize the conduct of Soviet helicopter operations. Together, these four new designs represent the focus of the Soviet attack helicopter fleet of the future.

THE MI-28 HAVOC

The MI-28 HAVOC's existence was first acknowledged in open source in January 1978 when U.S. Representative William L. Dickinson (R-AL) told a meeting of the American Helicopter Society in Washington, "The Russians have a follow-on attack helicopter which is thought to be equal to or better than the Hughes AH-64."<5> This comment was verified by a Soviet defector who was employed at the Mil Bureau when he wrote, in 1984, that the Main Design Department began work in 1978 on a new "specialized antitank machine."<6>

The design of the MI-28 came from a requirement generated by the Helicopter Department of the Soviet General Staff in 1975 and was forwarded to Marat Tishchenko for execution. Tishchenko's design crew, headed by M. V. Vainberg, immediately began to pull the elements of the design together, drawing upon the "maddening layers of customer-driven requirements" for the machine.<7> Unlike the HIND, the MI-28 was not to be saddled with the requirement of having a troop-carrying compartment which would add bulk and detract from its antitank role. Combat survivability was the overriding priority of the specification, no doubt later reinforced by lessons learned in Afghanistan.<8>

Little was known about this project's progress until 1984, when the annual issue of Soviet Military Power confirmed the existence of the aircraft and noted that it was in flight test.<9> The 1985 edition of the same publication produced a full-color artist rendering of the aircraft and offered a simple side-view drawing comparing the relative size of the MI-28 against current U.S. helicopters.<10> Details about this aircraft, nicknamed "APACHE-SKI" by the Threat analysts at Fort Rucker, began to emerge in earnest during the late 1980's, to the point that some very accurate scale drawings and even a plastic model became available to the public.<11> The common knowledge of the aircraft in the West as well as their new spirit of Glasnost (openness) by the Soviets undoubtedly prodded them

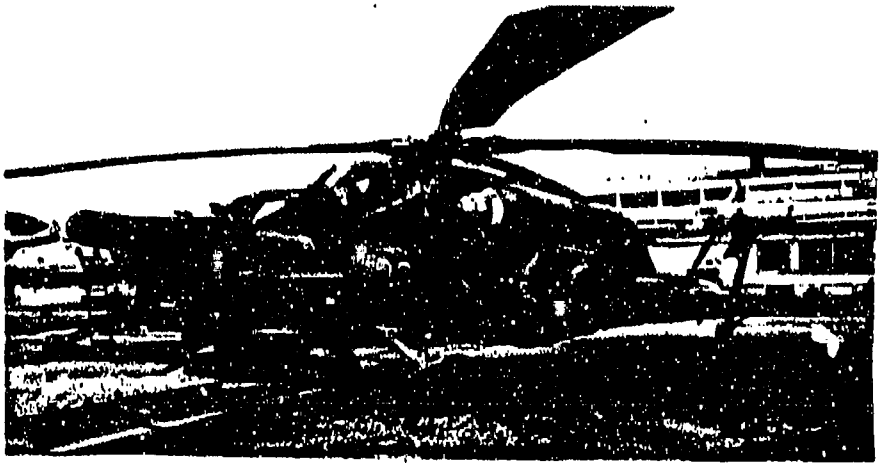
to unveil the aircraft publicly, and as a result, the world got a first-hand glimpse of the HAVOC during the Paris Air Show of 1989.

The arrival of the HAVOC in Paris on 8 June 1989 opened a veritable floodgate of information on the once highly-classified MI-28 program. A great deal of information was suddenly offered up on the part of the Mil Design Bureau, who greatly praised the capabilities of the HAVOC in relation to many foreign aircraft. The aircraft's presence at Paris was undoubtedly intended to spur international interest in purchasing Soviet military hardware throughout the world.<12> The version displayed was an export, day only operations-capable variant but nevertheless graphically demonstrated the degree of sophistication of which the Soviets are capable.<13>

The aircraft shown in Figure 9 was in fact the third prototype of the design series of three aircraft that have been flying since 10 November 1982. According to M. V. Vainberg, Deputy Chief of the Mil Bureau, the aircraft has been certified for production by the Soviet Government and is going to be fielded in significant numbers during the 1991-1992 timeframe. The great time-lag from project initiation to projected fielding (13 years) was openly addressed by explaining that "...technical problems in the development program... required additional time" but more importantly that "limited financial resources further delayed production."<14> It does seem that the Soviet fear

of a gap in the production line was justified.

FIGURE 9



(Source: Steven Zaloga, "Havoc at Paris," Jane's Soviet Intelligence Review (August 1989), p. 357.)

The MI-28 suggests that the Soviets have come to the conclusion that their traditional attack helicopter tactics, those exhibited by the HIND, will not work in a future war in Europe.<15> The requirement to remain terrain-masked, surrounded by the protective embrace of the natural folds of the earth, are seen as paramount to ensure survival. Although this concept has not been openly stated by the Soviets, the outward appearance of the HAVOC clearly demonstrates the characteristics of a NOE machine. The fixed tricycle landing gear mounted under the aircraft,

which causes a great deal of drag at high airspeeds, and the downward orientation of the engine exhaust baffles, which reduces the overhead heat signature both point to a hovering flight mission profile. One observer of the MI-28 noted that, "They obviously feel that there will be no missile threat from below."<16>

The HAVOC is probably the most survivable helicopter ever built. Special attention has been given to protect the most vulnerable portions of the aircraft including the crew. As Colonel V. Morov states:

> There is no other helicopter today that has the combat survivability of the MI-28. In this regard, its survivability factor is 5 to 6 times greater than its predecessor, the MI-24. Highly durable armor was used during the design of the cockpit with a completely armored compartment. The designers succeeded in modularizing the MI-28 so that the more important elements are shielded by the less important ones. There are many redundant systems. Both engines practically cannot be rendered inoperable by one shot. Hits by bullets and shrapnel will not result in an explosion of the fuel tanks, fire, or excessive fuel leaks.<17>

In order to realize these survivability improvements the Soviets utilized a significant amount of composite materials in the construction. For example, the main rotor system and tail rotor are made of a composite plastic material which provides a high degee of ballistic tolerance to calibers of all types. Specialized greenish-tinted glass armor panels, 35-50 mm thick, are mounted in the front and side facets of both cockpits and provide protection against 20 mm cannon fire and perhaps defeating battlefield lasers.<18> Additionally, the entire engine compartment and

crewstations are protected by what appears to be 25-30 mm of kevlar-type armor panels, installed conformally throughout the cockpit area and in access panels.<19> Perhaps what is most unusual about all of this redundant hardening is the fact that even with the massive use of armor the MI-28 is lighter than the MI-24.<20>

The armament suit shown on the MI-28 at Paris consisted of two "eight-pack" sets of AT-6 Kokon missiles and a pair of 20-tube per launcher 80 mm folding fin aerial rocket pods mounted under the stub wings.<21> Additionally, a 30 mm cannon, derived from the BMP-2 Infantry Fighting Vehicle, is mounted in a moveable turret under the gunner's station. This gun, deliberately selected to enhance commonality with army ground forces, has a high muzzle velocity and possesses two specific rates of fire to deal with ground threats (2-300 spm) or air threats (8-900 spm).<22> Given the capability of the turret's wide range of movement (+/- 110° lateral; +45° to -13° horizontal) coupled with the lethality of the ammunition (armor-piercing or high-explosive) the 30 mm 2A42 cannon more than covers the close-in weapons requirement.<23>

As for the main armament, some disagreement exists among the authors as to what the HAVOC will eventually see. The AT-6 is a decade-old missile system which many feel cannot penetrate the frontal armor of many current NATO tanks. The use of this missile may be only an interim solution, again drawing upon the Soviet style of squeezing

all of the worth out of an existing system until a new replacement is needed and fully developed. The enlarged missile guidance pod in the nose of the HAVOC (larger than the underslung pod on the HIND-E, F) suggests that a more capable missile was developed parallel with the aircraft.<24>

The mission equipment package shown at Paris reflects the current technological disparity between the Soviet Block and the West. The avionics and target-acquisition suit has been described as basic and rudimentary by observers. Target acquisition is accomplished through the use of a turret-mounted direct-view optical system which utilizes a laser rangefinder.<25> The gunner utilizes a single monocular eyepiece located to the right side of the central electronic display. A thermal-imaging system was intended to be incorporated on the Paris variant but was not installed. Apparently this system, mounted in two fixed forward "staring" units in the fuselage, has been the primary cause of the aircraft's lengthy developmental cycle. The Forward Looking Infra Red (FLIR) system "simply does not yet work" and judging by the weight of the FLIR (500 kg!) the Soviets apparently have been wrestling with a technology problem for only a short time.<26>

The FLIR system was additionally intended to aid the crew in night pilotage, but until the system becomes operational, the crewmembers will rely upon Night Vision

Goggles (NVG's).<27> Together with a basic "Pan Am 1975" set of cockpit avionics, the HAVOC displayed a mix of relatively old technology compared to the likes of the AH-64 with its Target Acquisition Display System (TADS) and Pilot Night Vision System (PNVS) which is 10 years more advanced. It does seem likely that improvements will be made to the electro-optical system and night vision capabilities before actual series production occurs.<28>

Aerodynamically, the HAVOC performs equally, if not better than the AH-64. Though somewhat larger and weighing over 4,000 lbs more, the HAVOC showed comparable maneuverability and agility when flown on display at Paris. COL Morov described the MI-28's flight performance by stating:

> Equipped with more powerful engines than the APACHE, the MI-28 is not inferior to the APACHE in speed or maneuverability and has approximately the same service ceiling and a higher static flight ceiling.<29>

This maneuverability and general flight performance is provided by coupling a five-bladed main rotor (strangely resembling the Aerospatiale Spheriflex System used on the AS-350 and 365 helicopters) with an APACHE-like X-shaped tail rotor and the combined brute force of two TV3-117 engines capable of producing 4,400 shp.<30> Many observers have been quick to point out that the Mil Bureau has certainly never been a victim of the "If it ain't been invented here" syndrome.

Above all, the HAVOC seems to have been designed to live

in the field with the troops versus the Western approach of needing a myriad of support services and equipment to operate. While similar to the AH-64 in system configuration, the MI-28 was obviously based on a design philosophy that was driven by the Army's antitank requirement.<31> This aircraft must operate autonomously with front-line troops and therefore must possess a great deal of commonality with front-line equipment. The 30 mm cannon, its external-loading capability and commonality of ammunition epitomizes this concept. More importantly, the MI-28 possesses a complete built-in fault detection system and requires only one special purpose vehicle, a combination fuel/maintenance truck, to live in the field.<32> The HAVOC indeed represents a rugged, proven design that was built by the design engineers for the troops and not for other design engineers.

The MI-28 HAVOC overall displays a curious mix of sound no-nonsense engineering and what would be described in the West as hopelessly shoddy workmanship.<33> The Paris variant displayed badly-fitted panelling and a paint scheme that could be ascribed to by an unskilled child. However, belittlers of the HAVOC should beware that this aircraft is not simply a copy of the APACHE. To be sure, a great deal of technology-transferring has taken place but the HAVOC represents a truly ideal Soviet solution to an urgent military need. When this aircraft is fielded <u>en masse</u>, the NATO Allliance, albeit anyone in the world who faces it,

will be forced to deal with a new quality (not just quantity) on the battlefield. As one observer of the HAVOC put it:

> (The HAVOC)...represents a significant evolution in the Soviet Union's attack helicopter capability that has been blended into a tough, nimble and high performance machine...The neighborhood just got tougher!<34>

THE KAMOV HOKUM

During the 1970's the Soviets began to rationalize the developing impact that the attack helicopter would have on the modern battlefield. This process of analysis drove the Soviets to the conclusion that the modern attack helicopter could achieve exchange ratios of 12 to 19:1 when fighting tanks.<35> This concept deeply bothered the Soviets for their doctrine relied upon the use of mass armor attacks to achieve success on the battlefield. With this quandry in mind, the Soviets began several weapons development programs specifically oriented toward eliminating the helicopter threat. This crash program resulted initially in the fielding of the dual-capable AT-6 Kokon missile, the shoulder-launched SA-14, 16, 18 series of infrared homing surface-to-air missiles, the tank-fired AT-8 Kobra antitank/helicopter missile, and just recently, the fielding of the 2S6 Tunguska twin-barrelled gun/missile air defense system. In addition, the Soviets realized that while necessary, ground-based air defense systems could never cover the entire requirement of killing enemy helicopters. Two-dimensional weapons can never hope to deal

with four-dimensional platforms. COL M. Belov perhaps stated it the best when he wrote:

> It has become vital to possess a weapon which could compete with the helicopter in respect of such things as combat power and tactical possibilities. Logic and historical experience suggest that such a weapon is the helicopter itself.<36>

As a result the Soviets, applying their doctrine, judged that only a fighter aircraft in the form of a helicopter could deal with an enemy helicopter and thus the Kamov "HOKUM," (Figure 10), was born.

FIGURE 10

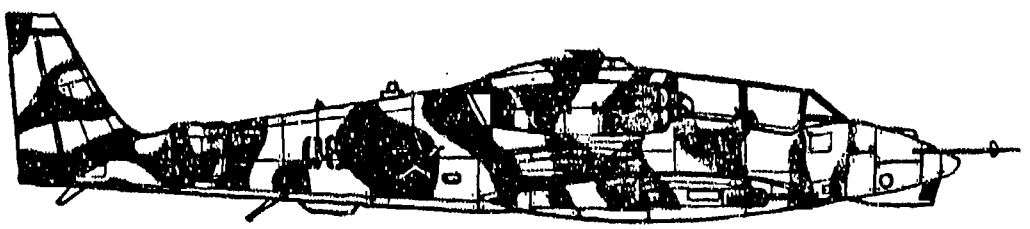
(SOURCE: U.S. Department of Defense, Soviet Military Power 1989 (Washington D.C.: U.S. Government Printing Office, 1989), p. 72.)

Much like the MI-28, the Kamov HOKUM project has been shrouded in secrecy by the Soviets. To date, the Soviets are still mum to questions about the helicopter. However, a great deal of information has managed to reach the West about the HOKUM's history and characteristics. The first U.S. announcement of the aircraft's existence came in the fifth edition of Soviet Military Power (SMP) in 1985.<37> A year previously it was public knowledge that a new

co-axial contra-rotating helicopter was under flight test in the Soviet Union.<38> Bit by bit, the information about the HOKUM began to depict that there was something revolutionary about the aircraft. The 1986 SMP added a more-refined lateral rendering of the HOKUM and was quickly followed by a full-color painting of the aircraft in 1987. With this painting, the "cat was out of the bag" and together with a remarkably detailed 1/72nd scale model offered by the AMT Corporation during the same year, the aircraft was finally revealed to the public.<39> The HOKUM was indeed a fighter helicopter.

The Kamov KA-?? HOKUM, (Figure 11), is a mission-optimized attack helicopter which has been designed for air-to-air combat.<40> The very appearance of the aircraft speaks of the characteristics of a machine designed to fight the swirling high-speed air battle at the tree tops. Maneuverability, agility, high speed flight and optimized crewstation positioning all point directly to an air-to-air combat-driven set of design perimeters.

FIGURE 11



(Source: AMT Model corporation, 1/72d scale model of the Kamov HOKUM, released in 1987.)

The HOKUM undoubtedly based on the working components of the Kamov KA-27 HELIX, a naval anti-submarine warfare helicopter. The basic rotor drive train, transmission and engine arrangement of the HELIX were probably mated with the same TV 3-117 engines mounted on the HIND and HAVOC.<41> It is reported that the rotor blades of the HOKUM are of a new, high-speed design incorporating "double-ended" tips (much like those found on the UH-60 BLACKHAWK and AH-64) and a special airfoil cross-section which retards blade stall and allows higher forward airspeeds.<42> The absence of a tail rotor in the design also allows for higher speeds as the negative drag penalty of the tail rotor is eliminated as anti-torque control is managed through the contra-rotating main rotor system. Lastly, the HOKUM possesses a fully retracting set of landing gear, with the designers undoubtedly willing to pay the weight penalty of the mechanisms in order to reduce aerodynamic drag. As a result, the aircraft is capable of speeds in excess of 190 knots.<43>

The flight control surfaces on the wings and tail of the HOKUM give some indication as to the degee of maneuverability that the aircraft possesses. A very large rudder, together with two tail planes greatly stabilizes movements around the horizontal and vertical axes.<44> All of these control surfaces also allow the aircraft to significantly alter its drag configuration in flight, thereby allowing the aircraft to quickly slow its airspeed

when desired.<45> These attributes, together with the proven maneuverability of the HELIX rotor system, in all probability, create the most agile helicopter in the world today. Clearly, the Kamov designers struck a good compromise between high dash speed and superior maneuverability and agility in the HOKUM's design.<46>

The armament suit carried on the HOKUM is subject to a great deal of discussion. Among the descriptions given, all assume that the aircraft will undoubtedly carry a mixture of air-to-air weapons in order to cover a wide spectrum of engagement possibilities. Specifically, a combination of either the SA-14 (or newer SA-16) IR missiles, the AT-6 Kokon dual-capable missile and a single-barrelled 30 mm cannon are assessed to be mounted on the HOKUM.<47> Free fall bombs and 80 mm FFAR pods have also been credited to the HOKUM's arsenal.<48> These weapons are probably directed with a target-acquisition system that combines the infrared search and track system mounted on the SU-27 FLANKER together with a low-light level TV.<49> In all likelihood, the HOKUM will be night-capable when it reaches the field sometime during the 1990's.<50>

The Western world is eagerly awaiting the unveiling of the HOKUM by the Soviets, and until this happens any definitive appraisal of the capabilities of the aircraft will be subject to conjecture. One thing is certain, however. When the HOKUM does appear, the Soviets will possess a unique capability to sweep the battlefield's

terrain flight environment clear of enemy antitank helicopters--something with which the NATO Alliance has yet to come to terms.

THE MI-34 HERMIT

Traditionally, Soviet combat helicopters have been large, heavy designs. The likes of the HIND, HIP and HAVOC all have characterized the Soviet rotary-wing air arm. The Soviets realized this fact and fully understood the costs that aircraft of this size incur. Through the study of the wars in the Middle East, Africa, and Asia, the Soviet General Staff became convinced that there was a definite need for a modern light combat helicopter. The existing MI-2 HOPLITE design was at the end of its usefulness, having been in service since the early 1950's. A new cost effective design was necessary to complement and augment the HAVOC and HOKUM series aircraft into the next century. As a result, the MI-34 HERMIT was created.<51>

The Soviets were obviously greatly impressed with the performance of the SA-342 GAZELLEs that were employed by the Syrians against the Israeli Defense Forces during the 1982 Lebanese War. Their successful use against armor targets was a direct cause for the development of the MI-34. According to one source, the Soviets have studied, disassembled and test-flown a number of GAZELLEs from their Syrian allies. Together with lessons learned in Afghanistan (that large, terrain-flying helicopters are easily acquired and killed), the Soviets constructed the HERMIT.<52>

The MI-34 HERMIT, (Figure 12), was first unveiled publicly at the Paris Air Show in 1987, where it was touted as a pilot trainer and sport/competition aircraft.<53> Recall that while this may be true, only one Soviet helicopter has ever been designed solely as a civilian design. The HERMIT's design reflects the simple attributes of many successful small combat helicopters in service today. The fuselage neatly resembles that of the GAZELLE, while the T-tail empennage is a direct copy of the McDonnell Douglas 500 series helicopter. Although the first prototypes of the MI-34 have piston engines, it is a sure bet that the design will be upgraded with a lightweight turbine engine, no doubt the same engine which the Poles use in their version of the MI-2 HOPLITE. Figure 13 summarizes the principal characteristics of the MI-34.

FIGURE 12

(Source: Jossef Bodansky, "Soviet Small Fry." Defence Helicopter World (October-November, 1989), p. 14.)

FIGURE 13

DIMENSIONS, EXTERNAL:

Main rotor diameter	10.00 m (32 ft 9¾ in)
Tail rotor diameter	1.48 m (4 ft 10¼ in)
Length of fuselage	8.71 m (28 ft 7 in)
Width of fuselage	1.42 m (4 ft 8 in)
Skid track	2.06 m (6 ft 9¼ in)

WEIGHTS:

Normal loaded weight, training mission	1,020 kg (2,249 lb)
Max T-O weight	1,250 kg (2,755 lb)

PERFORMANCE (at T-O weight of 1,020 kg; 2,249 lb, except where indicated):

Max level speed	113 knots (210 km/h; 130 mph)
Max cruising speed	97 knots (180 km/h; 112 mph)

(Source: Jane's All the World's Aircraft (Coulstdon, UK, Jane's Information Group, 1989), p. 273.)

The HERMIT will probably mount a lightweight version of the AT-6 Kokon missile-launcher system, incorporating a roof-mounted ATGM sight in the same configuration of the SA-342 GAZELLE. Air-to-air missiles are also a probable weapons choice as the SA-7 has already been mounted on existing Warsaw Pact helicopters.<54>

When the MI-34 reaches the field in 1990 or 1991, the Soviets will possess a new combat capability. This "Russian Gazelle" will offer an aeroscout-capability to complement the MI-28 for NOE operations--something the West has possessed for a long time and about which the Soviets have often written. It is not unreasonable to assess them of this capability as they have often copied many Western practices.

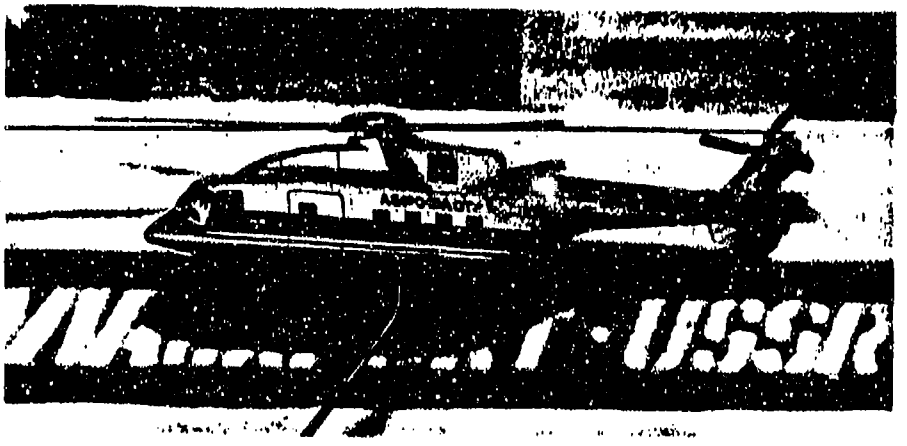
THE MI-38

The 1989 Paris Air Show brought forth the first details of the long-awaited replacement for the HIP. The MI-38 helicopter, (Figure 14), neatly resembles the EH-101 transport/assault aircraft and is intended to carry 30

personnel. The MI-38 is currently under development and is scheduled to conduct its first flight in 1992 or 1993 with an expected fielding in 1996.<55>

Normal payload and performance projections for the MI-38 indicate that the aircraft's design is driven by economic concerns. The aircraft is intended to cruise at 155 kts, possess an internal cargo capacity of 4,000 kg (with an external load of 1,000 kg) and has a range of 600 km. Maximum gross weights for the MI-38 will range from 13,500 kg to 14,500 kg. Obviously, the Soviets are intending to modernize their transport fleet.<56>

FIGURE 14



(Source: Jane's All the World's Aircraft (Coulsdon, UK, Jane's Information Group, 1989), p. 764.)

THE THIRD WORLD

Military professionals throughout NATO have traditionally been oriented toward the Soviet Union or North Korea when the Threat is brought up. This is not so surprising, given the predominant Cold War orientation that has dominated the headlines since the end of the Second

World War. However, the world situation has changed significantly during the period between 1975 and the present. The growing reluctance of the Superpowers to face off against each other directly has led to a growing number of proxy conflicts throughout the world. Small Third World client states, supplied by the Superpowers, have witnessed the wholesale equipping and organization of modern fighting forces whose leaders are not afraid to use them in anger. Naturally, when one's neighbor picks up the sword, all surrounding nations must be similarly equipped to protect themselves. As a result, the Third World currently possesses a vast array of combat helicopters.

The composition of the Third World helicopter Threat is determined primarily by three factors: political orientation, regional location, and relative wealth. The political orientation of a nation state determines alot about the country's helicopter fleet. Those nations who have ties to the Soviet Union are predominantly equipped with Mil-designed helicopters (HIP/HIND). Some 14 Third World countries are now equipped with HIND helicopters.<57> The countries of Afghanistan, Angola, Ethiopia, Iraq, Mozambique, Nicaragua, Syria, Libya, and Vietnam have employed both HINDs and HIPs in combat and still operate both types of aircraft.<58>

The region of the world that a country is located in also determines the composite of its helicopter force. The countries which now occupy the former elements of the old

colonial empires typically obtain helicopters manufactured by their former imperial masters. The French influence throughout the Middle East and Africa has resulted in preference for Aerospatiale helicopters. The nations of the British Commonwealth, on the other hand, tend to lean toward Westland and British-built-under-license Sikorsky machines.

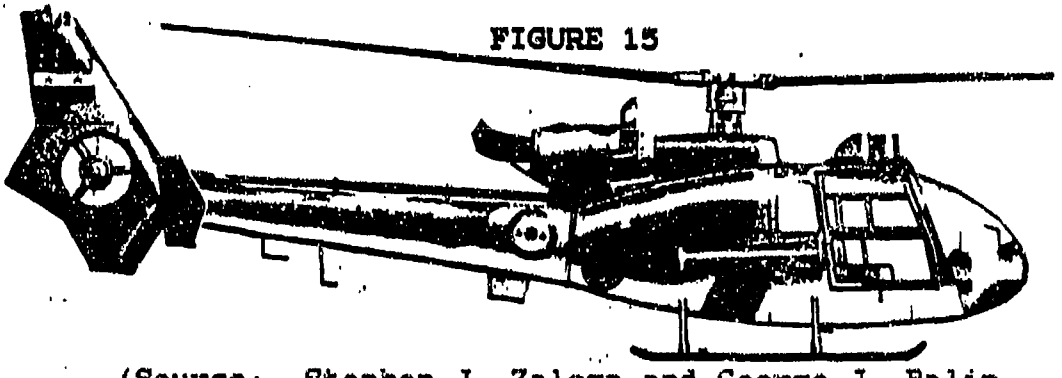
Above all, though, military helicopters are expensive machines, both in initial acquisition and daily operational costs. As a result, the relative wealth, that is the size of a country's military budget, also determines the composition of its helicopter force. The oil-rich nations of the Persian Gulf best describe this tenant as many of these nations (specifically Saudi Arabia, Jordan, Oman) operate a wide variety of Western-block helicopters which employ the most current military technology.

Typically, these three factors combine to produce an aggregate helicopter force in the countries of the Third World. Perhaps the best example of this lies in the small equatorial African country, the former French colony Guinea (Bissau), which operates five total combat helicopters of both French and Russian origin.<59> Attempts by the Soviet Union to attain political influence in the region produced the gift of two Mil helicopters, while the French enticed the country's leadership to buy the three Aerospatiale machines they now possess.

Aside from the dominance of those helicopters originating from the Soviet Union (MI-8 and MI-24/25/35),

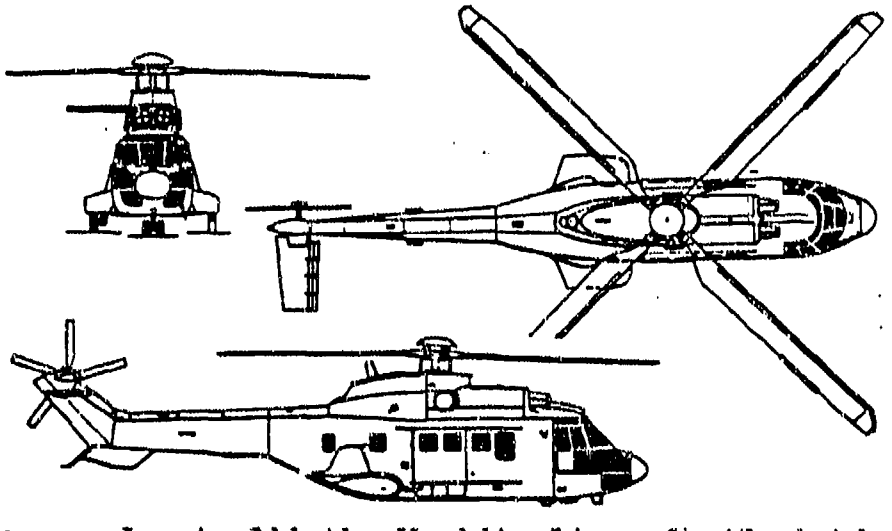
the nations of the Third World have generally selected two Aerospatiale aircraft as the primary components of their attack and assault helicopter fleets. The SA-341/342 GAZELLE and the SA-330/332 PUMA, (Figures 15, 16), together share over 12% of the world's military helicopter inventories and comprise over 38% of the combat helicopters in the Middle East and North Africa environment.<60> The GAZELLE, due to its simple design and relative low cost, is the preferred attack helicopter in the Middle East.

FIGURE 15



(Source: Stephen J. Zaloga and George J. Balin, Anti-Tank Helicopters (London, Osprey Publishing, 1986), p. 44.)

FIGURE 16



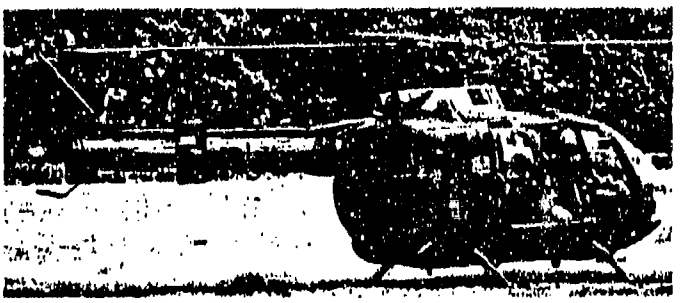
(Source: Jane's All the World's Aircraft (Coulsdon, UK, Jane's Information Group, 1989), p. 59.)

The remainder of the Third World combat helicopter force is composed of a group of small, agile and inexpensive multi-purpose helicopters of American and German manufacture. The McDonnell Douglas 500 Series and Messerschmitt Bolkow Blohm BO-105/117 fleet occupy the remainder of this inventory, (Figures 17, 18).<61> Appendix A details the current composition of the total Third World combat helicopter force.

FIGURE 17

(Source: Stephen J. Zaloga and George J. Balin, Anti-Tank Helicopters (London, Osprey Publishing, 1986), p. 38.)

FIGURE 18

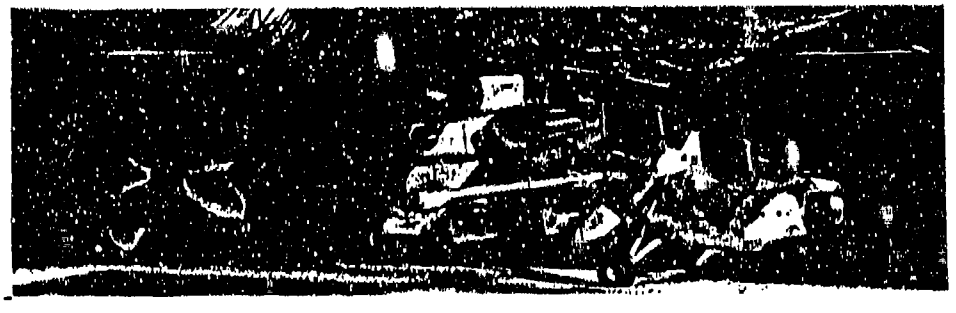


(Source: Defence Helicopter World, "Defense Specifications" (December 1989-January 1990), p. 100.)

Today, the Third World combat helicopter force is essentially comprised of a number of low to medium-level technology aircraft that stress simplicity and reliability in their designs. However, the future holds great promise for the upgrading of these rotorcraft with ever-increasing levels of technological sophistication in weapons and sensor systems. In fact, as Third World regional tensions mount, we should witness the design and development of entirely new combat helicopter systems and airframes to exploit the mission-effectiveness of the battlefield's vertical dimension. The conduct of counterinsurgency warfare by many nations of the Third World today demands the use of modern, reliable combat helicopters to insert troops and to provide accurate fire support.

A recent example of this trend was the unveiling of the South African Atlas XH-2 Rooivalk (RED KESTRAL) combat support helicopter. This aircraft, (Figure 19), has been the result of the South African experience of fighting Angolan and South West African People Organization troops in Namibia.

FIGURE 19



(Source: International Defense Review, "South Africa Rolls Out New Helicopter" (IDR #2/1990), p. 212)

The XH-2 is a modern, tandem-seat attack helicopter that utilizes the rotor and drive train systems of the SA-330 PUMA and mounts an APACHE-like night vision/target-acquisition system in the nose. The aircraft's weapon systems feature air-to-air missiles, ATGM's, FFAR's, and even a nose-mounted cannon.<62> The Rooivalk represents a quantum leap in Third World technology and will obviously be offered for sale on the world's arms market.

Another crucial development in the Third World's Armed Forces has been the creation of "Army Aviation" branches or corps, which mirror the developments with the U.S. and Soviet Armed Forces. Specifically, the formation of these organizations within the Armed Forces of Brazil and India both indicate a growing realization throughout the world that the use of the terrain flight environment is tied directly to the ground forces versus that of the Air Force. The Indian Army alone will procure over 200 helicopters for its Army Aviation Corps, while the Brazilian Armed Forces forecasts an end strength of over 300 helicopters.<63>

In all, the Armed Forces of the United States face a rather unusual combat helicopter Threat. The specific characteristics and composition greatly depend upon a myriad of factors which go far beyond the scope of this document. What is most important is the fact that there is currently a plethora of combat helicopters through the Armed Forces

(Army--Air Forces) of the world. The much-vaunted technological superiority enjoyed by the United States is slowly evaporating. Many of our potential enemies will fight us using the same technology we rely upon, specifically...the attack helicopter.

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CHAPTER V

THREAT TACTICS, DOCTRINE AND FORCE DESIGN

> If you are thoroughly conversant with (tactics), you will realize the enemy's intentions and thus have many opportunities to win.<1>
>
> Miyamoto Musashi, 1645

> War today is fought by masses of men and machines.<2>
>
> Giulio Douhet, 1927

The particular value of any weapon system is only realized through its skillful employment on the battlefield. This is achieved by the combined influences of the concept of use of a particular weapon (Doctrine), the placement and actual use against the enemy (Tactics), and the creation of the tactical organizations which mix the proper numbers of personnel and weapons with associated equipment together under a single commander (Force Design). As with other elements of the Threat, the Soviet combat helicopter force is measured as a sum of its parts, producing an extremely lethal combat force on the modern battlefield. This chapter will examine the "HOW" and "HOW MANY" aspects of the Threat question and will provide the reader with an understanding of how the Threat combat helicopter force operates in combat situations.

The Great Patriotic War had a profound effect upon the development of the Soviet doctrine for employing combat helicopters. Through the loss of 25(+) million people, the Soviet Union became the greatest land military power in the

world. They learned many hard lessons during the war about mobility, all at the cost of untold destruction of their country by the Nazis. These lessons turned into absolute doctrinal concepts during the period immediately after the war...concepts that still dominate their thinking today.

From 1945 until the death of Stalin in 1953, the Soviet Armed Forces remained chained to the doctrine and tactics which proved successful during the war. The modernization of the Army and Air Force with new more-capable weapons (T-10 Tank and MIG-15 Fighter of Korean War Fame) left only minor impressions in the basic warfighting doctrine. This, however, began to change in 1954 when the advent of tactical nuclear weapons forced a re-thinking of how wars would be fought. NATO's reliance upon nuclear weapons caused the Soviets to orient away from the concept of relying upon the cumbersome massing of great numbers of troops and tanks, fearing the consequences of initiating an escalating nuclear exchange with the West. By 1967, NATO had shifted its doctrine from that of massive nuclear retaliation to one of forward defense and flexible response which relied upon conventional forces backed-up by tactical nuclear weapons. The Soviets must have appreciated that a double-edged problem faced them if war broke out on the European continent. Even though they possessed an overwhelming advantage in conventional forces over NATO throughout the 1960's and 1970's, they could not afford to mass this power for fear of triggering a nuclear exchange

which would lead to the incineration of the European objective. Therefore, the Soviets decided that in order to win in any European war they would have to find a way to bring about the collapse of governments of NATO through quick actions which would simultaneously prevent the West's resorting to going nuclear.<3>

During this period, the Soviets searched for a new method of war that would achieve the goal of providing a quick conventional victory. The Marxist concept of the dialectic (thesis+anti-thesis=synthesis) was applied to study the problem, and together with the rehabilitation of many personalities and theories which were discredited by Stalin's purges of the 1930's, the Soviets came to the conclusion that a new form of mobility could be exploited on the battlefield--that of the vertical dimension.

In the 1930's, the Soviets developed a theory of offensive operations which would exploit the technological advantages offered by mixing the mechanization of ground forces with that of airborne forces. This concept envisioned the simultaneous use of ground and air mobile forces to attack the enemy in all sectors (front, flanks, and rear) thereby completely disrupting the enemy by being all around and within his defenses. Developed by Marshal Tukhachevskii in 1936, the concept drove the development of the Soviet armored formations and created the first airborne organization in the world.<4>

However, development and implementation of the

concept was sidetracked by Stalin's purges of 1936-37 (Tukhachevskii was one of the first to be shot by the NKVD). With Stalin's death, though, and subsequent rehabilitation of his political foes by Nikita Khrushchev during the 1960's, the concept of vertical envelopment (vertikal nyi okhvat) saw a strong reemphasis, and with it came the answer to cracking the problem of winning a war in Europe. By being able to prevent the West's ability to extricate itself from an enemy, the Soviets could keep the NATO Alliance from safely using tactical nuclear weapons, as Soviet air mechanized formations would be intermingled on the battlefield to such a degree that NATO would be killing their own people versus their enemies. NATO conventional forces would be essentially held hostage to prevent the use of nuclear weapons, thus allowing Soviet ground forces the freedom to mass, overwhelm and defeat the Western alliance in Europe. Therefore, the Soviets saw the need for a platform which could exploit the vertical dimension of the battlefield, and as events in Korea, Algeria, and Vietnam graphically demonstrated, the helicopter became the answer.

By the early 1960's, the Soviets observed, studied, and tested the use of combat helicopters on the modern battlefield. They quickly elevated this once lowly-supporting player in their doctrine to the premier star of their way of waging war. This perception was best described by a former Soviet army officer who wrote that, "Soviet commanders believe that to all intent and purpose

the helicopter is a tank."<5>

Today, the Soviets view the battlefield as a multi-dimensional theater where the combat helicopter reigns supreme throughout the ground, air, and time facets. One author observed that:

> The Soviet Army no longer thinks of the all-important land battle in purely ground terms---it is now a three-dimensional battle...the air element...at the tactical level, provided by the helicopter.<6>

At the higher levels of war, the Soviet combat helicopter is "perceived as a means to extend the scope and pace of the conduct of operational level land operations."<7> The modern combat helicopter is indeed an indispensable component of the modern Soviet art of war.

ORGANIZATION

Within the Soviet Armed Forces, the Soviet Air Force (Voenno-Vozdushnie Sily or VVS) has the responsibility of maintaining and operating the preponderance of the combat helicopter fleet. The Soviet lexicon describes all armed helicopters within the Air Force under the collective title of "fire support" helicopters. These aircraft are envisioned to act as mobile weapons platforms to provide a responsive degree of firepower to the ground commander.<8> Fire support helicopters are found within the Army Aviation branch of the VVS. Those aircraft (HIND/HIP) which are intended to support the Army's tactical operations (theater, front, army, and division) are contained within the Army Aviation force structure. Within this structure, Army

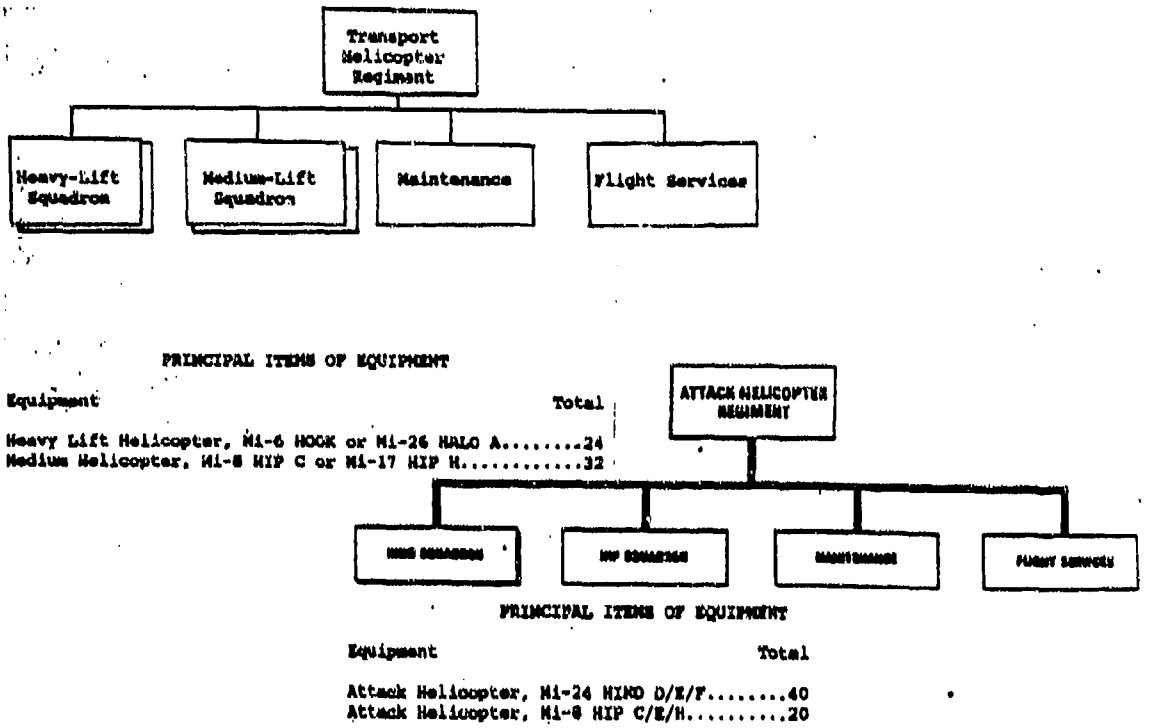
Aviation assets are allocated from front and/or assigned to reinforce organic army and divisional-level organizations for use in support of operational-level maneuver.<9> Within these structures, armed helicopters are treated as ground-attack aircraft which operated under the direct control of the ground commander.

Within an army, rotary-wing aircraft are organized into independent helicopter regiments with distinction being given to attack or transport missions. The regiment is the smallest organization that possesses service and support elements and utilizes the squadron as the basic combat unit. A normal squadron is organized into several flights consisting of three to four aircraft each. A typical attack helicopter regiment is commanded by a colonel and consists of a regimental headquarters section, an aviation service support unit, up to three MI-24 HIND attack squadrons, a technical unit and two MI-8/17 HIP lift squadrons. The transport regiment follows the same organization but employs three HIP lift squadrons and two MI-6 HOOK or MI-26 HALO heavy lift squadrons. When committed to battle, these regimental organizations, (Figure 20), can mass 40 HINDs and 20 HIPs under the direction of the ground commander at those critical places where fire support is needed.

By 1988, over twenty attack regiments were formed at front or army level alone, comprising a sizeable force of over 800 HINDs and 400 HIPs.<10> The sixteen Military

District Commands and the four Group of Forces (which become fronts in wartime) possess a transport regiment, which provides another 600 HIPs.<11>

FIGURE 20



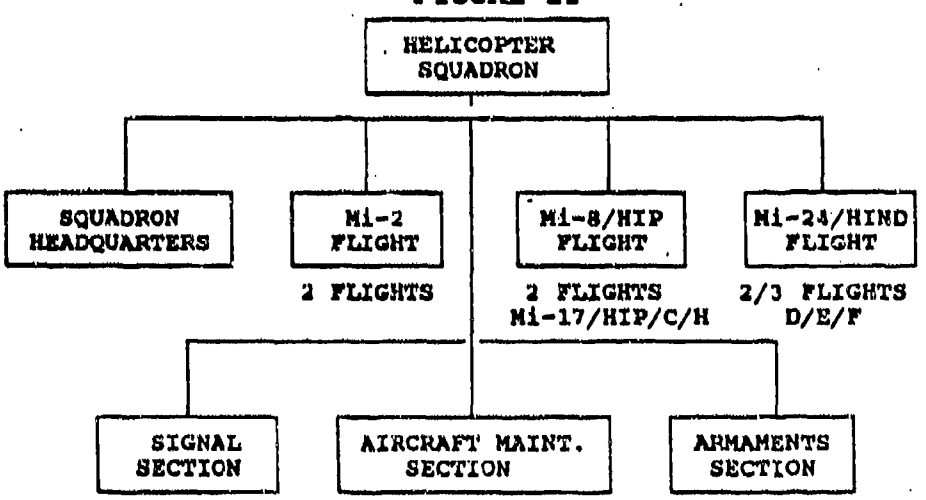
(Source: Department of the Army, Field Manual 1-107, Air Combat Operations (Fort Rucker, AL., USAAVNC, 1989) pp. 2-8, 2-11.)

The highly-centralized nature of placing helicopters at high echelons within a Soviet army created a number of tactical integration problems. Coordination between ground commanders and flight crews was frequently inadequate for the task at hand, often resulting in aircrews firing upon "friendly trenches" during tactical exercises. This practical experience along with the already-mentioned shift in conventional warfighting doctrine during the 1960's and

1970's hastened the tactical integration of combat helicopters within the Soviet Armed Forces. Obviously, the Soviets needed to decentralize the helicopter force structure to improve its responsiveness and thus was born the divisional-level helicopter squadron.

In 1979 divisional organizations within the GSFG (now the Western Group of Forces) began to receive their own combat helicopters. By 1985 all 19 tank and motorized rifle divisions each possessed a squadron of helicopters consisting of a mix of 18 aircraft (Figure 21).<12>

FIGURE 21



(Source: Department of the Army, Field Manual 1-107, Air Combat Operations (Fort Rucker, AL., USAAVNC, 1989) pp. 2-12.)

Each squadron originally consisted of six HIND-D's, six HIP-C's and six MI-2 HOPLITE helicopters together with its own command and support elements. These divisional squadrons have subsequently grown in size. Many ready divisions in the Western Group of Forces have received additional HINDs, increasing the divisional structure to

about 20 HINDs per squadron.<13> Thus, by the mid-1980's, the Western Group of Forces was in possession of over 320 HIND-D, E, F models and about an equal number of HIPs--altogether a fourfold increase in numbers in just under ten years.<14>

Perhaps more indicative of this decentralization effort is the modernization of all of the divisional structures within the Soviet Army. One observer noted that:

> Since 1985, when 1,100 HINDs supported 196 active divisions, the divisional slice of attack helicopters in the Soviet Army Aviation has grown from 5.6 to 6.8 HINDs per active maneuver division.<15>

Obviously, the trend points to the ever-increasing decentralization of combat helicopters in the Soviet Armed Forces. More importantly, the combat helicopters within these divisional squadrons now form a part of the ground element--a vital combination in the Soviet equation on maneuver warfare.

TACTICAL MISSIONS OF THE SOVIET COMBAT HELICOPTER FORCE

The variety of combat missions assigned to the Soviet combat helicopter force is best described by General V. G. Reznichenko's Tatika, which noted in 1987 that:

> Fire support helicopters are an effective weapon against enemy tanks and other ground objectives. They are the backbone of the combat helicopter fleet. They are intended for combat against enemy armored targets, the annihilation of nuclear attack resources ıd field artillery, the suppression of troop air defense equipment at tactical depth and the disruption of command, control and communication and supply systems. Moreover helicopter gunships can also be used to provide close support to friendly troops by hitting enemy personnel and fire positions, to escort troop-carrying and assault landing helicopters and

> support the landing of assault forces or unloading of armament and combat equipment, to conduct reconnaissance with the purpose of revealing important enemy targets on the battlefield in the interests of the ground troops, to determine the results of strikes on strongpoints at tactical depth, to annihilate enemy helicopters in the air and to carry out other combat missions.<16>

In essence, the Soviets have defined five major missions for their combat helicopters:

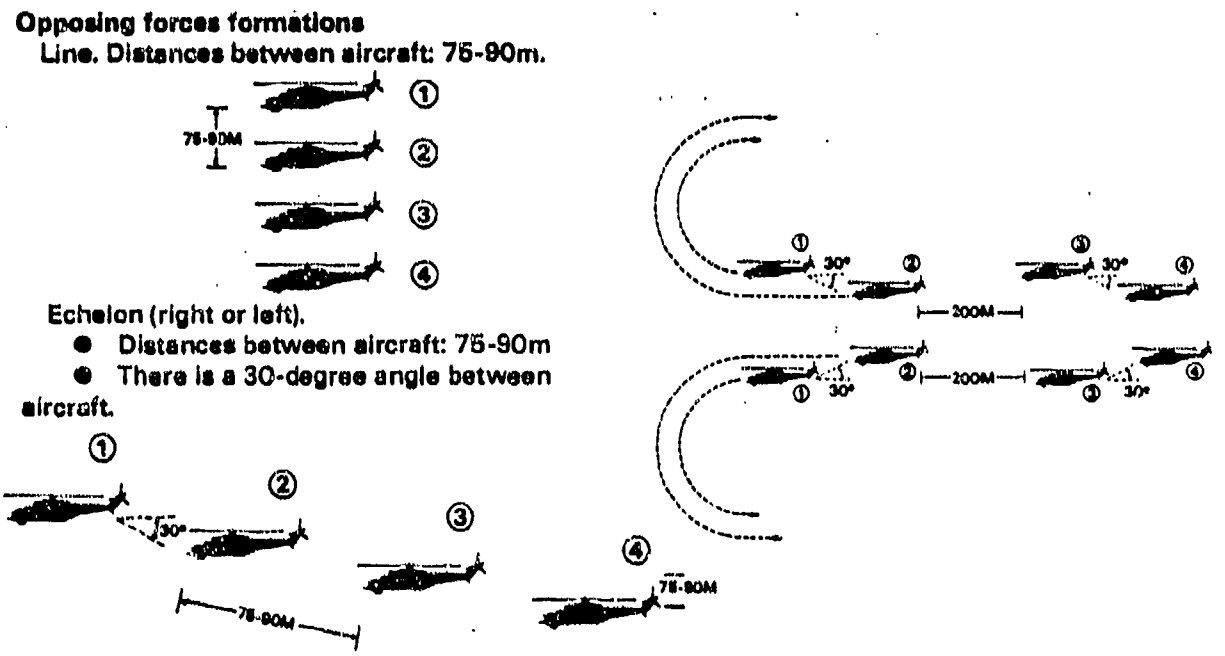
> **Close air support;**
> **Antitank operations;**
> **Anti-helicopter operations;**
> **Air assault and air escort of landing forces;**
> **Armed reconnaissance operations.**<17>

Close air support is performed by the combat helicopters belonging to Army Aviation in order to support Soviet ground formations in direct proximity to enemy forces. The Soviets view the combat helicopter force as being the best asset to use for close air support. Since helicopters fly at low altitudes and operate at lower airspeeds, the Soviets have greater confidence in these platforms to be able to avoid enemy detection and place accurate fire on targets. More importantly, though, combat helicopters can be relied upon to fly in most weather conditions where fixed-wing aircraft would be paralyzed. This reliability coupled with the ability to conduct many sorties with huge armament loads, operating close to the Forward Line of Own Troops (FLOT), provides an extremely efficient means of fire support to the ground troops.

Normally the HIND/HIP will attack ground targets as a flight of four aircraft being controlled by a senior

captain. As Figure 22 illustrates, Soviet attack helicopters employ a wide variety of formations to mass firepower during an attack run. The common component of all of these formations is the reliance on the use of the para or pair of aircraft and the concept of echelonment, or use of sequential waves of aircraft. In most instances, Soviet combat helicopters will attack in pairs with the first pair marking targets, followed by another pair or zveno (flight) approximately one to two minutes behind which masses fires, destroys the target, and covers the withdrawal of the lead pair.<18>

FIGURE 22



(Source: Michael J. Doyle, "Looking Through the Sights at Adversary Air," Air Defense Artillery (September-October, 1987) p. 37.)

The specific flight profile of the HIND and HIP series

reflects the design characteristics of the aircraft and the Soviet offensive doctrine and thus more resembles a fixed-wing attack profile that emphasizes speed.<19> At the ground commander's request, the zveno of aircraft will head toward an Initial Point (IP), located approximately 15 km from the enemy. From this point, the zveno descend to low-level flight altitudes which enable terrain-masking techniques to conceal the aircraft from enemy detection. A Forward Air Controller (FAC), located in a tactical command vehicle (BTR, MTLB), directs the zveno from the IP to the target area by providing routes, target description, and timing information. As the zveno approaches the intended target, the FAC directs the aircraft when to execute a climbing maneuver to acquire and identify the target. From this point, the flight leader assumes full control, engages the target and passes target data on to the following pairs of flights for subsequent engagement.<20>

Antitank operations are essentially conducted as an offshoot of the standard close air support mission profile. However, some variations have been seen in the conduct of anti-armor engagement techniques. Hovering ambush techniques are not favored by HIND and HIP crews as the aircraft have poor hovering capability. However, the Soviets have demonstrated a low-speed (<50 kts) form of NOE engagement of armored targets that closely mirrors the "running fire" techniques used by several NATO nations. Videotapes indicate that Soviet helicopter crews are

somewhat "leery" of this technique of low-speed or hovering ATGM firing, as they will lower their landing gear prior to engagement.<21>

Helicopter air-to-air combat operations are the newest mission requirement for the Soviet combat helicopter force. Whether in the air or on the ground, the Soviets see the requirement to destroy enemy helicopters as being one of the key factors to enable their armor formations to be successful. While not optimized for the role, the HIND and HIP helicopters have developed the capability to engage enemy helicopters. Knowing that the HIND and HIP are vulnerable to being outmaneuvered and outgunned in a close-in turning fight, the Soviets have stressed the requirement to mass superior numbers and engage enemy helicopters from stand-off ranges using the AT-6 Kokon missile. Figure 23 depicts these tactics.

The Soviets clearly appreciate the lethality of the modern battlefield and obviously stress rapid long-range target acquisition. HIND and HIP aircrews now practice air combat engagement techniques and will engage enemy helicopters on the battlefield.<22>

The escort of heliborne desant operations mirror the tactics used by the U.S. Army to conduct airmobile insertions during the Vietnam War. Typical missions assigned to the heliborne force are the neutralization of enemy command and control facilities; the seizure of critical terrain objectives (i.e., river crossings, bridges,

dominating hilltops); blocking the withdrawal of a retreating enemy; attacking an enemy from the rear; and the disruption of enemy combat support and combat service support elements.<23>

FIGURE 23

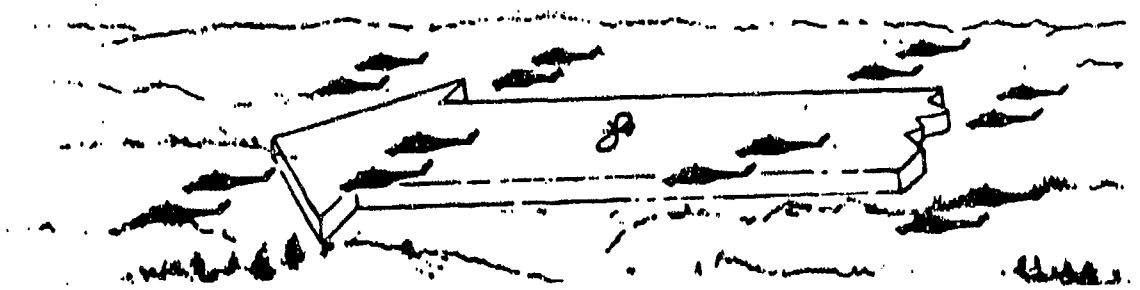
(Source: Colonel V. Smusenok, "Combat Helicopter Attack," Aviatsiya i Kosmonavtika (#9, 1989) pp. 24-25.)

The Soviets expect the heliborne force to be threatened by superior enemy firepower and mobility after landing in the enemy rear, and consequently assign a number of HIND/HIP helicopters to provide protection and fire support. The size of the air assault force can range from

that of a small raiding party (2-3 HIPs) to a battalion-sized lift involving over 500 troops and consuming all of the assets of a transport helicopter regiment. A heliborne operation conducted by the Soviets in the 1967 Dnepr exercises involved over 100 MI-4 HOUND and MI-6 HOOK aircraft to conduct a similar-sized lift.<24> The number of armed escort helicopters used in such operations is proportionate to the size of the lift. It is normal practice, therefore, to employ at least 12-16 HINDs to support a battalion-sized lift operation.<25>

Figure 24 depicts the normal positioning of armed escort helicopters in relationship to the main lift force. Normally, the Soviets will divide the escort force into two elements: one, to precede the main body, which clears flight routes and performs a final reconnaissance of the landing zone; and a second group to provide security for the main body in route and to provide fire support on the landing zone.<26> The armed escort helicopters are relied upon to neutralize enemy air defenses in all phases of the operation.

FIGURE 24



(Source: Department of the Army, Training Circular 1-107, Air Combat Operations (Fort Rucker, AL., USAAVNC, 1988) pp. 2-28.)

Armed reconnaissance is undertaken by the Soviet combat helicopter force when the ground commander needs information on the enemy's dispositions. This mission is likely to be executed under conditions of limited visibility, when information about targets is incomplete, and when the enemy's flanks are not protected.<27> The HIND-G is the principal aircraft that executes the reconnaissance mission, normally utilizing a high-speed, low-altitude penetration of the enemy's lines--again operating in multiple pairs.<28>

FUTURE SOVIET STRUCTURES AND TACTICS

The fielding of two special-purpose combat helicopters, the HAVOC and HOKUM, will undoubtedly have a major impact on how the Soviets organize and employ their helicopters. The NOE-capable HAVOC and the high-performance HOKUM will provide the Soviets with a new capability of fighting for and utilizing the terrain flight environment. Their organizations and tactics will reflect this mission capability. There is not a great deal of information available which clearly defines the tactics and structures that these new helicopters will utilize. As a result, one must make an educated guess, drawing upon Soviet trends, to extrapolate what tactics these aircraft might employ.

For a number of years, the Soviets have longingly written of the AH-64 APACHE's capabilities while operating in the NOE environment. General Reznichenko wrote:

They are superior to other anti-tank weapons in terms

> of field of vision, maneuverability, and fire power. They are capable of hitting armored enemy targets while remaining out of reach of anti-aircraft weapons. The correlation between tank and helicopter losses is 12:1 or even 19:1 in the helicopter's favor, according to practical experiments...Let the tanks aim their machine guns at them. Helicopters will be able to strike from afar. The crew has everything required to destroy the tanks: the most accurate sights, missiles, plus combat skills.<29>

The Soviets learned quickly from Afghanistan that they had to start operating at low altitudes (i.e., NOE) in order to survive. SA-7 and STINGER missiles forced a rethinking of modern attack helicopter tactics with which their new MI-28 would operate. As a result, it is a sure bet that the HAVOC will be an aircraft that will be a true NOE machine, operating from the hover within the protective embrace of the terrain.

The MI-28 will undoubtedly supplement the HIND rather than completely replace it.<30> This is in keeping with the Soviet practice of not retiring a weapon system as long as it has some value. Obviously, the HAVOC is superior to the HIND for conducting antitank and anti-helicopter missions, whereas the HIND is still strongly-suited for conducting air assault escort, fire support and reconnaissance missions. The HAVOC will be integrated into the existing force structure and will be fielded in the Western Group of Forces during the 1990's, amassing as many as 480 aircraft in the near future, even after announced force cuts.<31>

The HOKUM, on the other hand, will be a new asset

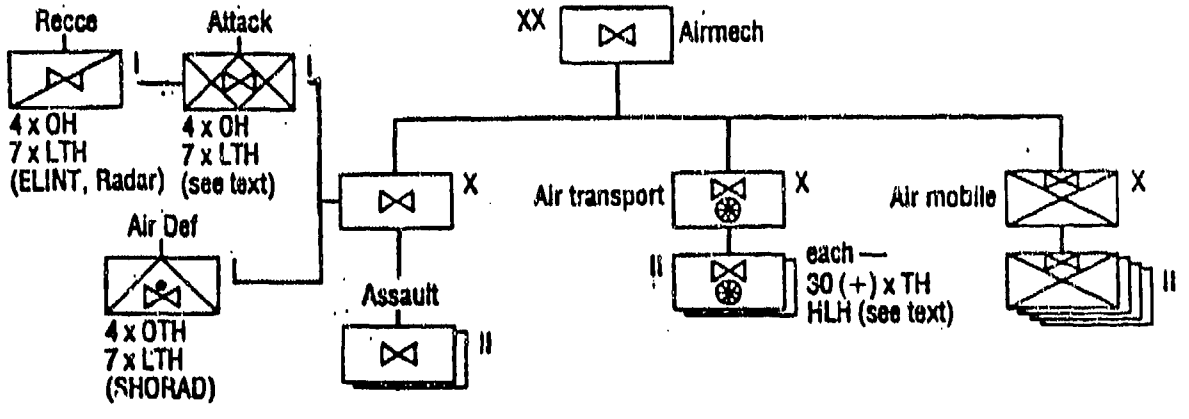
with which the Soviets have to deal. This new and radical departure in mission specialization, being the world's first dedicated fighter helicopter, will necessitate specialized force structures and tactics. The HOKUM will probably utilize proven fixed-wing fighter concepts that have been adapted to the terrain flight environment and to the nature of the principal target: enemy attack helicopter. HOKUM pairs and flights, utilizing stand-off passive detection sensors and stalking tactics, will target and attack NOE operating enemy helicopters with long-range air-to-air missiles. Close-in fights will be avoided if possible but can probably be adequately dealt with, given the maneuverability and agility exhibited by the HOKUM's design.<32> With the expected high cost of the HOKUM and its mission-utilization rates, the HOKUM is expected to be fielded in specialized "air-to-air combat squadrons at front and Army levels, with up to 20 HOKUMs per squadron, eventually totalling as many as 800 HOKUMs (within the Soviet Air Force)."<33>

Soviet Army Aviation as a whole can be expected to see an intensive modernization effort within the next few years, in both quality and quantity. Army Aviation could comprise as many as 1,600 HINDs alone by 1990 and support a reduced ground force structure (courtesy of recent unilateral disarmament initiatives on the part of President Gorbachev) with 8-12 HINDs per division. The HIP combat helicopter fleet will also see significant modernization, with MI-17

models replacing and augmenting older HIP-C's primarily as a result of announced force reductions. Army Aviation can see the addition of 2,000 or more HIPs or follow-on aircraft in the next 20 years, which will result in the divisional squadrons possessing 10 to 12-16 aircraft each.<34>

The Soviets are very close to realizing true Air Mechanization. As detailed by General Senger Von Etterin in 1983 and later refined by General Simpkin in 1985, the concept requires an integration of heavy lift (MI-26 HALO), assault (MI-8/17/38), specialized attack (MI-28 HAVOC), small reconnaissance (MI-34 HERMIT) and fighter (KA-? HOKUM) helicopters to work in conjunction with lightweight armored vehicles (BMP/BMD) and infantry formations to fully exploit the vertical maneuver dimension (Figure 25). Given the parts that have been required and the assets available, it is more than a vague prophecy to forecast the creation of Air Mechanized formations within the Soviet Army in the near future.

FIGURE 25



(Source: Richard Simpkin, "Flying Tanks," Military Technology (# 8, 1984) p. 63.)

The Soviets' emphasis on the vertical dimension of the battlefield will continue into the next century.<35> It is an inescapable conclusion that even given the recent peace initiatives offered by the Soviets, the value of the modern combat helicopter will play heavily in the future of their Armed Forces. The Soviets have been enamored with the ability of the combat helicopter to achieve mobility on the battlefield. They are keen to exploit the speed, firepower, and flexibility of the helicopter and feel that this one system, when operated in conjunction with other combined arms multipliers, can dominate maneuver warfare. All in all, more than 4,400 Soviet combat helicopters stand ready to wage four-dimensional war against us in any major conflict---a growing capability which cannot be taken lightly anymore.<36>

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CHAPTER VI

THE COMBAT TRAINING CENTERS

> Let him who desires peace, prepare for war.<1>
> Vegetius

> All of this talk about super-weapons and pushbutton warfare is a pile of junk. Man is the only war machine. Man has to drive the tanks, fly the planes, crawl through the mud, pull the triggers, and push the buttons. We must train to be strong in body and mind. Always remember man is the only war machine.<2>
> George S. Patton, Jr.

The U.S. Armed Forces have had a poor track record in being able to win the first battle in our nation's long history of conflicts. Invariably, we've relied upon the great moats of the Pacific and Atlantic Oceans to provide us with the time to raise, equip, and train the Armed Forces and then employ them at our leisure. This tendency has produced a mediocre level of performance by our ground forces in the first battles of our nation's wars. As Heller and Stofft discovered:

> Of the first ten battles, the U.S. Army suffered five defeats (Long Island, Queenston, Bull Run, Kasserine, and Osan/Naktong) and won five victories. Four of those victories were very costly (San Juan, Cantigny, Buna, Ia Drang)--some might say too costly for the gains achieved...Won or lost, the first battle almost guarantees that experience will be paid for in blood.<3>

Obviously, the critical discriminator in all of these battles has been the relative preparedness of the soldiers to endure the rigors of combat. The level of training (or lack thereof) has traditionally been the key to

winning battles in the past and will continue to be the same in the future. The realities of the modern battlefield, with its reliance on high technology weapons and sensors, are tied to the dominant constant which will always govern their effectiveness...the conditioned behavioral response of the operators. Human nature has remained fundamentally unchanged throughout its existence. Soldiers still exhibit a fear of darkness, of being startled by the unexpected, and panicking when a calming influence is not present. General George S. Patton's concepts about the fundamental nature of war are correct: technology is a poor substitute for training.

This chapter will examine the development of the Army's answer to the training dilemma—the creation of the Combat Training Centers (CTC's). A historical analysis will trace the conceptual drivers of the Army's CTC's to enable the reader to understand the scope and function these facilities were designed for and will provide a foundation to judge the effectiveness of this type of training on unit combat efficiency.

THE NATIONAL TRAINING CENTER (NTC)

The development of the Army's first CTC, the National Training Center at Fort Irwin, California was a direct response to several interrelated military conditions that originated during the 1970's. Foremost among these, was the wretched state of the U.S. Army at the conclusion of

the Vietnam War.<4>

The nine-year conflict in Vietnam laid waste to the Army's reputation of being a capable and competent military organization. Millions of dollars of high-tech weaponry had proven unable to win a war against an enemy who still used bamboo traps and simple explosives. The Army saw that much of its inability to master the use of its new and costly weapons was directly a result of failure of its personnel to master the basic fundamental skills of leadership. Officers and NCO's failed to adequately train and lead their troops in Vietnam. Often commanders, in accord with Army doctrine, would "lead" ground troops from command and control helicopters thousands of feet above their sweating troops. Additionally, most commanders held leadership positions for only six months at a time, rotating back to the safety of staff positions for the remainder of their one-year tours. The result was contempt for constantly changing leaders among the young line soldiers who had to endure year-long combat tours. The effect on morale and unit cohesiveness was devastating. Drug use and insubordination among the troops graphically demonstrated the problem.<5>

The 1973 Arab-Israeli War was seen by the Army as a classic example of what a conventional war in Europe might entail (versus that of the guerrilla war in Vietnam). The Yom Kippur War showed that tanks could still be decisive but, more graphically, that modern weapons could be extremely lethal. Israeli guts, tactics, training, and

initiative proved vastly superior to that of their numerically superior Arab enemies. Front-line quality Soviet aircraft, armor, and air defense systems employed by the Syrians and Egyptians using Soviet doctrine, were eviscerated by the Israelis in a short, but intense conflict. In many ways the war's course paralleled what the U.S. Army envisioned to occur in a conventional fight in Europe: a quick surprise attack by the enemy, a strong active defense and a subsequent counterattack to regain and retain territorial sovereignty. The Army found the perfect model for a future war.<6>

With these two conditions, the Army began to look at itself, to find answers to problems and to prepare for its new focus of defending Europe from the Soviet Union and the Warsaw Pact. The force structure would have to be modified, based upon the lessons of the Yom Kippur War. Army tactics and doctrine needed fixing. New weapons would have to be designed and procured. Most notably, though, the Army had to be trained; trained to fight outnumbered and to win on the modern battlefield. The Army searched for the training solution and found it, not on the ground, but in the air, the result of aerial combat over North Vietnam.<7>

The U.S. Navy and Air Force went into the Vietnam War with the notion that air-to-air missile technology was the panacea for air combat between modern fighters. This was due primarily to the changing ideas of warfare in the "Nuclear Age." The next war was to be fought with strategic

bombers and intercontinental ballistic missiles. Fighter aircraft, therefore, needed to be fast, high-flying interceptors armed with long-range missiles and sophisticated radar equipment.<8> The antagonists would never "see" the enemy, as all engagements would be conducted at extended ranges on radar scopes. As a consequence, both air services went into Vietnam without fighters, in the classic sense, possessing big high-speed F-4 PHANTOM and F-100/105 THUNDERCHIEF aircraft, none of which mounted a single machinegun or cannon. The pilots who flew these aircraft knew little of air combat maneuvering or dogfighting tactics but were confident that they could achieve the same 10-14:1 air combat exchange ratios that were enjoyed in the air over Korea.<9>

The first American air offensive over North Vietnam, Operation "Rolling Thunder," was a painful experience for both the U.S. Navy and Air Force. From 1965 through 1968, 110 MIGs were destroyed in aerial combat with a loss of 48 U.S. fighters--an exchange ratio of 2.29 to 1. Compared to our showing in Korea, it was a disaster.<10> Close-in maneuvering "dogfights" had returned from their deaths in the Korean War. Firing missiles Beyond Visual Range (BVR) was totally impossible in the crowded and confused air war over North Vietnam. Valuable aircraft and their aircrews were being chewed-up at a rate that the services could not tolerate. Something had to be done.

The Navy reacted first. In 1968 Navy Captain Frank

W. Ault was tasked to investigate the reasons behind the poor showing on the part of Navy aircrews. Entitled "Air-to-Air Systems Capability Review of 1968," Captain Ault's investigation looked not at training per se, but was oriented to conducting "an in-depth review of the entire process by which the Navy's Air-to-Air Missile Systems (sic) are acquired and employed in order to identify those areas where improvements can and should be made."<11> This study approach was indicative of the attitude that dictated the study—fix the machine before fixing the man. None of the five basic study questions used to guide Captain Ault's study dealt with training the aircrews.<12>

Captain Ault's final report laid it on the line. Not worried about promotion, Ault flatly stated "In the past we may have concentrated too extensively on improving the machine without spending enough effort on improving the man who flies the aircraft."<13> Ault called for "more realistic air combat training" and for the establishment of "an Advanced Fighter Weapons School...at NAS Miramar for both the F-8 and the F-4 (aircrews)."<14>

Before the Ault report was even finished, the Navy decided to act on Ault's initial recommendations and, in September 1968, implemented an existing plan to form the fledgling Navy Fighter Weapons School at Miramar Naval Air Station near San Diego, California. The "Top Gun" school instituted a special course that was devoted to training aircrews in close combat between jets. The objective of the

entire program was to place at least one graduate in every Navy fleet squadron to act as the unit's expert in weapons and enemy and friendly tactics.<15> Navy A-4 SKYHAWKs were used to simulate MIG-17's. Air Force F-106 DELTA DARTS and T-38 TALONs duplicated the MIG-21's and soon the air space over southern California became the most realistic training ground ever seen in the history of air warfare.

The first class graduated from Top Gun in April of 1969, and the results were startling. From 1969 to 1972, Navy aviators killed 12.5 MIGs for every one they lost.<16> The graduates of Top Gun brought over 200 simulated dogfights of experience with them, paid for in sweat and study instead of blood.<17>

The Air Force found the problem harder to solve. Tactical Air Command (TAC) performed a wider variety of missions and did not have the luxury of dedicating aircraft to air superiority missions as did the Navy.<18> The Air Force did not possess the wide variety of specialized aircraft that the Navy had. This fact, however, did not account for the Air Force's poor showing during the period of 1965-1968 when only 2.25 MIGs fell for every TAC fighter.<19> As a consequence, the Air Force commissioned a study like that of the Navy Ault report, which was entitled "Red Baron," no doubt in honor of the famous World War I ace, Baron Manfred von Richthofen.

The Red Baron series of reports (Volumes I, II, III), published from 1972 to 1975, "compared USAF pilot

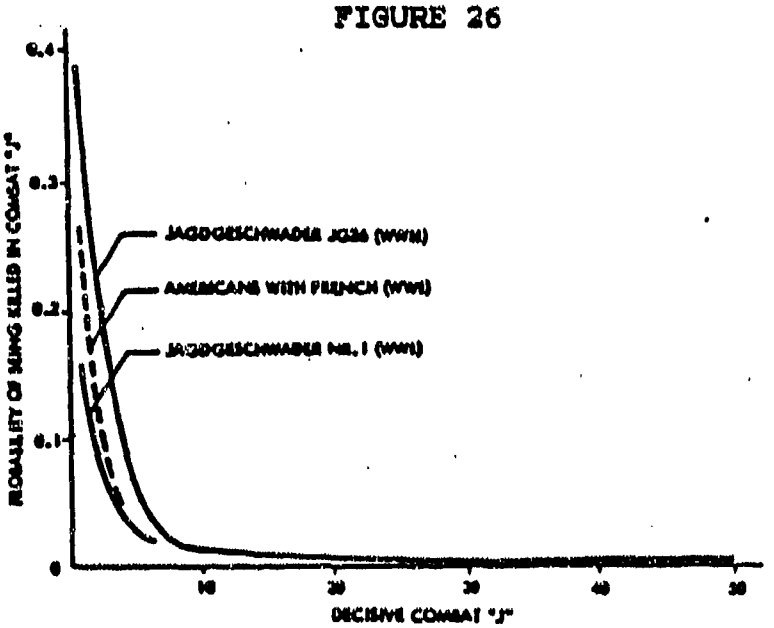
experience with a pilot's record of success or failure in decisive combats."<20> All three volumes categorically cited "insufficient training and experience in air-to-air combat" as being the cause of the Air Force's poor performance in Vietnam. Specifically, training in the Air Force had been conducted against similar aircraft (i.e. F-4 PHANTOM vs. F-4 PHANTOM) employing standard USAF tactics on both sides--the pilots only learned how to beat themselves and not the enemy. The performance differences between the MIGs flown by the North Vietnamese (which were smaller and more maneuverable) and the F-4's and F-105's flown by the Air Force (which were bigger and faster) were not experienced by TAC aircrews until they were in a life or death situation.

More surprisingly, Red Baron III discovered that there was a significant difference between pilots who were successful in shooting down MIGs and those who lost to MIGs in terms of previous combat missions flown.<21> This revelation was not new, having been postulated by a then obscure analyst working for the Litton Corporation in 1966. Herbert K. Weiss published his analysis of air combat operations in World War II, Korea and early Vietnam War data. Weiss concluded that:

> ...the increasing complexity of equipment, and the incredibly demanding environment of air combat will only reduce to even smaller numbers, those individuals who can master their equipment, and whose presence as dozens within a force of hundreds, or thousands, will be decisive.<22>

Additionally, Weiss concluded that experience, or lack thereof, was the prime factor in determining pilot survivability in his first combat missions, which historically proved to be the killing ground of many young pilots. Weiss posited that "fewer than 15 percent of the(se) pilots had a better than even chance of surviving their first combat."<23> Figure 26 graphically depicts this data.

FIGURE 26



(Source: Herbert K. Weiss, "Systems Analysis Problems of Limited War," Annals of Reliability and Maintainability (Vol. 5, July 1966) p. 25.)

Together, the Red Baron reports and Herbert K. Weiss's conclusions led the Air Force to finally act. TAC formed the now famous 64th Fighter Weapons Squadron at Nellis Air Force Base in Nevada in October 1972. The 64th was organized as an "Aggressor" squadron, flying T-38 TALON trainers, and trained to fly and fight just like the

Soviets. By 1975, the 64th Aggressor Squadron became the heart of a series of exercises which became known as "RED FLAG," which combined air combat, bombing, electronic warfare and even cargo missions into a realistic air war over the Nevada desert.<24>

Red Flag managed to shake up and "shoot down" a number of hot Air Force pilots during its early years, utilizing the Aggressors as the enemy and a sophisticated live tracking and television system which no longer allowed for the winner to be determined by how loud and big a pilot was during debriefings. The cameras never lied. When people made mistakes, they were told so in a no-holds barred fashion. Unfortunately, the Air Force started the program too late to be able to measure its effectiveness in Vietnam. In fact, during the same period the Navy was flaming MIGs at a 12.5 to 1 ratio, the Air Force actually got worse, going from 2.25 to 1 down to 1.92 to 1 during the period 1970-1973.<25>

Thus, with these precedent-setting models, a possible solution to the Army's training requirement was at hand. A ground-based form of Red Flag could provide the same type of "Experiential Training" to Army units. The deserts of the American Southwest could easily accomodate the large land requirements of such an Army training center. These ideas gelled and together became the impetus which drove the creation of the National Training Center (NTC) (Figure 27).

The concept of the NTC had its conceptual origins in a series of informal discussions among senior Army leaders between 1974-1976. In November 1976, Major General Paul F. Gorman, the Deputy Chief of Staff for Training and Doctrine Command (TRADOC) put forth the concept in a document entitled "Toward a Combined Arms Training Center."<26> This document was endorsed by many of the Army's commanders and was formally approved as a concept by General Walter F. Kerwin, Vice Chief of Staff of the Army in April 1977.<27> Later that year MG Gorman finalized his concept paper and coined a new and catchier name for the Army's Red Flag, calling for "(A) National Training Center (NTC) for the U.S. Army."<28>

FIGURE 27

(Source: Department of the Army, Combined Arms Training Activity, Briefing, "Combat Training Centers" (Fort Leavenworth, KS: CATA, 1987) P. 7.)

Although the Army lacked the hard data which the Air Force used to justify this type of training expenditure, the Army leadership realized how much could be gained in the area of combat readiness if the NTC could produce a

realistic training environment.<29> The schedule approved by the Vice Chief of Staff on 11 April 1977 intended that the NTC would be realistic. It called for the expenditure of $1.029 billion during the period of 1980-1987 of which only about $70 million was set aside for "hardware," the remainder oriented toward "people."<30> Battalion-size units were programmed to rotate through the NTC in pairs for two weeks of intensive maneuver and live fire training. These "rotations" were programmed to begin in the summer of 1981 and build gradually until 42 battalion organizations would visit the NTC per year in 1984.

Two critical factors made the NTC possible. First, a conscious decision was made by the Army to create a sizeable opposing force organization "out of hide," that is, by drawing from front-line troop units and not adding to the force structure of the Army. Secondly, new technologies became available which could provide the realism that had previously escaped Army force-on-force maneuver events.

The Multiple Integrated Laser Engagement System (MILES) was being developed which would provide the capability to assess real-time casualties through the use of laser transmitters and receivers applied to the training combatants. Each time a laser-equipped weapon fired its eye-safe bolt of light and struck a laser detector worn by a soldier or attached to a vehicle, the detector would activate a strobe light or horn indicating the soldier or vehicle had been disabled. Each weapon system was provided

with its own specific kill code to simulate the category of weapon it portrayed so that M-16 rifles could not kill tanks but main tank guns could kill tanks.

Another technological advance was the creation of a complex network of position-locator transmitters and monitoring stations. This system enabled the tracking and recording of the movement and condition of every tactical vehicle employed during training.

All of this technology and OPFOR contributed to a new training philosophy for the Army to use at the NTC. Since the objective of the NTC was to improve readiness, the Army instituted a Train-Evaluate-Train Methodology which would provide immediate feedback to the players following an exercise and would be used to improve performance immediately thereafter.<31> To accomplish this, a cadre of observer-controllers and real-time training feedback equipment operators were organized to conduct "After-Action Reviews' (AAR's), or critiques of units (normally platoon-sized and up) on their performance at their field locations. AAR's were intended to allow soldiers and their observer/controllers to discuss and evaluate unit performance, offer solutions to problems, and generally learn from one's mistakes.

Above all, the NTC offered a "graduation exercise" to cap a unit's biannual training cycle. The near-war environment of the NTC was envisioned to take advantage of the unit's home station training, where individual soldier

skills, unit team skills (section, crew, squad) and collective skills (platoon, company) could be drawn upon and tested by fighting a realistic enemy which did not exist at the home station. Thus, the NTC's major value would be:

> in providing a unique opportunity for a total combined arms battalion task force to realistically execute missions it (had) trained on at the home station. Unit training time spent at the NTC (would be) an intensive teacher/performance experience to calibrate and standardize execution of battlefield tasks and show leaders how to do much better at the home station.<32>

The NTC opened its doors for business on 1 July 1981 and has since been the "closest approximation yet devised to combat between modern military forces."<33> As of October 1987 over 233,825 personnel had been through a rotation at the NTC and just about everyone who has trained there has praised the value of the training.<34> The NTC has been singled out as one of the most dynamic training tools in the world and has spawned several additional training centers which utilize the same Train-Evaluate-Train Methodology. Though expensive, this type of training works. It has shown itself to be a motivating tool that challenges soldiers to survive and win when fighting outnumbered and under stress.

THE JOINT READINESS TRAINING CENTER (JRTC)

After the NTC was firmly established, the Army began to examine other potential areas of conflict around the world. The rising number of "brush fire" wars in the Third World countries around the globe began to receive a great

amount of attention within the Army. New light divisions came into existence and the existing Army Ranger force structure was increased to accomodate the new mission of conducting low and mid-intensity combat operations around the world. With the new mission and new forces, came the requirement to train, to pracice deployments, and to have a representative OPFOR to maneuver against. Thus the Army, again drawing upon the historical precedence of Top Gun, Red Flag, and the NTC, conceptualized a low-intensity oriented training center and named it the Joint Readiness Training Center, or JRTC (Figure 28).

FIGURE 28

(Source: Department of the Army, Combined Arms Training Activity, Briefing, "Combat Training Centers" (Fort Leavenworth, KS: CATA, 1987) P. 7.)

The JRTC, provisionally located in and around Fort Chaffee and Little Rock AFB, Arkansas, began training operations in September 1988.<35> Like the NTC, the JRTC employs a professional OPFOR and Observer Controller Force in conjunction with a full array of MILES weapon simulators

and a limited position monitoring system. The emphasis of the JRTC is presently centered around non-mechanized Army Task Force sized units which conduct low and mid-intensity operations in support of a fictitious Latin American island state which has been invaded and infiltrated by its neighbor.<36> Presently, one Task Force spends five days conducting low-intensity operations (counterinsurgency) and six days conducting mid-intensity maneuvers against a ground-based OPFOR.<37> By 1991, Army planners envision a substantial increase in the number of "Blue" units undergoing training and further expect a rise in the size, scope and capabilities of the OPFOR, no doubt to be further reinforced as a result of Operation "Just Cause."

THE COMBAT MANEUVER TRAINING CENTER (CMTC)

The U.S. presence in Europe has also had an effect on the requirements to establish additional unit training facilities for Army maneuver units. Presently, there are two complete Army Corps in Europe, units that due to travel cost constraints and readiness considerations, cannot avail themselves of the services provided by the NTC or JRTC. As a consequence, the Army began the planning effort to establish an "NTC East" within the Federal Republic of Germany. Unfortunately for the Army, land in Germany was hard to obtain and consequently the Army was forced to look at its existing training areas on which to build this new training center. The Hohenfels Training Area (HTA), was

ideal for the requirement, possessing maneuver and live fire training ranges. However, the HTA was too small to handle anything larger than a battalion-sized maneuver unit within the boundaries of its unrestricted maneuver area. Compromises had to be made, and out of this "give and take" environment emerged the Combat Maneuver Training Center, or CMTC (Figure 29).

FIGURE 29

(Source: Department of the Army, Combined Arms Training Activity, Briefing, "Combat Training Centers" (Fort Leavenworth, KS: CATA, 1987) P. 7.)

The CMTC is only partially operational at the time of this writing, having only been formally approved in 1986. However, the concept and developmental plans have been formulated, with full-fledged instrumented training set to begin in 1991.<38> The CMTC will focus on heavy (armor and mechanized infantry) battalion Task Force operations, operating against a Soviet OPFOR regiment, utilizing European mid to high-intensity scenarios.<39> Battalions will maneuver for only three to five days when at the CMTC, in order to provide the maximum number of rotations to the forces in Europe. As a concession to the land problems and

to the local population, live firing will not be conducted at the CMTC. Together, the constraints placed on the CMTC have scaled down the scope of the concept but nevertheless, will still provide 48 battalion Task Force organizations a year the chance to fight a bloodless first battle, and to hopefully win in any future conflict in Europe.

The Armed Forces of the United States have gone far in realizing the impact that human performance has in any military organization. The creation of the "Experiential Training" programs by the three major services graphically demonstrates this journey. Our potential enemies have also seen this. In fact, the Soviet Army is presently trying to organize its own National Training Center somewhere in the Soviet Union.<40> It seems that even the Soviets have figured out that combat experience is a perishable commodity.

What really makes the Combat Training Centers, albeit any "Experiential Training" program work? In short, it is a professional group of trainers who accurately portray the potential enemy. Be they Aggressors, Adversaries, or OPFOR, all share the enviable task of being the "Bad Guy" in this type of training and will be the focus of Chapter VII.

ENDNOTES 6

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3. Charles E. Heller and William A. Stafft, America's First Battles (Lawrence, KS: University Press of Kansas, 1986), p. 329.

4. Daniel P. Bolger, Dragons at War (Novato, CA: Presidio Press, 1986), p. 8.

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8. Randy Cunningham, Fox Two (Mesa, AZ: Champlin Fighter Museum, 1984), p. 134.

9. Ibid.

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11. Department of the Navy, Naval Air Systems Command, "Air-to-Air Systems Capability Review July-November 1968" (Chairman, Captain Frank W. Ault, 24 July 1968), p. 1.

12. Ibid.

13. Cunningham, p. 134.

14. Ault, p. 37.

15. Benjamin F. Schemmer, "You Fight Like You Train and Top Gun Crews Train Hard," Armed Forces Journal (May 1974), p. 26.

16. Bolger, p. 14.

17. Cunningham, p. 135.

18. Schemmer, p. 26.

19. Ibid.

20. Peter deLeon, "The Peacetime Evaluation of the Pilot Skill Factor in Air-to-Air Combat" (Rand Corporation, January 1977), p. 15.

21. Ibid., pp. 16-17.

22. Herbert K. Weiss, "Systems Analysis Problems of Limited War," Annals of Reliability and Maintainability 5 (July 1966), p. 308.

23. Ibid., p. 307.

24. Bolger, p. 16.

25. Schemmer, p. 26.

26. Robert L. Herndon, "The Army's National Training Center: A Case Study in Management of a Large Defense Project" (Massachusetts Institute of Technology, 1983), p. 22.

27. Ibid., p. 23.

28. Ibid.

29. William G. Webster, "Using the National Training Center (NTC) Lessons Learned to Improve Combat Readiness" (MMAS, USACGSC, Fort Leavenworth, KS, 1984), p. 5.

30. Herndon, p. 9.

31. Webster, p. 8.

32. Ibid.

33. Herndon, p. 9.

34. Department of the Army, Training and Doctrine Command, "NTC Summary Fact Sheet" (Prepared by Captain Weiden, AFZJ-PTO, 1 October 1987), p. 1.

35. Major Steve Darnall, personal interview, Combined Arms Training Activity, Fort Leavenworth, Kansas, 5 February 1990.

36. Ibid.

37. Ibid.

38. Department of the Army, Combined Arms Training Activity, Briefing, "Combat Training Centers" (Fort Leavenworth, KS: CATA, 13 July 1989), p. 9.

39. Ibid.

40. Major A. Dokuchayev, "Neglecting Priorities: Why is the Road from the Birth of a New Idea to its Realization so Long?" Krasnaya Zvezda (20 April 1989), TR Foreign Broadcast Information Service JPRS-UMA-89-019, (Washington, D.C.), pp. 1-2.

CHAPTER VII

THE OPFOR

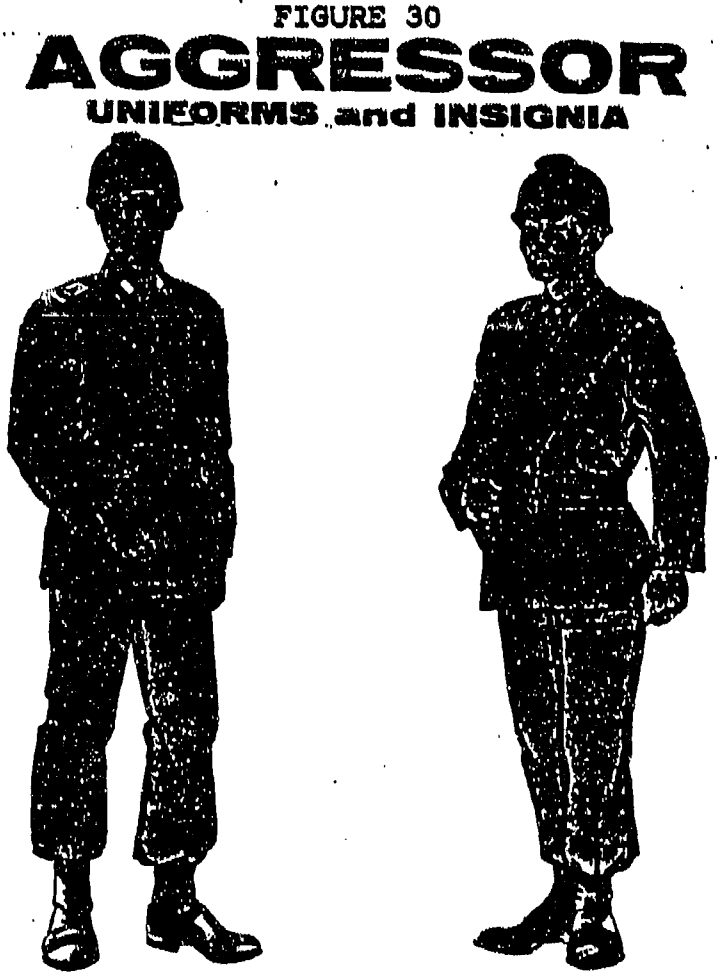
> If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle.<1>
>
> SUN TZU

Up to this juncture, the reader has been familiarized with the Threat's composition and capabilities, and the Army's methods of conducting combined arms unit training at its primary combat training centers, by drawing upon historical analysis to trace the sinews of commonality through both subject areas. This chapter will continue this methodology to analyze the origins of the Army's OPFOR, its current organizations, focusing on its combat helicopter arm at the NTC. This background will enable the reader to fathom the factors that drove the OPFOR's present structure and training capabilities.

Up to a point in the 1970's, the U.S. Army never outwardly discussed fighting the Soviets when conducting training. FM 30-102, Handbook On Aggressor, and other Army Regulations specifically delineated that the training enemy be a non-definitive nationality depicted as "Aggressors."<2> The Aggressors were made recognizable by marking their equipment with a green triangle painted over a white circle, and hence became known as the "Circle Trigon." These forces

supposedly spoke a language known as Esperanto, flew HOODOO helicopters, drove TABU tanks and fired the RIPPER antitank missile while all the time dressed in Ming-the-Merciless crested helmets (Figure 30).<3> Obviously, these Aggressors were intended to be enemies, but were also intended to be politically unobtrusive to the Soviet Union.

FIGURE 30



(Source: Department of the Army, Field Manual 30-102 Handbook on Aggressor (Washington D.C., 1 June 1973), p.22-3.)

The end result of the program was predictable. The Aggressors were never employed in accordance with the goals

established in the regulations. No one ever read the dreary volumes of Aggressor data dreamed up by the Intelligence agencies, much less ever took the time to play the role as Aggressors. As a consequence, the Aggressors frequently fought like Americans, albeit dressed like Ming-the-Merciless, or worse yet, did not fight at all. The entire meaning of the word "Aggressor" began to connotate someone who did not fight; a simple target who lit fires at base camps to ensure that friendly patrols found them. Rarely did the Aggressors outnumber the Blue Force, and as a consequence, ever really challenge anyone in training.<4>

The general failure of the Aggressors frequently led Army units to rely upon other sister organizations to provide the opposing force during training. "Blue" versus "Blue" maneuver training was typically the final result of a unit's annual training program, with neither unit ever having been exposed to the tactics, techniques, and weapons used by the principal Threat. The Army was learning how to beat itself and not the enemy. The Army needed a real, live enemy for its training.

The original concept that drove the NTC required an active and unrelenting enemy force, just like those used at Top Gun and Red Flag. General Gorman simply borrowed the concept and applied it to a ground forces training requirement. The release of the Army's new warfighting doctrine, outlined in the 1975 version of FM 100-5, Operations, set forth exactly who the enemy was: "The

forces of the Warsaw Pact."<5> This bold and definitive step finally released a torrent of previously classified information about the "Threat" and allowed for definition of what the OPFOR should be. Since the focus of the NTC was to train a ground battalion task force, and this organization was expected to fight off the enemy at 1:3 odds, the Army made the decision to replicate a Soviet motorized rifle regiment. The most important aspect of this decision was that this opposing force would be professionally trained (like its Navy and Air Force brothers) and would be a permanent fixture to the NTC, being composed of active Army units. An out-of-hide effort, fulfilling training requirements by utilizing active TO&E units out of their wartime mission requirements, marked a watershed for the Army's commitment to addressing the human factor of preparedness.

No Army program can survive for long without a governing set of regulations to guide and legitimize it through the maze of bureaucratic agencies that provide its support. The Army's OPFOR was no exception and was quickly regulated under the auspices of AR 350-2, Army Opposing Forces Program (1980). This regulation outlined the objective of the OPFOR specifically stating that the program was to:

- Develop an appreciation of the capabilities, strengths, and weaknesses of the combat doctrine, tactics, equipment, and organization of the armed forces of potential adversaries.
- Develop a sense of purpose in training by focusing on

> potential rather than fictional adversaries.
> - Provide realistic field training through operations against a non-cooperative opposing force that uses the tactics, and when possible, the actual equipment of potential adversary armed forces.
> - Improve and expand unit combined arms, intelligence, electronic warfare, counterintelligence, operations security, tactical cover and deception, and defense against unconventional warfare capabilities.<6>

AR 350-2 went on to explain the concept behind OPFOR training by stating that:

> The OPFOR program allows commanders to see how a potential adversary will operate on the battlefield against both individuals and units...in two ways: By training against a non-cooperative opposing force that is using the tactics of a potential adversary, (and) by operating as members of an OPFOR unit and using the tactics and equipment of a potential adversary. In this way, U.S. soldiers will become aware of how a real adversary might try to overcome U.S. tactics and equipment on the battlefield.<7>

In essence, the Army created an "owned and operated" enemy force, wishing to capitalize on the double-edged advantages, it offered to train not only maneuver units but its own role players.

The NTC OPFOR was initially formed and trained in late 1981 by the Army's Opposing Forces Training Detachment (Red Thrust).<8> The men and equipment of the 6th Battalion (Mechanized), 31st Infantry and the 1st Battalion, 73rd Armor made up the original OPFOR and have since been augmented with a brigade headquarters company to ease planning requirements. These organizations were provided with surrogate vehicles to replicate the usual signatures and weapons of the principal combat vehicles of a standard Soviet Motorized Rifle Regiment (MRR). Typically, an MRR is

equipped with a mixture of T-72/80 tanks, BMP 1/2 infantry fighting vehicles, ZSU-23-4 self-propelled (SP) anti-aircraft artillery systems, SAU-122 mm (SP) guns, MTLB all-purpose tracked vehicles, BRDM-2 reconnaissance vehicles and a plethora of smaller weapons. Since most of this hardware was somewhat hard to obtain, the Army decided to bring 230 excess M-551 Sheridan tanks out of mothballs from the Anniston Army Depot.<9> By adding a series of fiberglass Visual Modification kits (VISMOD) to the vehicles outside and complete MILES kits to the weapons stations, the Army quickly converted these Vietnam veterans into cheap and reliable surrogates of the combat vehicles used in the MRR. Army M-880 series pickup trucks were similarly modified to portray the BRDM's.

Again, this method was nothing new. Both the Navy and Air Force did essentially the same thing to establish their Adversary/Aggressor forces. Top Gun cadre members were famous for their "midnight runs" to the Air Force's Davis-Monthan surplus aircraft outdoor storage facility in Arizona. Here, the Navy managed to obtain the first of its T-38 TALON fighters, make them flyable and obtain many spare parts for their fledgling program.<10> The Air Force also used the Davis-Monthan "bone yard" as one of the sources to find its Aggressor aircraft, obtaining 21 F-5E's that had been "donated" by the South Vietnamese Air Force in 1975.<11>

The soldiers of the OPFOR were similarly clothed in

unique dark green uniforms, replete with authentic reproductions of Soviet uniform accutrements, all topped off with either plain U.S. steel helmets or "rakish black berets."<12> As originally envisioned, the total OPFOR regiment was to employ 1,003 of these men who would not only portray the Threat but would also have to remain proficient at operating their normal U.S. equipment.<13> By 1987, the OPFOR had grown significantly to the point that it comprised over 54% of the total population of Fort Irwin.<14>

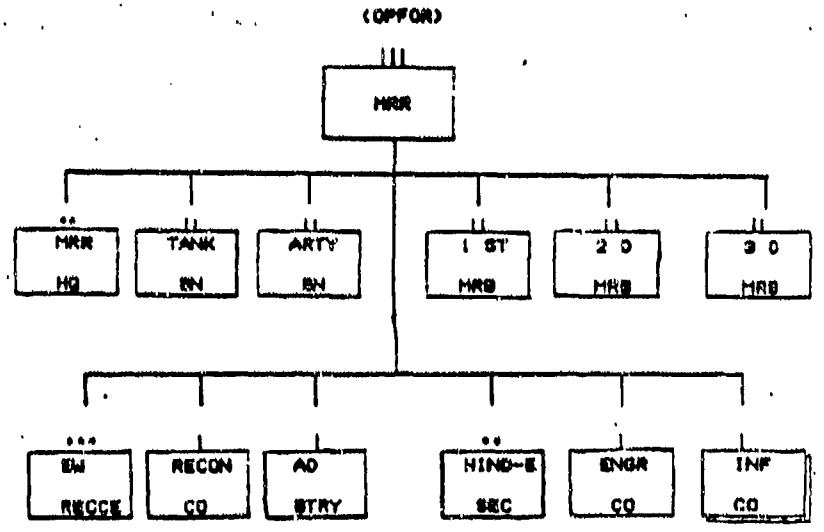
The NTC's OPFOR quickly gained a reputation of being a worthy adversary. Time and time again, the OPFOR rolled over the rotating training units in mock combat. To be sure, the OPFOR had (and still has) the advantage of knowing the terrain (rotating units call this the Home Field Advantage), but what gives the "Bad Guys of the Mojave" the advantage are two simple attributes: First, they train day in and day out averaging over 200 days a year in the field.<15> Second, and more importantly, they are masters of employing Soviet tactics, techniques, and procedures on the battlefield. Though Soviet tactics are often scorned by U.S. officers as being crude and rigid, they are dreadfully effective, employing speed and shock effect to achieve victory. Quite simply, the OPFOR are the best "Soviets" that the Army could make.

The original structure of the OPFOR at the NTC is shown in Figure 31. The principal organic elements of a GSFG MRR were well duplicated. <16> However, some things

were missing, specifically many of the assets that the normal Soviet division and Army would "push" or task organize down with a typical MRR in time of war. Normally, the Soviets will augment the MRR with additional artillery battalions, engineers, and antitank assets to bolster its firepower if the regiment is to be the division's main effort. More importantly, the MRR would receive priority for close air support and could avail itself of numerous sorties of both fixed wing and (more likely) rotary wing aircraft. None of these reinforcing assets were originally resourced at Fort Irwin. The vertical dimension of the battlefield was missing in action.

FIGURE 31

MOTORIZED RIFLE REGIMENT



(Source: Robert L. Jordan, "Know Your Enemy: A Comparison of a Soviet Motorized Rifle Regiment and the Opposing Forces (OPFOR) Motorized Rifle Regiment," MMAS Thesis, (U.S.A. Command and General Staff College, Fort Leavenworth, KS., 1986), p. 2-8.)

The Army quickly addressed the problems involved in

replicating these additional assets that the MRR was supposed to have. The problem was simply reasoned away with the stroke of a pen by giving the OPFOR the mission of conducting only a secondary effort or supporting attack mission instead of the more demanding requirement of replicating the division main effort.<17>

However, the helicopter side of the problem would not die. Several commanders began to question the lack of an attack helicopter air Threat. The Army's Red Thrust Detachment also realized this early-on when it stated in 1981 that:

> A weakness of OPFOR training is the inability to realistically play the OPFOR air threat. Currently, evaluators must determine the relative vulnerability of U.S. Forces to air strikes, and subjectively assess air strike casualties. The lack of realism involved tends to relegate the air threat to a dangerously insignificant place in OPFOR play. The use of friendly aircraft to simulate OPFOR (air attacks) has proven to be ineffective.<18>

The commander of the Army's Armor Center, whose branch would directly receive the brunt of the fires from the Soviet combat helicopter fleet, was also concerned about the lack of an aerial OPFOR. He wrote that:

> We...have not done a good job in developing training to counter the attack helicopter threat...We want to train to engage and defeat the HIND-D. We do not want to train our combat leaders on how to engage and defeat AH-1S (COBRA) and AH-64 (APACHE) helicopters employing our aerial tactics and techniques. Our goal is to provide the most realistic training possible within the constraints of available resources.<19>

As a result of these and other discussions, the Army turned to Fort Rucker's Aviation Training Center to provide a

recommendation on how to fix the problem with the lowest cost.

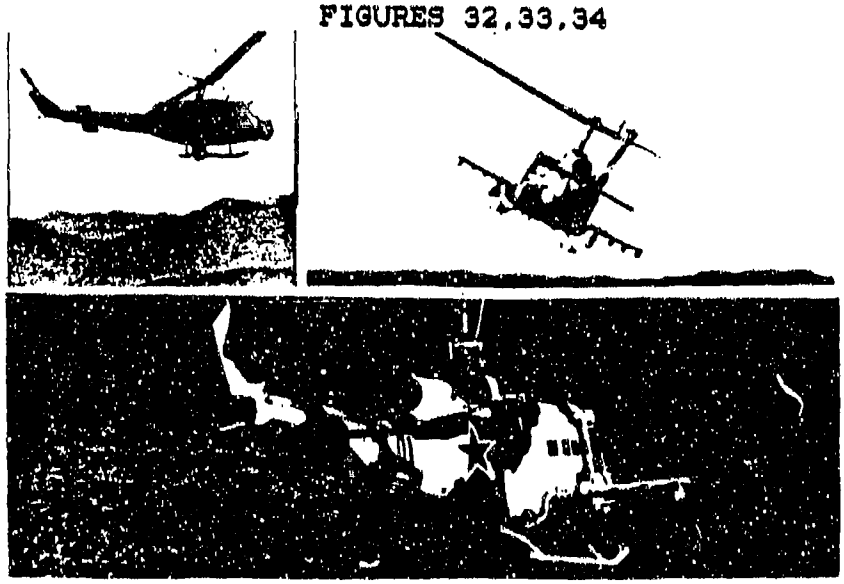
The concept to organize and field a helicopter OPFOR at the NTC was laid out in a concept statement produced by the TRADOC Sytems Management Office for Attack Helicopters at Fort Rucker in mid-1982. This document concluded that the UH-1 HUEY helicopter would be the best, most cost-effective surrogate aircraft to use to replicate the HIND/HIP fleet. A platoon (-) organization, consisting of four UH-1M gunships (UH-1's of Vietnam vintage which mounted the SS-11 missile system and a 40 mm gun turret in the nose of the aircraft), eight pilots and 20 enlisted personnel would be attached to the FORSCOM flight detachment based at Barstow/Dagget Airfield located some 50 miles south of Fort Irwin. The concept statement called for the permanent assignment and modification of these aircraft for use as OPFOR and directed that civilian contract maintenance be provided in order "to reduce the personnel overhead and impact on Fort Irwin."<20>

The first aircraft delivered to the NTC for the OPFOR were obtained from the Arizona National Guard in June 1984. These first two UH-1M helicopters arrived in their original state (without any modifications) and were promptly destroyed in crashes on the Fort Irwin Military Reservation. The "Mike" models were simply not up to the task of flying in the hot and high altitude conditions of the NTC. As a result, the program went back to the drawing board.<21>

Standard UH-1H helicopters were subsequently chosen. A series of aircraft modification contracts was awarded to design, modify and integrate the UH-1/HIND VISMOD and airborne MILES kits (MILES/Air Ground Engagement System or MILES/AGES) which would replicate the HIND's weapons suit.

The contracting process eventually consumed the better part of two years just to modify and obtain flight safety releases for four aircraft for use at the NTC.<22> In September 1985, the first aircraft were finally ready for acceptance after being "tested" at the Loral Corporation's (makers of the MILES/AGES system) Palmdale, California facility and after being flight-certified by the Army Aviation Flight Activity at Edwards AFB, California.<23> The result of the modification work is shown in Figures 32, 33 and 34.

FIGURES 32,33,34



(Sources: Dennis Repke, "Soviet Heliborne Threat," Red Thrust Star (May, 1989), p. 11.; MILES: The Ultimate in Training," Sales Brochure,(Loral Electro-Optical Division, 1986), p. 15.)

The HUEY/HIND-D is still basically a UH-1H helicopter in size and in basic silhouette. A nose VISMOD kit was added to replicate the HIND's nose section configuration. The aircraft paint scheme is perhaps the most telling visual discriminator which allows for a degree of aircraft recognition training when flown at the NTC. The addition of the antiquated SS-11 ATGM wing stores bracket also helps visually distinguish the aircraft from the frontal aspect and acts as the mounting point for any number of Automatic Weapons Effect Signature Simulators (AWESS) which replicate the HIND's cannon and rocket systems. Internally, the HUEY/HIND mounts a pair of stabilized binoculars strapped to the SS-11 sight bracket mounted above the copilot's seat. These binoculars (actually monoculars) have had half of the optical system removed and have a MILES/AGES TOW missile laser transmitter installed which replicates the AT-6 Kokon (SPIRAL) missile system.

The aircrews picked to operate the HUEY/HINDs began training long before the aircraft arrived at the NTC. A Red Thrust mobile training team trained the original OPFOR pilots in three phases during August 1985. Phase One involved classroom instruction dealing with Soviet helicopter characteristics, doctrine, missions, weapons and flight profiles. Phase Two consisted of actual flight training, conducted in normal UH-1's, which familiarized the pilots with Soviet formations and mission profiles. A final certification conducted by observers from the Threat

Directorate of the Combined Arms Center at Fort Leavenworth comprised Phase Three. The entire training program was completed in just eight days.<24>

Currently, the four HUEY/HINDs of the NTC constitute the only flying OPFOR at all of the Combat Training Centers. Both the JRTC and the CMTC operate with only ground-based OPFORs that replicate a low-intensity force (regimental strength) and a Western Group of Forces MRR, respectively.

Having an aerial OPFOR is one thing, but having an effective training tool is another. How well does the OPFOR Air Detachment replicate the Threat and how does it measure up to the goals set for it in Army Regulations? Chapter VIII will address these questions and provide a side-by-side analysis of the fidelity of air arm of the OPFOR.

ENDNOTES 7

1. Sun Tzu, The Art of War, Translated by James Clavell (Novato, CA: Delacorte Press, 1983), p. 18.

2. Daniel P. Bolger, Dragons at War (Novato, CA: Presidio Press, 1986), p. 17. Bolger fails to actually mention the Handbook on Aggressor and attributes FM 105-5, Maneuver Control, as the source of the old Aggressor Program.

3. Ibid.; Department of the Army, FM 30-102, Handbook on Aggressor (Washington, D.C., 1 June 1973), pp. 22-2 through 22-3; Glossary, pp. 2-3.

4. Ibid.

5. Ibid.

6. Department of the Army, Army Regulation 350-2, Opposing Force Program (Washington, D.C.: U.S. Government Printing Office, 15 July 1983), p. 1.

7. Ibid., p. 3.

8. Bolger, p. 28.

9. K. S. Fitzgeralt, "NTC OPFOR Vehicle Program," Red Thrust Star 14 (July-December 1981), p. 7.

10. Benjamin F. Schemmer, "You Fight Like You Train and Top Gun Crews Train Hard," Armed Forces Journal (May 1974), p. 34.

11. For details on the "Aggressor" Squadrons and their underlying concept, see the testimony of LTC Jerry Nabors, then the Commander of the Nellis Aggressor Squadrons, in U.S. Senate, Hearings Before the Committee on Armed Services: Tactical Airpower, 94th Congress, 2d Session, Part 9, (1976), Washington, D.C., pp. 4907-4919. Specific reference cited, p. 4916.

12. Bolger, p. 28.

13. Department of the Army, Training and Doctrine Command, "NTC Development Plan" (Fort Monroe, VA, 3 April 1979), p. I-3.

14. Department of the Army, Training and Doctrine Command, "NTC Summary Fact Sheet" (Prepared by Major Daver, AFZJ-AG, 4 October 1987), p. C-F-5.

15. Bolger, p. 29.

16. Robert L. Jordan, "Know Your Enemy: A Comparison of a Soviet Motorized Rifle Regiment and the Opposing Forces (OPFOR) Motorized Rifle Regiment" (MMAS Thesis, USACGSC, Fort Leavenworth, KS, 1986), p. 5-3.

17. Major Doug L. Dilday, personal interview, Threats Directorate, Combined Arms Center, Fort Leavenworth, KS, 12 February 1990.

18. Red Thrust Star, "Notes from the Field" (July-December 1981), pp. 18-19.

19. Department of the Army, United States Armor Center, Message 300900Z, September 1983, "Threat Helicopter Simulators" (Fort Knox, KY, ATZK-CG), p. 1.

20. Department of the Army, United States Army Aviation Center, "Concept Statement--AGES/AD Integration" (TRADOC Systems Manager for Attack Helicopters, 4 August 1982), p. 1.

21. CW4 William Butts, telephone interview, Platoon Leader, OPFOR Air Detachment, Fort Irwin, CA, 16 February 1990.

22. Ibid.

23. Ibid.

24. Steve Makarsky, "Air Attack Warning: OPFOR Helicopters Prowl the National Training Center" Air Defense Artillery Magazine (Summer 1986), p. 28.

CHAPTER VIII

A COMPARISON OF CAPABILITIES

> Above all...training must be realistic--anything else is just rubbish.<1>
>
> Colonel Erich Hartmann
> World's Leading Ace
> 352 Victories, WWII

> In no other profession are the penalties for employing untrained personnel so appalling and irrevocable as in the military.<2>
>
> General Douglas MacArthur

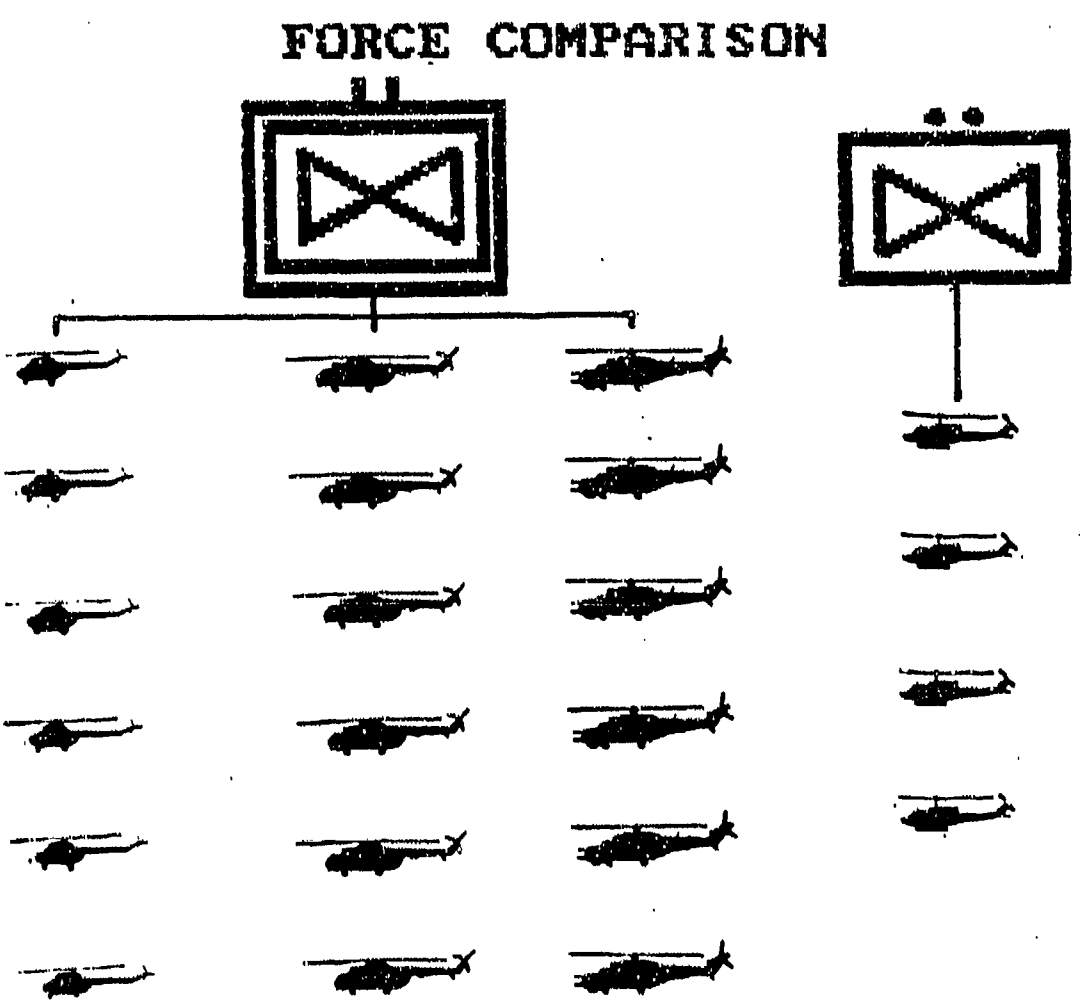
From the moment of its debut at the NTC, the OPFOR Air Detachment was hailed as a new dimension in the realism of Army CTC training. Several authors have written of the success of the HUEY/HINDs, singing the praises of effectiveness of the aircraft in their training mission.<3> These glowing descriptions all were based on the first months of the aircraft's operation and in some cases reflected only a superficial knowledge of the actual ongoing training events. Quietly, and behind the facade of good public (and service) relations, problems began to emerge. Something was rotten in Barstow.

The original driving requirement of the OPFOR Air Detachment was TRADOC's desire to put something into the air quickly over the NTC while at the same time not breaking the back of the training budget. Helicopters are expensive combat vehicles to acquire and operate and, as a result, the Army went for the low-cost option. UH-1H helicopters were,

and still are, the most plentiful helicopters in the Army inventory so the impact of converting four aircraft for HIND simulation would not adversely affect the Army's force structure. Lastly, the "attachment" of the HUEY/HINDs to the already existing UH-1 flight detachment was envisioned to alleviate any additional maintenance and support personnel requirements, which again would have to be paid for out of the force structure. In essence, the Army wanted something for nothing and they got what they paid for.

The force structure that was committed to the OPFOR Air Detachment was and still is inadequate for the needs of the NTC. As shown in Figure 35, the four HUEY/HINDs represent only 20% of the air assets normally found in the Divisional Helicopter Squadron. This numerical relationship is misleading, though, as the actual Operational Readiness (OR) rate of the HUEY/HINDs fails to allow all four aircraft to fly simultaneously. The OPFOR Air Detachment's contract maintenance has proven to be a cumbersome arrangement that has two specific contractors splitting the aircraft and mission equipment package maintenance mission between them. This slows and reduces the availability of the HUEY/HINDs to the point that it has been all too common to see only one aircraft supporting any one battle. By not being able to provide a pair of aircraft, the OPFOR fails to replicate even the basic Threat combat helicopter flight formation, let alone its echeloned doctrine of a pair followed by another pair.

FIGURE 35



The lack of raw numbers of aircraft also has a debilitating effect on the OPFOR Air Detachment's capability to conduct air assault, or <u>desant</u>, operations. Without the raw numbers of aircraft to transport ground troops, the execution of <u>desant</u> operations at the NTC has been made impossible, or worse, made totally unrealistic.<4>

The end result of the limited OPFOR helicopter force structure at the NTC has resulted in the failure to

replicate the basic tactics and doctrine of Threat's combat helicopters. The most glaring discrepancy between the OPFOR Air Detachment and the actual Threat is the difference between the aircraft themselves. The principal helicopters that comprise the Threat combat force are far more different than that offered as a surrogate at the NTC. As Figure 36 shows, the MI-8/17/24 series aircraft differ significantly from the UH-1H VISMOD in both size, shape, and performance.

FIGURE 36

AIRCRAFT COMPARISON

PHYSICAL CHARACTERISTICS	MI-8/17	UH-1H HUEY/HIND	MI-24/25/35		
FUSELAGE LENGTH FT.	60.5	42	57.4		
OVERALL LENGTH FT.	80.1	57	70.5		
AIRCRAFT HEIGTH FT.	15.5	11.7	21.3		
FUSELAGE WIDTH FT.	8.1	9.5	5.6		
MAIN ROTOR BLADE DIAMETER FT.	69.8	48	55.7		
TROOP CAPACITY	24-28	2 @2000 ft/95 deg.	8		
ROTOR SYSTEM NUMBER OF BLADES	ARTICULATED 5	SEMIRIGID/TEETERING 2	ARTICULATED 5		
ATGM RANGE (.9 Pk) KM.	3.5	AVG 1.8	3.5-5		
MAX AIRSPEED KTS.	135	110 @2000 ft/95 deg.	168		

SOURCE: Jane's All The World's Aircraft 1989-1990, (Coulsdon, Jane's Information Group, 1989) pp. 267-270, 362.

The HUEY/HINDs of the NTC have been the butt of

numerous jokes due to its ungainly appearance. While mounting a nose modification kit, wing stores, and a colorful paint scheme, the HUEY/HINDs "still look like a HUEY with a glandular problem."<5> The only redeeming feature of the entire VISMOD kit is the big Soviet Red Star insignia, which as it turns out, is in violation of vehicle-marking guidelines of AR 350-2.<6>

The UH-1H's rotor system is the next most detracting aspect to training. The two-bladed, semi-rigid rotor of the UH-1H is totally alien to any Soviet design. Most Soviet helicopters operate with five-bladed, fully articulated rotors which possess a unique sound and visual signature. The importance of these two attributes cannot be conveyed in still pictures or in print but must be seen and heard. The "whop, whop, whop," sound of the UH-1H HUEY/HIND in no way replicates the constant roar of a five-bladed rotor. Typically, the first indication of the presence of a helicopter is its distinctive sound and the appearance of the upward-bending or "coning" rotor system.

The "Achilles heel" of the HUEY/HIND has been, and continues to this day to be the lack of effectiveness of the mission equipment package simulators. The MILES/AGES transmitters mounted on the aircraft simply do not replicate the demonstrated destructive power of the Threat combat helicopters. The 90% hit/kill probability of the AT-6 Kokon (SPIRAL) missile, which is constant out to a range of over five kms has been reduced to a factor of about a 40%

hit/kill average at ranges of 1500-2500 meters.<6> Similarly, the 57 mm FFAR and 30 mm cannon simulators are for the most part ineffective as they rarely kill any type of target at the NTC. Even troops in the open are immune to these area fire weapon simulators.<7>

The reasons for these problems all stem from the "rush order" manner in which the HUEY/HINDs were modified. Instead of integrating an existing sighting into the aircraft, (i.e., using spare M-65 TOW missile sights used on the AH-1 COBRA fleet which have provisions for MILES/AGES equipment) the Loral Corporation convinced the Army that it could successfully modify sets of stabilized binoculars to do the job.<8> Most aviators who have worked with the cantankerous and unreliable stabilized binoculars disdain from using these optical devices because they simply do not work. No one asked the users (i.e., pilots) about the problem! As a consequence, the "binos" are frequently "down" more than they are "up."

The stabilized binoculars are key to the MILES/AGES system of the HUEY/HINDs. These binos contain the vital AT-6 laser transmitters that simulate the Kokon (SPIRAL) missile system. The mounting for the binoculars is a rigid one that is at the mercy of the vertical vibrations that eminate from the HUEY's rotor system. This causes tremendous problems for the gunner to target a ground vehicle as the laser enemy generated by the transmitter ends up being scattered around and away from an aiming point.

The further away the target, the greater the relative aiming error becomes and consequently, the crews find that they must "bore in so close to get a hit (with the MILES system) that we might as well stab tanks with bayonets in order to get kills."<9> The same problem exists with the other weapon systems simulators: vibration loads cause aiming errors which means no hits at standoff ranges.

The final MEP problem with the HUEY/HINDs is a lack of night-fighting capability. To be sure, night operations are currently not the forte of Soviet Army Aviation, but soon they will have this capability. The HUEY/HINDs are totally incapable of acquiring and engaging targets during hours of darkness as the MILES/AGES equipment is incompatible with Night Vision Goggles operations.<10>

Training has always been a great concern among all OPFOR organizations, especially with those who operate aircraft. Military flying is an unforgiving occupation that demands a high degree of training, under normal conditions, to maintain an acceptable level of safety. Add the requirement to mimic the Threat's tactics and techniques during flight, (which represents added skill mastery on the part of the pilots), and one quickly gains an appreciation of how important pilot training is to all of the flying OPFORs. Unfortunately, training is something that the OPFOR Air Detachment does not receive. Aside from the aforementioned initial train-up conducted in 1985, the HUEY/HIND pilots of the NTC have not received any additional

outside flight training assistance.<11>

The result of this abhorrent situation has been a reliance upon the "old hands" group of pilots who were the ones which were trained originally to do most of the flying while newly-assigned pilots are trained "in house" by the "old hands." The flight time allotted to train the newly-arriving pilots to be OPFOR mission qualified is only eight hours. Contrast this to the Air Force Aggressor requirement of 62 days of flight instruction and it is apparent that training standards are vastly different between the various services.<12> Air Force Aggressors and Navy Adversaries both concentrate heavily on training the trainers requiring upwards of six months of daily training to produce one qualified OPFOR aviator.<13> Army pilots at the NTC are frequently qualified after only three weeks of ground and air training.<14>

Herein lies the primary differences between the services' OPFOR programs. Whereas the Navy and Air Force view their "bad guys" as trainers and teachers, the Army sees its OPFOR organizations and personnel to be simply training aids (i.e., something that aids in the conduct of training) and not as instructors per se. Air Force and Navy Aggressors conduct instruction on various Threat-related areas in addition to their flight duties. In fact, the training program which qualifies both the Navy and Air Force Aggressor pilots spends much of its effort on educating the individual in the academic pursuits, in order to be able to

teach various Threat subjects while not flying. The Army, on the other hand, utilizes its Red Thrust Training Detachment to conduct most Threat instruction utilizing specialized teams of instructors who travel from installation to installation and inform the units of Forces Command (FORSCOM) as to developments in the Threat. The OPFOR Air Detachment mirrors the Army concept and rarely conducts any academic training of rotational units.<15>

Lastly, some mention is necessary of some of the administrative limitations that have been placed on the OPFOR Air Detachment. Due to safety concerns on the part of the Fort Irwin commander, air-to-air combat engagements between OPFOR and "Blue" helicopters have been forbidden for all intents and purposes. This restriction was levied in order to forestall any aviation accidents that might occur if the HUEY/HINDs and "Blue" aviation units got involved in "fur balls," or close-in turning fights, above the desert. This restriction manifested itself in a series of artificial constraints that forced the OPFOR Air Detachment to curtail many tactical operations for fear of being accused of deliberately going after "Blue" attack helicopters which were closely supporting the friendly forces scheme of maneuver. As a result of this edict, the OPFOR Air Detachment must always clear its route of flight into and out of the Fort Irwin maneuver area with "star wars control," or the main maneuver controllers, prior to take off. This measure is still used today and is intended to

prevent the "accidental" meeting of "Red" and "Blue" helicopters over the battlefield.<16>

In summary, it is painfully obvious that the current OPFOR Air Detachment is not resourced sufficiently to conduct its mission. The Detachment's aircraft do not look like, perform like, or have the effectiveness of the actual Soviet combat helicopter Threat. The klutzy assemblage of the aircraft's mission equipment simulation package is far from adequate and, together with the poor reliability of the limited number of aircraft assigned, causes the non-replication of even the basic Threat combat helicopter tactics and techniques.

This is the current state of affairs at the NTC. It must be kept in mind that these aircraft represent the only OPFOR helicopters in use at all of the Combat Training Centers, as the JRTC and the CMTC have yet to organize and field a representative combat helicopter Threat.

What can be done to remedy this situation? What plans have been already made to field an improved combat helicopter Threat at the Army's CTC's? How much will these programs cost? These and other questions will be addressed in Chapter IX.

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2. Justin Wintle, The Dictionary of War Quotations (New York, NY: The Free Press, 1989), p. 113.

3. Stephen R. Baribeau, "Soviet Attack Helicopters and their Implications for U.S. Army Division Operations" (SAMS Monograph, USACGSC, Fort Leavenworth, KS, 1985), p. 28; Steve Makarsky, "Air Attack Warning: OPFOR Attack Helicopters Prowl the National Training Center," Air Defense Artillery (Summer 1986), p. 28.

4. CW4 William Butts, telephone interview, Platoon Leader, OPFOR Air Detachment, Fort Irwin, CA, February 1990. CW4 Bill Butts was the senior HUEY/HIND pilot in the OPFOR Air Detachment at the time of this interview; he has since retired from the Army.

5. Hans Halberstadt, NTC: A Primer of Modern Land Combat (Novato, CA: Presidio Press, 1989), p. 30.

6. Department of the Army, Army Regulation 350-2, Army Opposing Forces Program (Washington, D.C.: U.S. Government Printing Office, 15 July 1983), p. 6.

7. Butts, telephone interview.

8. Ibid.

9. Ibid.

10. Ibid.

11. Ibid.

12. Ibid.

13. Department of the Air Force, Tactical Air Command, USAF Adversary Tactics Instructor Course F-5E (Langley AFB, VA: HQS TAC, 1986), p. 1-1.

14. George Hall, Top Gun, the Navy's Fighter Weapons School (Novato, CA: Presidio Press, 1987), p. 49.

15. Butts, telephone interview.

16. Ibid.

17. Ibid.

CHAPTER IX

THE SEARCH FOR SOLUTIONS

> We can always learn from each other.<1>
> George S. Patton, Jr.

> There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things.<2>
> Niccolo Machiavelli

With the initial omission of a combat helicopter Threat and a lack of effectiveness demonstrated by the OPFOR Air Detachment at the NTC during the period 1981 through 1990, the Army learned little in training about how to fight Threat rotary-wing aircraft. Because of a reliance upon using and witnessing "Blue" helicopters in training, the Army's combined arms team became the victim of many misperceptions about how the Threat employs its combat helicopters. From what little has been written about counter-helicopter training, I have discovered that many authors simply have no grasp of how the Threat fights. Many authors write about how Threat helicopters will attack from the nap-of-the-earth (NOE) flight profile. One author wrote that:

> Attack helicopter(s) using nap-of-the-earth and sneak-and-peek techniques will survey the battlefield for targets. Upon spotting the target...the helicopter pilot will use some sort of natural terrain such as a forested area or hill to hide behind, and...will pop up behind the terrain feature and launch his antitank guided missiles at the target.<3>

Other authors have ascribed Threat tactics as constant bounds between "hover hole(s)," from which Threat combat helicopters "pop-up and fire."<4> Obviously, the authors of these comments were confusing what they saw, or did not see in training.

The Army leadership knew of the problem. The commanders of both the Aviation Center and the Air Defense School corresponded frequently about the lack of realism in the Army's combined arms unit training. Major General Ellis D. Parker, Commander of the Aviation Center, wrote in 1985 that:

> (We) do not adequately replicate the Combined Arms Threat at the NTC. It is urgent that we do this. We must field a Threat force which includes both ground and air systems (rotary-wing and fixed-wing) operating in concert.<5>

Major General Parker's concerns were well-founded and, along with the growing intelligence revelations about the HAVOC and HOKUM helicopters, began to stir a level of concern among the Army leadership about the aspects of defeating Threat helicopters. The Combined Arms Center at Fort Leavenworth addressed the issue in 1986 through the auspices of the Combined Arms Center for Lessons Learned Office (CALL) which discovered that, in fact, a problem existed. CALL flatly stated that ground commanders who visited the NTC had a strictly two-dimensional view of the Threat and that the Army needed to "get the commander thinking skyward."<6> Even in light of the new Forward Area Air Defense (FAAD) concept of combined arms air defense

operations doctrine, the ground commanders refused to treat the air battle above the ground fight as a combined effort, still relegating the problem solely to the Air Defense Branch. Two years later, CALL issued its final report entitled, "Defeat of the Attack Helicopter" which underscored the original observations and added that the Army must "train units to use all of the Combined Arms Team for Air Defense."<7> Further, the report cited that there was "no planned near-term solution for defeating enemy attack helicopters" and that "capabilities of existing weapon systems would have to be maximized" in order to realize any potential counter-helicopter operations.<8> However, the Army was not seeing a real helicopter Threat at the NTC and, as a result, the issue laid mute in the eyes of TRADOC following the report.

The Army had some experience with helicopter OPFOR operations long before the FAAD concept ever came about. In 1978, the Army and Air Force conducted a special test to examine the best way to counter the Soviet Combat Helicopter Threat. Titled "Joint Countering of Attack Helicopters" (J-CATCH), the first phase of the test pitted Army Air Defense assets and attack helicopter units against a surrogate Soviet OPFOR consisting of a number of USAF HH-3 JOLLY GREEN GIANT aircraft (Figure 37). The HH-3 proved to be a very realistic-looking and performing surrogate for the MI-24 series aircraft as it possessed a large silhouette and the same basic rotor system as many of the Mil-designed

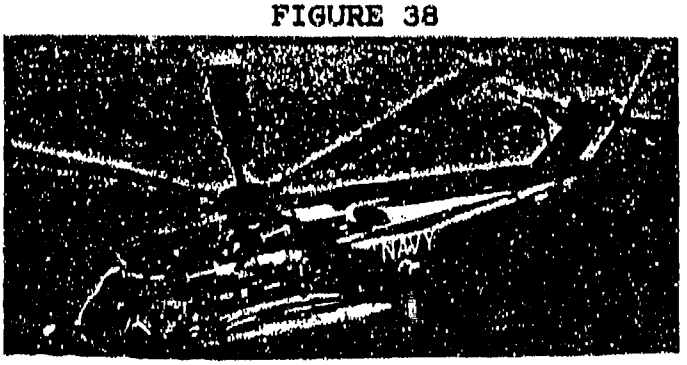
helicopters in the Soviet inventory. The Air Force crews, originally trained in search and rescue operations, quickly adapted to flying the HIND mission profiles and, for the first time in the Army's existence, provided a realistic helicopter OPFOR.<9>

FIGURE 37

(Source: Norman Polmer and Floyd D. Kennedy, Military Helicopters of the World (Annapolis, Naval Institute Press, 1981) p. 137.)

Similarly, in 1981, the Army's 6th Cavalry Brigade (Air Combat) at Fort Hood, Texas conducted anti-helicopter training utilizing another service's helicopters as the OPFOR. In December of that year, a selected group of the unit's attack helicopter instructor pilots conducted an intensive, week-long period of helicopter air-to-air combat training against a pair of USMC CH-53 SEA STALLIONs (Figure 38).

FIGURE 38



(Source: Defence Helicopter World "Defense Specifications," (December 1989-January 1990) p. 103.)

This training was a direct result of a field unit's initiatives to coordinate across service boundaries to draw upon one service's expertise and capabilities to do something that was not in the Army doctrine...killing enemy helicopters with Army helicopters.

The CH-53, like the HH-3, was an excellent surrogate Threat helicopter, especially when operated at minimum weights. Despite its great size, the CH-53's flight performance greatly impressed the Army flight crews who flew against it. When properly flown by the well-trained Marine instructors, who mimicked Threat helicopter profiles, the CH-53 proved to be a very good OPFOR aircraft.<10>

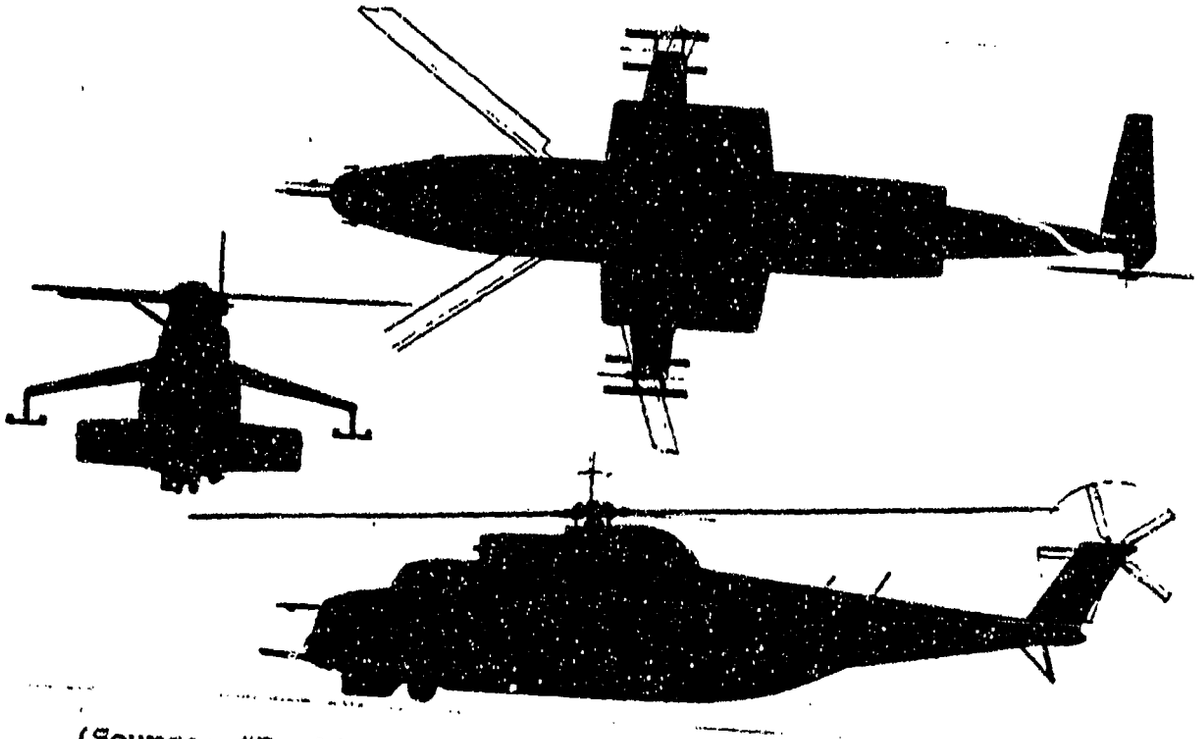
At the time of General Parker's discussions about the OPFOR helicopter problem, several solutions were under consideration. General Parker held that the capability existed then to quickly solve the problem and specifically offered two possible candidate proposals for discussion. First, was the Missile and Space Intelligence Command (MSIC) Threat helicopter surrogate program, which was working hard to replicate the various Threat combat helicopters for use in FAAD weapons testing. The second concept was in essence a spin-off from the movie Red Dawn, which used modified SA-330 PUMA helicopters to replicate the HIND-A aircraft depicted in the film. Both proposals were felt to merit strong consideration.<11>

The MSIC program originated in late 1979 and was intended to produce a limited number of high-fidelity HIND,

HAVOC, and HOKUM surrogates to be employed in the projected series of FAAD's weapons tests during the late 1980's and early 1990's. These aircraft were intended to be flown by Army pilots at all times and would be made available for low-density training use on a space available basis when testing or pilot training was not being conducted. The MSIC XMHDN (HIND simulator), XMHAV (HAVOC) and XMHOK (HOKUM) procurement objective was obtaining six aircraft each and specified that each type simulator be constructed from existing Western helicopters.

As a result of several studies initiated by MSIC, the venerable CH/HH-3 (S-61) JOLLY GREEN GIANT was selected to be used as the base airframe for two of the program surrogates (XMHDN, XMHAV) due to its rotor system and size similarity, but more importantly, due to its low-acquisition cost, as the Air Force was planning on retiring the aircraft from service, and in essence, giving them away to any DoD agency who wanted them. Several studies were conducted by MSIC establishing that the HH-3 (S-61) could be operated successfully at minimal costs (as low as $501.00 an hour) and was far more reliable than its principal civilian competitor, the SA-332 PUMA.<12> Figure 39 shows how the HH-3 resembles the HIND and what the final modified aircraft would look like. Presently, two of these aircraft are being modified at Fort Rucker, Alabama and are expected to be flying by mid-1990.

FIGURE 39



(Source: "Preliminary Design Study of Surrogate Threat Helicopters." Sikorsky Aircraft Inc. (Stratford, CT., 10 December, 1985) p. 36.)

Another study, completed in 1988, evaluated the HAVOC's possible candidate airframes and again recommended the wholesale modification of a series of HH-3's, citing the low-acquisition costs of the JOLLY GREEN GIANT as the deciding factor over using AH-64 APACHEs.<13> All aircraft involved in the program, however, have been committed fully to testing for the next three years, thus precluding their use in Army combined arms training until 1993.<14>

The 1984 production of the film Red Dawn produced a readily-available HIND-surrogate in the form of a converted SA-330 PUMA helicopter (Figure 40). The film's producer

contracted Wright Airlift International, of California, to modify three PUMAs for use in the movie. Each aircraft received a series of external airframe modifications which altered the visual appearance of the aircraft. These modifications did not affect the structure of the airframe and, together with the addition of a series of weapons effects simulators, produced a very realistic trio of Threat helicopters.

FIGURE 40

(Source: Department of the Army, "Army Rotary-Wing Adversary Aircraft," Briefing Slides (Fort Rucker, AL., ATZQ-CDD, 1987) P. 27.)

The success of the PUMAs in replicating the Soviet HINDs in Red Dawn, along with the movie's popularity, exposed the concept to many within the military and industrial community and led the Aerospatiale Helicopter

Corporation to propose the leasing of modified OPFOR SA-330 helicopters to the Army in 1985.<15> While inviting, initially, the Army rejected the Aerospatiale proposal as it was costly, and necessitated the use of contractor-supplied pilots to fly the aircraft, something that was not in the spirit of AR 350-2 which mandated the use of Army personnel in the role as OPFOR.<16>

During this period, another possible solution to the helicopter OPFOR problem was being tested. As a result of a long-standing series of mission-area analyses, stemming from 1981, the United States Army Aviation Center (USAAVNC) had been grappling with the helicopter counterair problem. By 1984, the issue of helicopter air-to-air combat had become the Aviation Branch's number one priority for corrective action; but no one had any imperical data upon which to base corrective actions.<17> A helicopter air-to-air combat test was needed, and with it, an OPFOR to test against. Under the direction of the USAAVNC and the Combat Developments Experimentation Command (CDEC), T-120, or otherwise known as Air-to-Air Combat Test number 1 (ATAC-1) was conducted during November 1985-March 1986 at Fort Hunter-Liggett, California.

Units from the 9th Cavalry Brigade (Air Attack), Fort Lewis, Washington and the 2/17th Air Cavalry Squadron, Fort Campbell, Kentucky were organized into both "Blue" and "Red" forces.<18> These units flew an exhausting number of realistic air combat trials which utilized real-time kill

assessment technology, much like that used at the NTC, to score the test.

A total of five UH-60 BLACKHAWK helicopters comprised the OPFOR for the test and were modified with a simple reflex sight which replicated the AT-6 sight of the HIND-E. The surrogate BLACKHAWKs were limited in their visual similarity, but were about the same size as the HIND, and more importantly, could almost match the high airspeeds of the HIND, which was critical to the test.<19> The UH-60 pilots were trained by the USAAVNC Tactics Directorate and employed the typical Soviet tactics of attacking with a pair of aircraft followed by a second trailing pair.<20>

Most results of ATAC-1 are still highly classified, but some unclassified findings are available. Perhaps most revealing was the revelation that it was not necessarily the technical capabilities of the HIND itself that determined the winner in many cases; it was the tactics that the OPFOR used that killed the majority of "Blue" helicopters.<21> It was found that during the train-up which preceded the test, the "Blue" player unit had never faced any kind of realistic Threat force. The "Blue" players concentrated on flying against each other and had learned how to fight other "Blue" helicopters hiding in the weeds versus that of two sequential pairs of low-flying high-speed helicopters.<22>

Helicopter air-to-air tactics and training began, soon thereafter, to be the something with which the Army Aviation community had to come to grips. Several units

began to seriously master this new set of requirements. One particular organization, the Attack Helicopter Troop (AHT) of the 163rd Armored Cavalry Regiment (ACR), Utah Army National Guard, quickly asserted its dominance in the field. In an effort to enhance its mission training, this unit assumed the role of rotary-wing adversary for the Marine Aviation Weapons and Tactics Squadron number 1 (MAWTS-1), Helicopter Air Combat Maneuvers School at Yuma, Arizona in 1986.

The AHT of the 163rd ACR frequently flew their aircraft from Salt Lake City, Utah to Yuma. There they converted their AH-1F COBRA helicopters into Threat simulators by applying large Red Stars and Warsaw Pact-style buzz numbers on the fuselages (Figure 41).<23>

FIGURE 41

(Source: Michael J. Doyle, "Looking Through the Sights At Adversary Air," Air Defense Artillery (September-October, 1987), p.36.)

While not truly resembling any principal Threat

helicopter, the pilots of the unit concentrated on flying their COBRAs in the various formations and replicating the tactical doctrine of the Threat (both Soviet and Third World), all-the-while attempting to be the best pilots they could be.<24> The rationale behind this concept of training contended that given the long ranges of target acquisition at the Yuma training area, actual aircraft silhouettes are not as important to recognize in training as are the actual Threat formations an aviator encounters.<25> This form of OPFOR training has been a big hit with both parties and has garnered many accolades from the Marine Corps hierarchy.<26>

Aside from the fielding of the NTC's OPFOR Air Detachment, the only other major effort to address the needs of the Army's combined arms counter-helicopter training requirement was the ill-fated Army Rotary-Wing Adversary Aircraft (ARWAA) program. Originated as part of the Army's Air Combat Master Plan in July 1987, the ARWAA concept called for:

> a complete flying adversary helicopter system and organization to foster an awareness of and develop training capabilities to counter...Threat rotary-wing combat aircraft.<27>

The ARWAA program's main driving goal was to provide a realistic helicopter OPFOR for both the Combat Training Centers and home station unit training. As originally envisioned, three separate ARWAA companies, consisting of 12 generic, multi-purpose helicopters, were to be stationed at the primary CTC's and would conduct training visits to

various Army posts and installations within a given geographical area. In essence, the ARWAA concept mirrored the Air Force Aggressors.

The Achilles heel of the ARWAA program was the manner and method of the program's promulgation and the cost of procuring the aircraft. The Army had never procured helicopters solely for OPFOR use in its short aviation history. As a consequence, there was no established procedure or procurement format to use in order to express the need, specify the performance characteristics, and describe the force structure requirements. The ARWAA concept was spread across both combat developments (force structure, airframes) and training areas of responsibilities and, as such, demanded agreement between two TRADOC agencies that traditionally fought each other for funding priorities. The Army Training Support Command steadfastly refused to address the need as it required the procurement of expensive helicopters, such as the S-76, SA-365, or A-109 (Figures 42, 43, 44), whose procurement was normally paid for out of Combat Developments cycle monies. The Combat Developments community at TRADOC felt that the costs of the aircraft should be purchased out of training money, as no funding was programmed for "training aircraft" in the Army Aviation Modernization Plans of 1986-1989. Neither side was willing to budge on the issue. The total estimated cost of $444.6 million for the 42 aircraft of the ARWAA program was simply too excessive.<28>

During the developmental stages of the ARWAA program, the USAAVNC, in conjuction with Aviation Systems Command (AVSCOM), commissioned a study to determine and validate the specifics of the ARWAA program. This study, conducted by the Westar Corporation and Information Management Incorporated, produced a number of startling revelations pertaining to the composition of the world combat helicopter Threat and the Army training requirements for counter-helicopter operations.

FIGURES 42, 43, 44

(Sources: Defence Helicopter World "Defence Specifications," (December 1989-January 1990) p. 95. Norman Polmar and Floyd D. Kennedy, Military Helicopters of the World (Annapolis, Naval Institute Press, 1981). pp. 24, 157.)

The ARWAA Study, published in 1988, identified five major combat helicopters that would constitute 68% of the world's combat helicopter Threat in 1996: the MI-8/17 HIP, MI-24/25/35/HIND, MI-28 HAVOC, KA-? HOKUM, and the SA-340 series GAZELLE.<29> More importantly, however, the ARWAA Study, utilizing an exhausting number of survey questionnaires, which were administered to all of the DoD adversary organizations, identified the requirements and performance specifications for the Army's OPFOR helicopters. The study stongly recommended that the ideal combined arms training adversary helicopter should:

-Be able to maneuver at levels equal to or greater than the principal Threat (HIND/HIP);

-Be optimized for high speed flight;

-Possess four to five rotor blades;

-Be a fairly large helicopter;

-Possess outboard wing stores for outward visual identification;

-Have a crew of two Army pilots;

-Possess a Mission Equipment Package which simply but accurately replicates Long Range ATGM capabilities, massed medium-range rocket fires and a fixed, forward firing cannon;

-Be capable of transporting at least 6-12 troops for secondary air assault operations;

-Not necessarily be one type of helicopter (two or more types of helicopters would probably be

needed: one attack type, one transport type):

-Be capable of being modified to keep pace with future Threat modernization trends.<30>

The ARWAA Study went on to address the force size requirements as determined by the concept of "training presentations." This concept was defined as the "total number of aircraft the "Blue" Force perceives at present on the battlefield. If a helicopter element of flight performs a tactical attack and withdraws beyond visual range of the "Blue" Force (driven by either normal Threat employment tactics or simulation of destruction by "Blue" Forces), that element/flight can fly back within visual range for a second presentation."<31> As defined, this concept factors in the relative visual lines-of-sight offered at each CTC (for instance, the NTC being a desert environment with very long lines-of-sight, restricts the ability to quickly exit and re-enter the training event while the CMTC in Germany typically offers shortened lines-of-sight and allows for multiple re-entries by OPFOR helicopters). As a result, the ARWAA Study concluded that on the average, six OPFOR helicopters could replicate the typical Soviet combat attack profile (which normally requires eight actual aircraft).<32>

Together, with normal maintenance requirements, the ARWAA Study concluded that the NTC and the JRTC needed a total combat helicopter OPFOR of six attack and eight assault aircraft. The CMTC would need only six attack aircraft as the resolution of the training scenario only

included a Blue attalion task force and was typically not subject to enemy air assault operations. Additionally, the study concluded that an additional number of aircraft should be located to support both Army institutional training (five attack aircraft at Fort Bliss, Fort Knox, and Fort Rucker) and home station training at several large installations within the United States.<33> In all, the ARWAA program was recommended to include a total of 55 surrogate aircraft manned at a ratio of 3.0 aviators per aircraft.<34>

While the realities of the Army's acquisition process led to the delusion of the ARWAA program in 1988, a Marine officer writing in the same year, offered a unique common sense solution to the OPFOR combat helicopter problem. Captain Travis M. Allen's article, "Toprotor?" looked into the requirement for a Marine Corps helicopter aggressor program. The USMC has had a long-standing requirement (not unlike the Army's) to train its soldiers and helicopter aircrews in counter-helicopter operations. The Utah Army National Guard's OPFOR activities, as discussed earlier, had a great impact on the author. The simplicity of utilizing a reserve component unit to provide the aircraft, pilots and maintenance to support training was seen as being the obvious choice in light of capped manning levels and the long duration aircraft acquisition process. Captain Allen concluded that:

> to avoid a lengthy budget battle with Congress and establish a fully capable rotary-wing aggressor unit in our lifetime, we must develop a program

that does not require any of the following measures:
-Purchase of new aircraft;
-Purchase of new support equipment;
-A significant increase in maintenance personnel....<35>

Captain Allen suggested that the USMC utilize recently retired AH-1J COBRA helicopters (twin-engined models of the original COBRA design) flown by full-time Marine Corps Reserve pilots and maintained through the auspices of cost efficient civilian-contracted labor. The AH-1J is certainly capable of providing the necessary flight performance (possessing a top speed of 160 kts) but is definitely lacking in its visual appearance and ability to carry troops (only a crew of two). The USMC could, in Captain Allen's eyes, easily implement the program without having to resort to any outside (Department of the Navy) agencies and thus could realize a capability quickly. Obviously, Captain Allen saw the DoD bureaucracy as the major impediment to solving the problem.<36>

Throughout the period of this aforementioned activity, the agency responsible for the development of the CTC's was working on solutions of its own. As for the NTC, the Combined Arms Training Activity (CATA) at Fort Leavenworth, proposed the modification and use of six AH-1S COBRA helicopters for use by the OPFOR Air Detachment beginning in the year 1991.<37> This plan also envisioned adding six UH-1H aircraft to create a surrogate HIP section within the Detachment.<38> However, these plans have apparently not addressed additional pilot positions or

maintenance considerations.

The JRTC OPFOR, which is currently devoid of any combat helicopter Threat, was recently reviewed by CATA which recommended the addition of a Cuban-style, nine-aircraft, helicopter detachment. This organization will replicate the attack, transport and utility helicopter capabilities of the Third World Threat.<39> To date, no funding or personnel allocations have been made toward this requirement.

The CMTC Master Plan likewise calls for a detachment of OPFOR helicopters. This document specifically details a requirement for six MI-28 HAVOC surrogates and an 18-man detachment to fly and maintain the aircraft. However again, as with the JRTC plans, it is an unfunded requirement that is not currently projected for implementation.<40>

In summary then, the Army has had a plethora of possible solutions offered to resolve the disparity between what the Threat is and what Army training resources present. The Army's current plans, with the exception of th NTC, are all unfunded and unmanned, and no specific airframe has been identified that resembles any Threat helicopter. Aircraft costs and personnel requirements are the principal concerns of implementing the current plans. Given these impediments, it may be a long time before any practical OPFOR is fielded with the CTC's unless a common sense solution is found.

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CHAPTER X

CONCLUSIONS AND RECOMMENDATIONS

The intent of this thesis is to evaluate the effectiveness of the Army's counter-helicopter training that is conducted at the various Combat Training Centers. Throughout the course of this document, I have shown, through historical analysis and direct comparison, the various factors that drove the formation of the Army's three CTC's. I have detailed the composition and training methodologies used at these centers and described how combined arms, counter-helicopter training is conducted in conjunction with normal unit training rotations.

Through the use of a historical analysis methodology, I was able to establish a number of trends, in both the development of the combat helicopter Threat and in the Army's training philosophy. This allowed me to project into the future and identify several factors that will be paramount in our counter-helicopter training strategies. As a result of these factors, I have come to a number of conclusions that are detailed below.

--THE THREAT--

The world combat helicopter Threat is a significant and growing force that will have to be reckoned with in any

major military conflict. The Armed Forces of the Soviet Union have placed great emphasis in developing and fielding the necessary numbers and specialized types of combat rotorcraft to further the realization of the "Air Mechanization" concept. The recent climate of ground forces reductions in Europe will only spur on the Soviet desire to modernize their combat helicopter fleet, as they will rely upon the versatility and mobility of combat helicopters to assume many of the voids left in the ground forces. Similarly, the Third World nations have also realized the capabilities of the combat helicopter.

Many nations, both rich and poor, are acquiring combat helicopter fleets to quell insurgencies, to aid in nation-building, and to project military power over the poorly-developed expanses of the globe. Many nations presently possess very primitive helicopters, but are beginning to acquire high technology combat rotorcraft. This, combined with what may be substantial numbers of modern combat helicopters, may offset the much-vaunted U.S. technological superiority that our forces rely upon so heavily. The combat helicopter Threat must be taken seriously.

The principal Threat combat helicopter in the world today is typically a large, multi-purpose machine which can conduct both attack and assault operations. The MI-24/25/35 HIND and the MI-8/17 HIP together constitute 51% of the entire world combat helicopter Threat. These aircraft,

together with a large number of SA-330/332 PUMA assault helicopters dominate the world picture and represent the model from which we must replicate our training Threat.

The future world combat helicopter Threat will see an increasing use of specialized, mission-designed combat rotorcraft, which will possess ever-increasing levels of high-tech sensors and weaponry. Additionally, these aircraft will see better integration into ground maneuver forces as the world's armed forces create "Army Aviation" formations of their own. This will eventually drive the concept of "Air Mechanization" into reality throughout the World.

—THE COMBAT TRAINING CENTERS—

The Army's concept of "experiential training," borrowed from the air combat training programs of the Navy and the Air Force, has forgotten its forerunners when counter-helicopter training is concerned. The Army has concentrated most of its efforts on creating a series of Combat Training Centers that really replicate only the ground Threat. The only existing and funded helicopter OPFOR (at the NTC) is not resourced sufficiently to conduct its mission of portraying the Warsaw Pact combat helicopter force.

The UH-1H HUEY/HINDs bear little resemblance to the actual Threat in both appearance and in mission performance. Insufficient numbers of aircraft and unreliable weapon

simulators detract from training realism and tactical replication. Two other Combat Training Centers have only incomplete paper requirements for a combat helicopter OPFOR and have yet to be even mentioned in the Army's training budget forecasts.

The Army has embarked upon a multi-million dollar program to upgrade the ground OPFOR, by purchasing over 700 vehicles, while a similar program to create a helicopter Threat force does not exist. As a result, over half of the Army's maneuver units never even see a HUEY/HIND, let alone experience the difficulties in countering a helicopter that can shoot armored vehicles from over five kilometers away. The fielding of the elements of the Forward Area Air Defense System (of which the combined arms team plays heavily) demands that the Combat Training Centers have a realistic combat helicopter force.

--THE SEARCH FOR SOLUTIONS--

The classic dilemma of getting the most fidelity out of scarce funding is the principal determining factor in providing the Army with an adequate combat helicopter OPFOR. While many possible solutions are very realistic at a glance, their costs tend to reject their application. Helicopters are intrinsically expensive aircraft to acquire and operate; they almost rule themselves out of consideration. However, the guidelines espoused by Captain Travis Allen's article, "Toprotor," seem to point to some

excellent solutions. Specifically:

-Utilize an aircraft that is already in the DoD inventory that closely resembles the existing and forecasted Threat to the year 2000;

-Modify that aircraft with those mission-essential systems that allow it to provide training feedback;

-Acquire a sufficient number of those aircraft to enable the necessary number of presentations needed to replicate the tactics;

-Utilize Army Aviators to fly and operate the aircraft selected which is in accordance with AR 350-2;

-Utilize contractor-supplied labor to modify and maintain the aircraft, so as to reduce personnel overhead;

-Designate a Table of Organization and Equipment (TO&E) unit to be the Army's Aerial Aggressors which preserves a tactical unit's integrity while still providing training personnel to act as the OPFOR;

-Establish a standardized academic and flight training program for the aviators who will act as the pilots for the aircraft. These aviators should be schooled and trained to a high degree of proficiency to enhance safety in all phases of their training mission.

—SUMMARY—

The Army today is dangerously close to reverting its existing counter-helicopter training to a level reminiscent of that of the old circle trigon days. The UH-1H HUEY/HINDs

are not the "pro-active, non-cooperative" OPFOR that is called for in the conduct of realistic combined arms battle training. These aircraft must be replaced; new aircraft which more effectively replicate the Threat must be procured, and the Army must start fighting the combat helicopter Threat in accordance with AirLand Battle Doctrine in its CTC's.

—RECOMMENDATIONS—

I strongly recommend that the Army create three distinctly, yet interconnected, combat helicopter OPFOR organizations to be stationed at the primary CTC's as envisioned in the Army Rotary-Wing Adversary program. A combination of retired Air Force HH-3 JOLLY GREEN GIANT, active Army AH-64A APACHE and Army Reserve component OH-6 CAYUSE helicopters should be obtained or transferred, along with the personnel from one AH-64 battalion, to establish these three organizations. This recommendation is based on cost and fidelity considerations to afford the Army the necessary training assets. Contract maintenance should be utilized, thus providing a cost-efficient method of providing sufficient aircraft for operations. A suggested implementation plan and rationale for the selection of the aircraft recommended for use is at Appendix C.

—FINAL THOUGHTS—

As the total force grows smaller, through budget

cutbacks and general disarmament, the relative value of realistic training will assume a paramount level of importance in the readiness equation. For too long, the U.S. Army has tacitly ignored the problem of training to fight Threat combat helicopters. The solutions are evident and can be easily implemented; all that is needed is a priority. Realism in our combined arms training is a "must-have" requirement and we must be prepared to pay for it. We can no longer ignore the vertical dimension of the battlefield in our training.

APPENDIX A

THIRD WORLD HELICOPTER THREAT

AFGHANISTAN	200 MI-8/17 100+ MI-24/25/35
ALGERIA	32 MI-8 37 MI-24/25
ANGOLA	45 MI-8, 30 MI-17 6 SA-342, 60+ MI-24/25/35
ARGENTINA	24 SA-330 18 A-109
BAHRAIN	3 MBB BO-105
BANGLADESH	15 MI-8
BOLIVIA	9 UH-1H 10 MD 500M
BRAZIL	6 SA-330, 15 SA-332 36 SA-365, 49 SA-355
BURUNDI	4 SA-342
CAMEROUN	4 SA-342, 12 BELL 206 NR
CHAD	23 SA-330 21 SA-342
CHILE	12 SA-330/332 7 MBB BO-105, 4 SA-365
COLOMBIA	22 UH-1H, 12 S-70 30 MD 500 D/E
CUBA	38 MI-8, 24 MI-17 18+ MI-24/25/35
ECUADOR	5 SA-330 5 SA-342, 4 SA-350
EGYPT	60 MI-8 75 SA-342, 18 AH-64

(Source: Defence Helicopter World, "Military Balance" (December 1989-January 1990), pp. 88-89.)

EL SALVADOR	49 UH1H 9 MD-500 MD
ETHIOPIA	30 MI-8 24 MI-24/25
GABON	4 SA-330 5 SA-342
GUINEA (B)	2 SA-330, 1 MI-8 2 SA-342
GUINEA (REP)	3 SA-330 1 SA-342
GUYANA	2 BELL 212, 3 MI-8
HONDURAS	18 UH-1H
INDIA	250 MI-8/17 20 MI-25, 20 MI-35 6 SA-365, 95 HAL CHETAK
INDONSIA	19 SA-330/332 36 MBB BO-105, 12 MD-500D
IRAN	100 BELL 214 12 AH-1J
IRAQ	170 MI-8, 50 MI-17 50 MBB BO-105, 65 BK-117 28 MD-500D, 50 MI-25/35 30 SA-342
ISRAEL	34 CH-53, 50 UH-1H 40 AH-1F, 16-18 AH-64 40 MD-500 MD
JORDAN	12 SA-330 24 AH-1S, 8 MD-500D
KAMPUCHEA	30 MI-8/17, 18 UH-1H 2 MI-25
KENYA	12 SA-330 40 MD-500D/MD/ME
KUWAIT	9 SA-330 22 SA-342

(Source: Defence Helicopter World, "Military Balance" (December 1989-January 1990), pp. 89-90.)

LAOS	10 MI-8 2 MI-25
LIBYA	30 MI-8/17 40 MI-24/25
MADAGASCAR	2 MI-8
MAURITANIA	4 MD-500M
MONGOLIA	24 MI-8 12 MI-24
MOROCCO	33 SA-330, 45 BELL 205 29 SA-342, 6 A-109
MOZAMBIQUE	4 MI-8 4 MI-24
NICARAGUA	7 MI-17 13 MI-25
NIGERIA	12 SA-332 4 MBB BO-105C, 20 BO-105D
NORTH KOREA	70+ MI-8/17 86 MD 500 D/E, 50 MI-24/25
PAKISTAN	31 SA-330, 10 MI-8 20 AH-1S
PANAMA	1 SA332, 20(?) UH-1H
CHINA (PRC)	30 MI-8, 24 S-70, 50 Z-9 (SA-365), 6 SA-332 8 SA-342, 4 S-76
PERU	40 MI-8, 15 MI-17 9 MBB BO-105, 12 MI-24
PHILIPPINES	70 UH-1H 10 MBB BO-105, 20 MD 500, 12 AUH-76
QATAR	6 SA-332 6 SA-342, 3 WESTLAND LYNX
RWANDA	6 SA-342
SAUDI ARABIA	101 S-70, 27 BELL 212 15 BELL 406 CS

(Source: Defence Helicopter World, "Military Balance" (December 1989-January 1990), pp. 90-92.)

SOMALIA	2 MI-8, 4 BELL 212
SOUTH AFRICA	70 SA-330 80 SE-3160/SA-316B
SOUTH KOREA	65+ UH-1H 29 AH-1J/S, 245+ MD-500MD/MG
SOUTH YEMEN	30 MI-8 15 MI-25
SUDAN	12 SA-330, 12 MI-8
SYRIA	130 MI-8/17, 10 BELL 212 50 SA-342, 60 MI-24/25
TAIWAN	70 UH-1H, 14 S-70 10 MD-500D
THAILAND	124 UH-1H 12 AH-1S
UGANDA	2 BELL 205, 4 BELL 412 3 MI-25
UAR ABU DHABI	20 SA-330/332
UAR DUBAI	6 BELL 205 3 MBB BO-105
VENEZUELA	8 SA-332, 23 UH-1H 10 A-109
VIETNAM	60 MI-8, 40+ UH-1H 36 MI-25
YEMEN REPUBLIC	25 MI-8 6 MI-25
YUGOSLAVIA	39 MI-8 170+ SA-341
ZAIRE	9 SA-330
ZAMBIA	15 BELL 205, 8 MI-8

(Source: Defence Helicopter World, "Military Balance" (December 1989-January 1990), pp. 92-93.)

APPENDIX B

WORLD COMBAT HELICOPTER SPECIFICATIONS

AEROSPATIALE AS 332 SUPER PUMA

Medium sized, multi-role helicopter. 332B battlefield version with seating for 21 troops and 2 crew. 332M has lengthened fuselage, with four more seats and extra windows. 332F (pictured) is naval version.
Specifications: Powerplant 2 Turbomeca Makila turboshafts rated at 1,835 shp for take off, gross weight 19,840 lb (9,000 kg), empty weight 9,458 lb (4,290 kg), length 50.77 ft (15.48 m), height 15.09 ft (4.60 m), rotor diameter 51.12 ft (15.58 m), typical range 335 nm (620 km). Max speed: 150 kt (278 km/h).
Armament: Machine guns, cannon and rockets. Exocet and AS 15TT anti-ship missiles, Murene torpedoes, sonar, sonobuoys and MAD.

AEROSPATIALE SA 342L1 GAZELLE

Light, multi-role machine. SA 342L basic version. SA 342M version used by French ALAT, seating for 4 passengers and 1 pilot.
Specifications: Powerplant: 1 Turbomeca Astazou XIV H rated at 592 shp for take-off. Gross weight: 4,415 lb (2,200 kg), empty weight 2,184 lb (991 kg), length 31.27 ft (9.53 m), height 10.45 ft (3.18 m), rotor diameter 34.45 ft (10.5 m), typical range: 383 nm (709 km). Max speed: 167 kt (310 km/h).
Armaments: Machine guns, 20 mm cannon, HOT anti-tank missiles, rockets. AS 11 anti-ship missiles. SA 341B,C,D,E,F,H powered by Astazou II or III. SA 342K is export variant. ALAT aircraft pictured has SFIM Viviane night sight.

AEROSPATIALE AS 350 ECUREUIL

Light utility helicopter with seating for pilot and five passengers. AS 350L1 is basic military version. Danish Army aircraft equipped with Saab/Emerson HeliTOW system. CH-50 Esquilo is licence built Brazilian Air Force version.
Specifications (AS 350L1): Powerplant: Turbomeca Arriel 1D turboshaft rated at 648 shp for take-off. Gross weight 4,850 lb (2,200 kg), empty weight 2,348 lb (1 065 kg), length 35.8 ft (10.9 m), height 10.33 ft (3.15 m), rotor diameter 34.07 ft (10.7 m). Max speed 155 kt (287 km/h), typical range 329 nm (609 km).
Armament: Pod or pintle mounted machine guns, 20 mm cannon, rockets, TOW anti-tank missiles.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

AEROSPATIALE SA 365 DAUPHIN 2

The SA 365F is normally operated by a crew of 3, and is in service with the Saudi and Irish Navies and on order for the French Navy for SAR duties. US Coast Guard operates Lycoming LTS101 powered SA 366G. Prototype multi-role derivatives is SA365M Panther with TM 333 engines, but first production Panthers, for Brazil, are SA 365Ks retaining Arriel engines.

Specifications (SA 365F): Powerplant: 2 Turbomeca Arriel 1M turboshafts rated at 750 shp for take-off. Gross weight 9,039 lb (4,100 kg), empty weight 4,447 lb (2,017 kg), length 39.73 ft (12.11 m), rotor diameter 39.13 ft (11.93 m). Max speed 160 kt (297 km/h), typical range 467 nm (865 km).

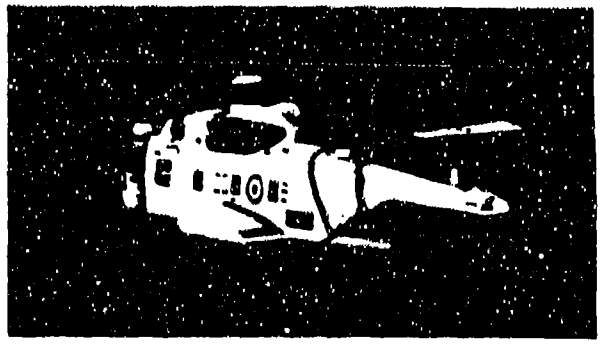
Armament: In ASW role can carry 2 torpedoes and a MAD or 1 torpedo and sonar, for anti-ship missions 4 AS 15 TT missiles.

AGUSTA-SIKORSKY S-61R (HH-3F)

Multi-purpose, amphibious SAR helicopter. Licence-built version of Sikorsky design with uprated avionics for Italian Air Force. Crew of 3 plus winch operator, utility version can seat up to 26 troops or carry 15 stretchers and 2 medics.

Specifications: Powerplant: 2 General Electric T58-GE100 turboshafts rated at 1,500 shp. Gross weight 22,050 lb (10,000 kg), empty weight 13,255 lb (6,010 kg), length 57 ft 3 in (17.45 m), height 16 ft 1 in (4.9m), rotor diameter 62 ft (18.9 m). Max speed 138 kt (255 km/h), typical range 480 nm (890 km)

Equipment: Computerised nav system, nav/search radar, FLIR, 600 lb (272 kg) hoist, searchlight, sea anchor, detachable rescue platform.



AGUSTA A109K

Heavier and more powerful version of A109 with improved hot and high performance. Fixed undercarriage provides greater energy absorption, extended nose houses extra avionics, transmission uprated. Seating for pilot and up to 7 passengers.

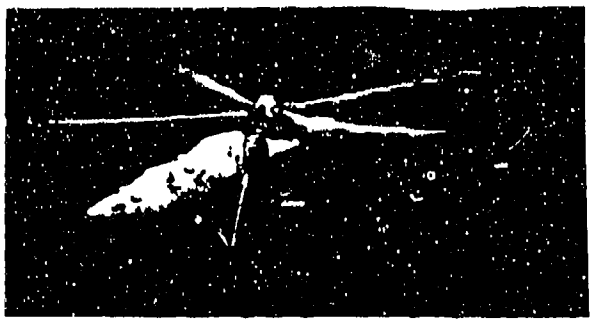
Specifications: Powerplant: 2 Turbomeca Arriel 1K turboshafts rated at 700 shp for take-off. Gross weight 6,283 lb (2,850 kg), empty weight 3,517 lb (1,565 kg), length 36.5 ft (11.1 m), height 10.1 ft (3.3 m), rotor diameter 36.1 ft (11 m). Max speed 168 kt (311 km/h), typical range 290 nm (537 km).

Armament: Light or heavy machine guns mounted either in pods or on pintles in the cabin, pylon-mounted rocket pods, TOW anti-tank missiles.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

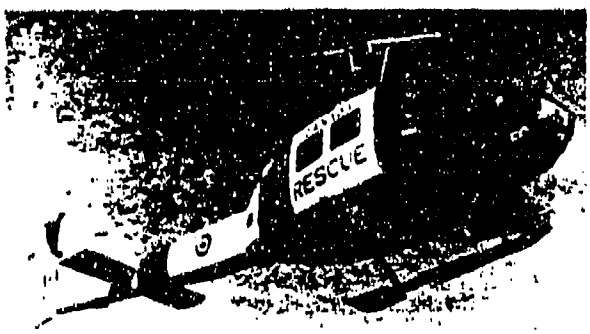
AGUSTA A129 MANGUSTA (MONGOOSE)

Specialised anti-tank/attack helicopter developed for the Italian Army. The first machines entered service in early 1988. Tandem seating with pilot at rear and co-pilot/gunner in front. Has also flown with T8/10 engines. Battlefield support variant to be built in Argentina.
Specifications: Powerplant: 2 Rolls-Royce Gem 1004D turboshafts rated at 881 shp for take-off. Gross weight 8,488 lb (3,850 kg), empty weight 5,575 lb (2,529 kg), length 40.91 ft (12.47 m), rotor diameter 39.04 ft (11.90 m). Max speed 168 kt (311 km/h), typical range 400 nm (650 km).
Armament: 8 anti-tank missiles (TOW, HOT or Hellfire), 12.7 mm gun in chin turret, rockets, air-to-air missiles, gun pods.



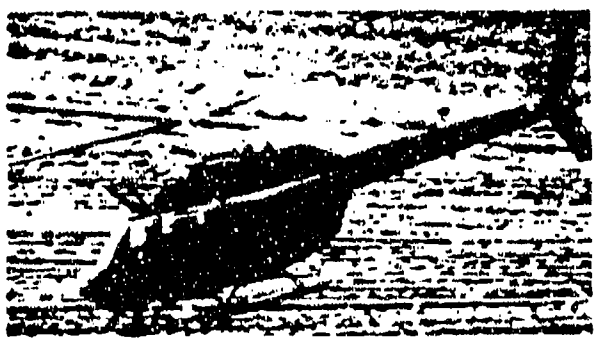
BELL 205

Light utility helicopter in widespread service around the world. US military designations UH-1D/H/V, EH-1H and HH-1H Iroquois. Canadian aircraft designated CH-118. Production recommenced in order to supply 55 aircraft to Turkey. Also manufactured by Agusta in Italy, and Fuji in Japan. Seating for 1 pilot and up to 14 passengers.
Specifications: Powerplant: Textron Lycoming T53-L13B rated at 1,400 shp for take-offs. Gross weight 9,500 lb (4,309 kg), empty weight 4,800 lb (2,117 kg), length 41 ft 11 in (12.7 m), height 11 ft 9 in (3.58 m), rotor diameter 48 ft (14.63 m). Max speed 128 kt (204 km/h), typical range 270 nm (500 km).
Armament: Can carry pintle mounted machine guns and has hardpoints for external guns, rockets and mines.



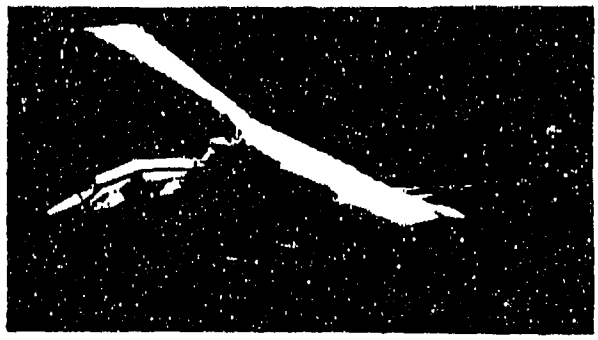
BELL 206

Light observation helicopter designated OH-58 Kiowa by the US Army, and CH-136 in Canadian service. US Navy training version is the TH-57 SeaRanger. NightRanger is rebuilt 206L with FLIR and weapons capability. Seating for 1 pilot and four passengers.
Specifications: Powerplant: 1 Allison T63-A-720 (250 C20J) turboshaft rated at 420 shp for take-off. Gross weight 3,200 lb (1,451 kg), length 32 ft 3.5 in (9.5 m), height 9.5 ft (2.91 m), rotor diameter 35 ft 4 in (10.77 m). Payload 1,270 lb (576 kg), max speed 122 kt (226 km/h), typical range 388 nm (882 km).
Armament: Machine guns, rockets, TOW anti-tank missiles. OH-58C to field Stinger AAM in 1989.



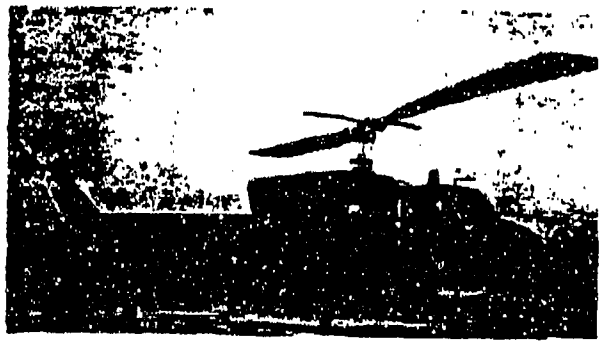
Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

BELL 209 COBRA



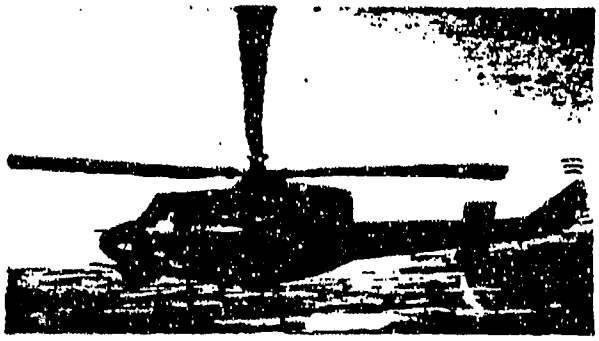
The AH-1S is a specialised anti-tank/attack helicopter developed from earlier model Cobras that made their debut in Vietnam. Licence produced in Japan, night targeting systems for TOW in production. TH-1S is night training version. Tandem seating for pilot in rear, co-pilot/gunner in front.
Specifications: Powerplant: 1 Lycoming T53-L-703 turboshaft rated at 1,800 shp for take-off. Gross weight 10,000 lb (4,535 kg), empty weight 6,598 lb (2,993 kg), length 44.6 ft (13.59 m), height 13.2 ft (4.02 m), rotor diameter 44 ft (13.41 m). Max speed 170 kt (315 km/h), typical range 317 nm (587 km).
Armament: Turretted 20 mm or 30 mm cannon; 2.75 in rockets or 8 TOW anti-tank missiles.

BELL 212



Twin engined Iroquois designated UH-1N in US and CH-135 in Canadian service. Also licence-built in Italy by Agusta who have developed a specialised ASW/ASV version. Seating for 1 pilot and 14 passengers.
Specifications (UH-1N): Powerplant: 2 Pratt & Whitney Canada T400-CP400 (PT6T-3B) rated at 1,800 shp for take-off. Gross weight 11,200 lb (5,080 kg), empty weight 5,997 lb (2,720 kg), length 57 ft 3 in (17.44 m), height 12 ft 11 in (3.9 m), rotor diameter 48 ft (14.6 m). Max speed 130 kt (241 km/h), typical range 277 nm (513 km).
Armament: Machine guns and 2.75 in rockets; torpedoes or depth charges for ASW; anti-ship missiles for ASV.

BELL 412SP



Developed from model 212 and fitted with advanced 4-blade rotor system. Ordered by Honduras and Norway, and licence-built in Indonesia and in Italy by Agusta, the latter having also developed a specialised military variant known as Griffon. Seating for 1 pilot and 14 passengers.
Specifications: Powerplant: 2 Pratt & Whitney Canada T400-CP400 (PT6T-3B) rated at 1,800 shp for take-off. Gross weight 11,900 lb (5,398 kg), empty weight 6,470 lb (2,935 kg), length 42 4 ft (13.90 m), height 14.3 ft (4 35 m), rotor diameter 48 ft (14.63 m). Max speed 140 kt (259 km/h), typical range 354 nm (656 km).
Armament: Machine guns; rockets; 0.50 in cal machine gun.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

BELL 406 (AHIP)

Specialised 2/5-seat scout based on Kiowa airframe developed to work with US Army anti-armour teams. OH-58D Aeroscout rebuilt OH58A with mast mounted sight, first flew in 1983. Model 406CS lacks mast mounted sight and integrated cockpit, first order by Saudi Arabia in 1988.
Specifications: Powerplant: 1 Allison T703-AD-700 (250 C30) rated at 650 shp for take-off. Gross weight 4,500 lb (2,041 kg), length 32.6 ft (9.93 m), height 12.8 ft (3.9 m), rotor diameter 35 ft (10.66 m). Payload 1,671 lb (758 kg), max speed 130 kt (241 km/h), typical range 330 nm (611 km).
Armament: Machine guns, 70 mm rockets, TOW or Hellfire anti-tank missiles, Stinger air-to-air missiles.

EH INDUSTRIES EH101

Joint venture between Westland and Agusta, being developed in naval and utility version simultaneously for Italian, UK and Canadian navies, and RAF. First six prototypes flight testing in Italy and the UK with T700-GE-401 and CT7-6/6A engines. UK production models might be powered by RTM 322. 2-3 crew and up to 30 troops.
Specifications (Pre-production and Italian aircraft): Powerplant: 3 General Electric CT7-6 turboshafts rated at 1,920 shp for take-off. Gross weight 31,500 lb (14,228 kg), empty weight 15,862 lb (7,195 kg), length 74.83 ft (22.8 m), height 21.85 ft (6.7 m), rotor diameter 61 ft (18.59 m). Max payload 10,000 lb (4,536 kg), max speed 167 kt (309 km/h), range 625 nm (1,158 km).
Armament: Mixture of torpedoes and depth charges on naval versions, utility aircraft could carry machine guns.

HINDUSTAN AERONAUTICS LTD (HAL) CHEETAH

Indian licence-built version of Aerospatiale SA 315B Lama, the aircraft that still holds the absolute height record for helicopters. The first examples built from components of Indian manufacture appeared in 1977. Operated by the Indian Air Force, seats pilot and 4 passengers.
Specifications: Powerplant: Turbomeca Artouste IIIb turboshaft rated at 550 shp. Gross weight 3,858 lb (1,750 kg), empty weight 1,560 lb (707 kg), length 33.6 kt (10.2 m), height 10.1 ft (3.1 m), rotor diameter 36.2 ft (11 m). Max speed 113 kt (209 km/h), typical range 250 nm (463 km).
Armament: NA.

Source: Defence Helicopter World "Defence Specifications." (December, 1989-January, 1990) pp. 94-103.

HINDUSTAN AERONAUTICS LTD (HAL) CHETAK

Indian licence-built versions of Aerospatiale SA 316B Alouette III. Also built under licence in Romania as IAR-316B. Seating for pilot and 6 passengers. Picture shows Royal Netherlands Air Force Alouette III.
Specifications: Powerplant; 1 Turbomeca Astazou XIVB turboshaft rated at 592 shp for take-off. Gross weight 4,960 lb (2,250 kg), empty weight 2,537 lb (1,105 kg), length 33.4 ft (10.17 m), height 9.8 ft (3.0 m), rotor diameter 36.2 ft (11 m). Max speed 118 kt (220 km/h), typical range 340 nm (630 km).
Armament: 2 × Mk 46 torpedoes or 1 torpedo and MAD; 2 light machine guns; AS11 or AS12 air-to-surface missiles.

KAMOV KA-34 HOKUM

Tandem-seat helicopter-interceptor designed with emphasis on manoeuvrability and agility. Employing three-bladed co-axial rotor, prototypes have been flying since 1984 with 2,225 shp TV3-117 turboshafts.
Specifications: Powerplant (production aircraft); 2 Isotov TV3-117 engines rated at 2,500 shp. Gross weight 12,000 lb (5,440 kg), length 44 ft (13.5 m), height 17.7 ft (5.4 m), rotor diameters 46 ft (14 m). Max speed 190 kt (352 km/h), typical range 135 nm (250 km).
Armament: 2A42 30 mm gun, IR and semi-active radar AA-8 Aphid, anti-tank missiles, rockets.

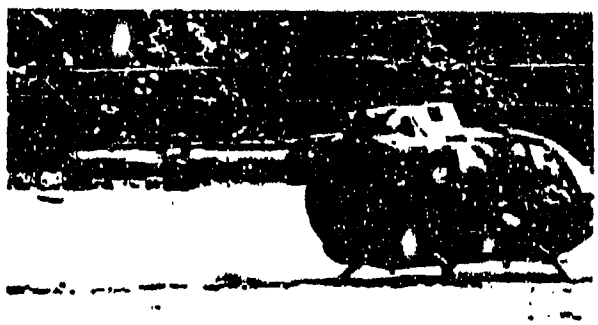
McDONNELL DOUGLAS 500/530 DEFENDER
Light scout/attack helicopter developed from the OH-6 Cayuse. Basic military version is the 500MD Scout Defender, also licence-built in Korea. Anti-tank variant is 500MD/TOW Defender. 500MD/MMS-TOW available with mast-mounted sight. 500MD/ASW Defender in service with Taiwanese Navy, 500/530MG variants have improved avionics. Seats 2 crew and 1-5 passengers.
Specifications (530MG): Powerplant; Allison 250 C30 turboshaft rated at 425 shp for take-off. Gross weight 3,750 lb (1,701 kg), empty weight 1,564 lb (709 kg), length 32.1 ft (9.7 m), height 9.2 ft (2.8 m), rotor diameters 27.4 ft (8.34 m). Max speed 152 kt (281 km/h), typical range 203 nm (376 km).
Armament: 4 TOW missiles; 7.62 mm Minigun or Chain Gun; 40 mm grenade launcher; rockets; torpedoes for ASW.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

McDONNELL DOUGLAS AH-64A APACHE

Specialised, heavy anti-armour/attack helicopter that has also demonstrated considerable air combat capability. Sophisticated visionic equipment allows night and bad weather operations. Tandem seating for pilot and co-pilot/gunner.
Specifications: Powerplant; 2 General Electric T700 GE-701 turboshafts rated at 1,694 shp for take-off. Gross weight 20,600 lb (9,344 kg), empty weight 11,640 lb (4,990 kg), length 58.2 ft (17.7 m), height 15.25 ft (4.64 m), rotor diameters 48 ft (14.63 m). Max speed 197 kt (378 km/h), typical range 260 nm (482 km).
Armament: 30 mm Chaingun; hardpoints for up to 16 Hellfire anti-tank missiles, 76 x 70 mm rockets, 2 Sidewinder or 4 Stinger air-to-air missiles, 2 Sidearm anti-radar missiles.

MESSERSCHMITT-BOLKOW-BLOHM (MBB) 105 CB



Light scout helicopter with semi-rigid rotor-head giving high agility. BO 105 M (VBH) and BO105 P (PAH-1) unarmed liaison and scout/anti-tank machines respectively in German Army service. Swedish version has night-capable Saab Emerson HeliTOW system. Licence assembly in Indonesia and Spain. Seating for pilot and 4 passengers.
Specifications: Powerplant; 2 Allison 250 C20 B turboshafts rated at 420 shp for take-off. Gross weight 5,511 lb (2,500 kg), empty weight 2,814 lb (1,279 kg), length 38.10 ft (11.66 m), height 9.84 ft (3 m), rotor diameter 32.3 ft (4.84 m). Max speed 131 kt (242 km/h), typical range 308 nm (570 km).
Armament: 6 HOT or 8 TOW anti-tank missile; 20 mm cannon.

MBB/KAWASAKI BK 117 M

Light multi-role machine with many components interchangeable with MBB BO 105. Capable of carrying a wide variety of ordnance, troops or casualties, NVG compatible cockpit. Seating for 2 crew and up to 9 passengers.
Specifications: Powerplant; 2 Textron Lycoming LTS 101-750 B-1 turboshafts rated at 493 shp for take-off. Gross weight 7,055 lb (3,200 kg), empty weight 3,807 lb (1,727 kg), length 32.5 ft (4.41 m), height 11.02 ft (3.36 m), rotor diameter 36.08 ft (11 m). Max speed 150 kt (278 km/h), typical range 308 nm (570 km).
Armament: HOT 2 or TOW anti-tank missiles with APX-M397 roof-mounted sight; turretted 12.7 mm machine gun; Forges de Zebrugge multi-tube rocket pods; machine-gun pods.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

MIL Mi-28 HAVOC

'Flying tank' built to survive on the combined-arms battlefield. Heavily armed and armoured, its design reflects the adoption of NOE tactics. Production aircraft have 2,500 shp development of TV3-117. Tandem seating for pilot and gunner.
Specifications: Powerplant; 2 Isotov TV3-117 turboshafts rated at 2,200 shp. Gross weight lbs (10,400 kg), empty weight lbs (6,760 kg), length 55.3 ft (16.85 m), height 15.8 ft (4.81 m), rotor diameter 56 ft (17.2 m). Max speed 165 kt (305 km/h), typical range 254 nm (470 km).
Armament: Turretted 2A42 30 mm gun, rockets, anti-tank and air-to-air missiles.

MIL Mi-34 HERMIT

Training, liaison and light-armed helicopter to replace Mi-1 and Mi-2. Light combat variant to be built by PZL as the SW-4 with 870 shp PZL-10W turboshafts. Seating for pilot and three passengers.
Specifications: Powerplant: 1 Vedeneev M-14B26 air-cooled radial piston engine rated at 325 shp for take-off. Gross weight lbs (1,300 kg), length 25 ft (7m), height 10 ft (3.2 m), rotor diameter 32.1 ft (10 m). Max speed 113 kt (210 km/h), typical range 243 nm (450 km).
Armament: 8 AT-6 and SA-14/16 missiles.

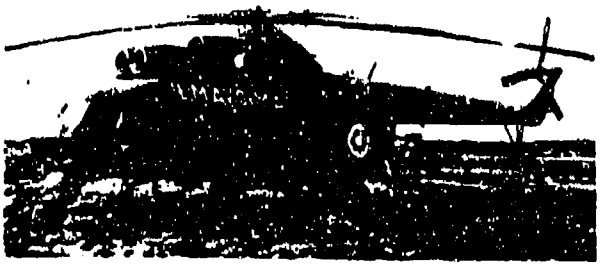
SIKORSKY UH-60A BLACK HAWK

Multi-role medium helicopter. UH-60A utility/assault machine, EH-60A special electronic mission aircraft, MH-60K special operations helicopter, HH-60A USAF combat rescue and special operations aircraft, WS-70 Westland built Black Hawk. Seating for 2-3 crew and up to 14 troops.
Specifications: Powerplant; 2 General Electric T700-GE-701C turboshafts rated at 1,900 shp for take-off. Gross weight 22,250 lb (9,185 kg), empty weight 10,624 lb (4,819 kg), length 50 ft (15.26 m), height 11.3 ft (3.76 m), rotor diameter 53.6 ft (16.63 m). Max speed 195 kt (361 km/h), typical range 324 nm (600 km).
Armament: 16 Hellfire anti-tank missiles; machine guns; mine dispensers.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

MIL Mi-17 HIP H

Considerably uprated version of Mi-8 medium multi-role helicopter with dynamics from the Mi-14 Haze, tail rotor moved to port side of stabiliser. Exported to several client states. Seating for 2-3 crew and up to 32 passengers.
Specifications: Powerplant; 2 Isotov TV3-117MT turboshafts rated at 1,900 shp for take-off. Gross weight: 26,660 lb (13,000 kg), empty weight 15,650 lb (7,100 kg), length 60.44 ft (18.42 m), height 15.6 ft (18.42 m), rotor diameter 70 ft (18.3 m). Max speed 135 kt (250 km/h) clean, typical range 250 nm (465 km).
Armament: Hardpoints for 2-6 AT-2 Swatter anti-tank missiles, 16 × 57 mm rockets, 7.62 mm machine guns, cannon (Hip E gunship).



MIL Mi-24 HIND

Close air support and armed assault aircraft likened to a flying APC. Hind G is dedicated NBC/reconnaissance machine, Mi-18/25/35 are export variants, Mi-27 has 2,500 shp development of the TV3-117.
Specifications: Powerplant; 2 Isotov TV3-117 turboshafts rated at 2,200 shp for take-off. Gross weight lbs (12,000 kg), empty weight lbs (8,200 kg), length 56.8 ft (17 m), height 14 ft (4.25 m), rotor diameter 55.8 ft (17 m). Max speed 178 kt (320 km/h), typical range on internal fuel 243 nm (450 km).
Armament: Turretted four-barrel 12.7 mm gun (Hind E) or fixed twin barrel GSh-23-2 or GSh-30-2 cannon (Hind F). Six hardpoints for rockets, gunpods, air-to-air and anti-tank missiles.

MIL Mi-26 HALO

Largest operational helicopter in the world, used for transport and heavy lift work. Equipped with rear loading ramp capable of accepting large vehicles, overhead track-mounted hoists with 5,510 lb (2,500 kg) capacity. Main rotor has 8 blades. First flew in December 1977. Seating for 5 crew and up to 85 fully equipped troops.
Specifications: Powerplant; 2 Lotarev D-136 turboshafts rated at 11,400 shp for take-off. Gross weight 123,450 lb, empty weight 62,170 lb, length 110.6 ft (33.7 m), height 26.4 ft (8.05 m), rotor diameter 105 ft (32 m). Max speed 159 kt (295 km/h), typical range 432 nm (800 km).
Armament: Usually unarmed.

Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

SIKORSKY CH-53E SUPER STALLION

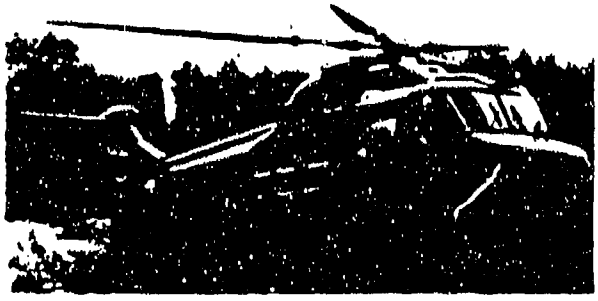
Three engined, heavy duty transport helicopter developed from CH-53D Stallion. CH-53E US Marine Corps variant, MH-53E Sea Dragon US Navy mine countermeasures aircraft, S-80E export version, MH-53J upgraded twin engined machine for USAF Special Operations Forces. 3 crew and up to 55 troops.
Specifications: Powerplant: 3 General Electric T64-GE-416 turboshafts rated at 4,380 shp for take-off. Gross weight 73,500 lb (33,339 kg), empty weight 33,226 lb (15,071 kg), length 73.3 ft (22.35 m), height 28.7 ft (8.66 m), rotor diameter 79 ft (24.08 m). Max speed 170 kt (315 km/h), typical range 1,120 nm (2,075km).
Armament: Mine countermeasures equipment, 0.50 cal (12.7 mm) machine gun

SIKORSKY H-76 EAGLE

Military development of the S-76B, can fulfill a variety of roles including gunship, assault, observation and SAR. Optional equipment includes armoured seats and self-sealing tanks, roof or mast-mounted sight, and self-protection systems. Seats 2 crew and 10 troops
Specifications: Powerplant: 2 Pratt & Whitney Canada PT6B-36 turboshafts rated at 960 shp for take-off. Gross weight 11,400 lb (5,171 kg), empty weight 6,295 lb. (2,855 kg), length 44.08 ft (13.43 m), height 14.46 ft (4.41 m), rotor diameter 44.00 ft (13.41 m). Max speed 155 kt (287 km/h), range 312 nm (578 km).
Armament: Combinations of TOW and Hellfire anti-tank missiles, Stinger air-to-air missiles, 70 mm and 80 mm rockets, mines, 7.62 mm, 12.7 mm and 20 mm guns.

WESTLAND BATTLEFIELD LYNX

Uprated version for British Army with improved tail rotor and wheeled landing gear. Initial order for 16 AH Mk 9s for British Army. Seats 1-2 crew and 12 passengers.
Specifications: Powerplant: 2 Rolls-Royce Gem 42-1 turboshafts rated at 1,120 shp for take-off. Gross weight 11,300 lb (5,126 kg), empty weight 6,548 lb. (2,970 kg), length 43.83 ft (13.30 m), height 12.25 ft (3.73 m), rotor diameter 42.00 ft (12.80 m). Max speed NA, max cruise 160 kt (296 km/h), typical range 370 nm (685 km).
Armament: 8 x TOW, HOT or Hellfire anti-tank missiles; 7.62 mm miniguns.



Source: Defence Helicopter World "Defence Specifications," (December, 1989-January, 1990) pp. 94-103.

APPENDIX C

RATIONALE AND IMPLEMENTATION

FORCE DESIGN

NTC	JRTC	CMTC
7 HH-3 (HIND/HIP)	7 HH-3 (HIND/HIP)	6 HH-3 (HIND/HIP)
6 AH-64 (HAVOC)	7 OH-6 (GAZELLE/500MD/ BO-105)	6 AH-64 (HAVOC)
6 OH-6 (HERMIT/ GAZELLE)		4 OH-6 (HERMIT/ GAZELLE)

TOTAL AIRCRAFT REQUIREMENT

AH-64--------12
HH-3---------20
OH-6---------17

PERSONNEL REQUIREMENTS

NTC	JRTC	CMTC
7 OFFICERS	7 OFFICERS	7 OFFICERS
29 WARRANT OFF	19 WARRANT OFF	24 WARRANT OFF
7 ENLISTED F/E	7 ENLISTED F/E	6 ENLISTED F/E
12 ENLISTED	12 ENLISTED	12 ENLISTED

TOTAL PERSONNEL NEEDED

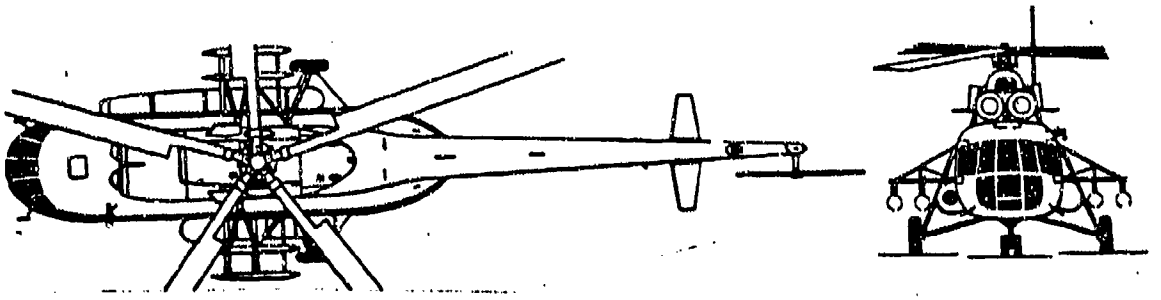
21 OFFICERS
72 WARRANT OFF
20 ENLISTED F/E
36 ENLISTED
149 TOTAL PERSONNEL

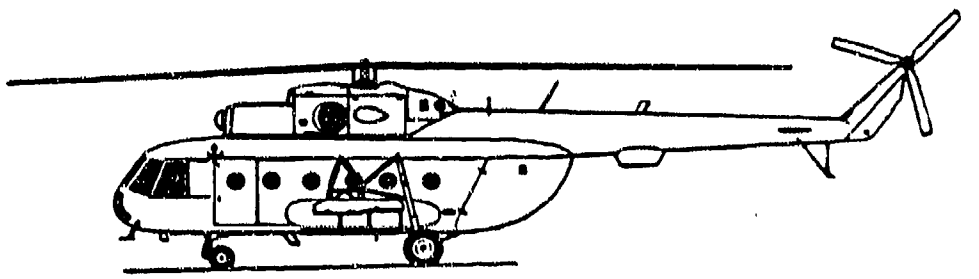
CURRENT AH-64 BATTALION TO&E #01385L200		CURRENT NTC OPFOR AIR DETACHMENT TO&E #01405LF01	
18 AH-64, 13 OH-58, 3 UH-60		4 UH-1H HUEY/HIND	
21	OFFICERS	1	OFFICER
44	WARRANT OFF	9	WARRANT OFF
12	ENLISTED F/E	5	ENLISTED F/E
188	ENLISTED	0	ENLISTED
265	TOTAL PERSONNEL	15	TOTAL PERSONNEL

TOTAL AVAILABLE PERSONNEL
22/52/16/189

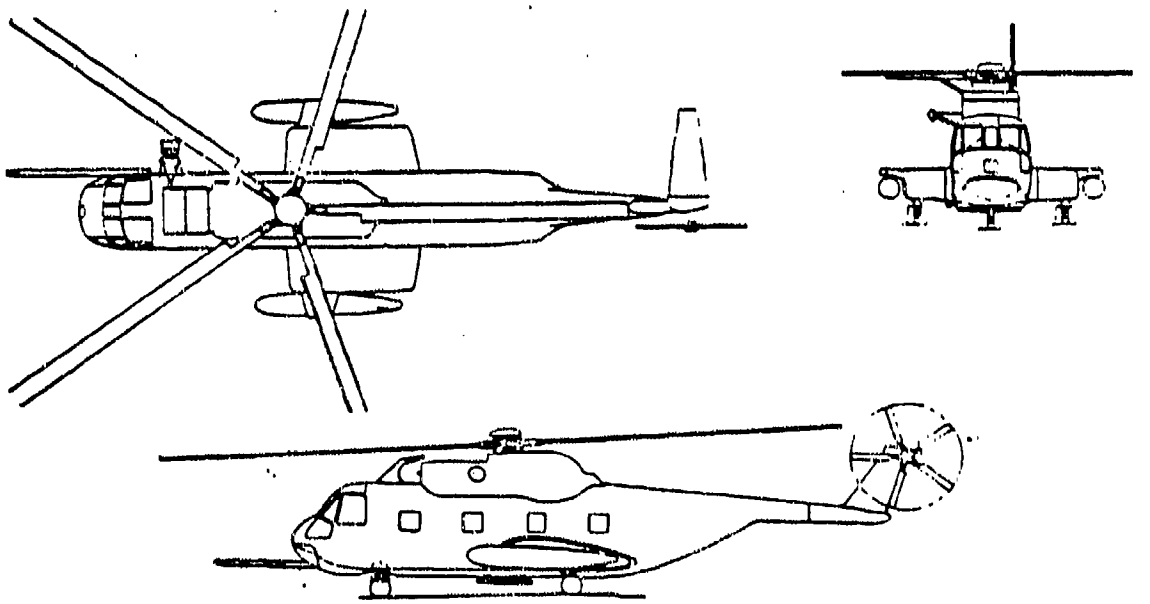
AIRCRAFT SELECTION

MI-8/17 SURROGATE





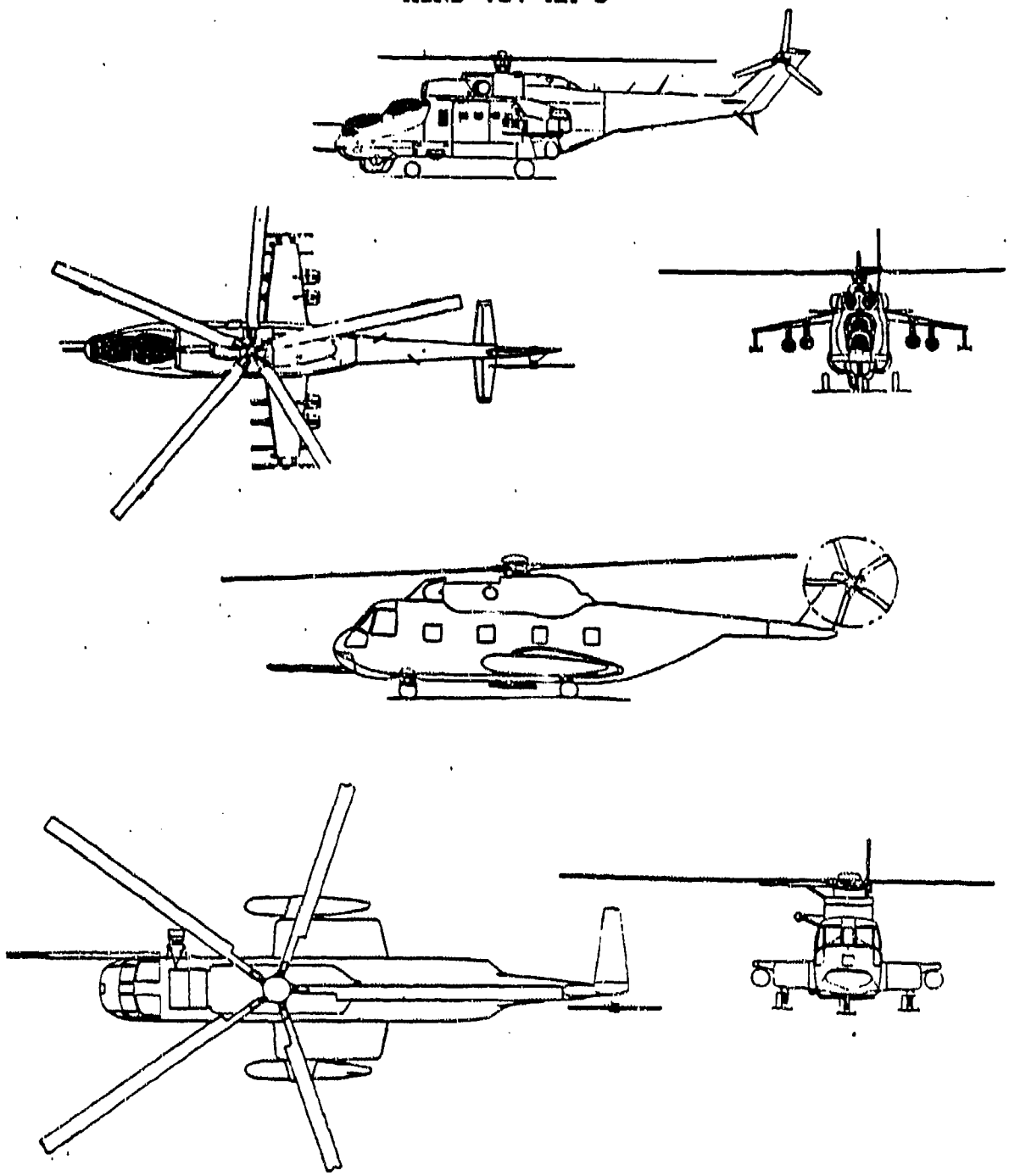
MI-8 HIP



HH-3 JOLLY GREEN GIANT

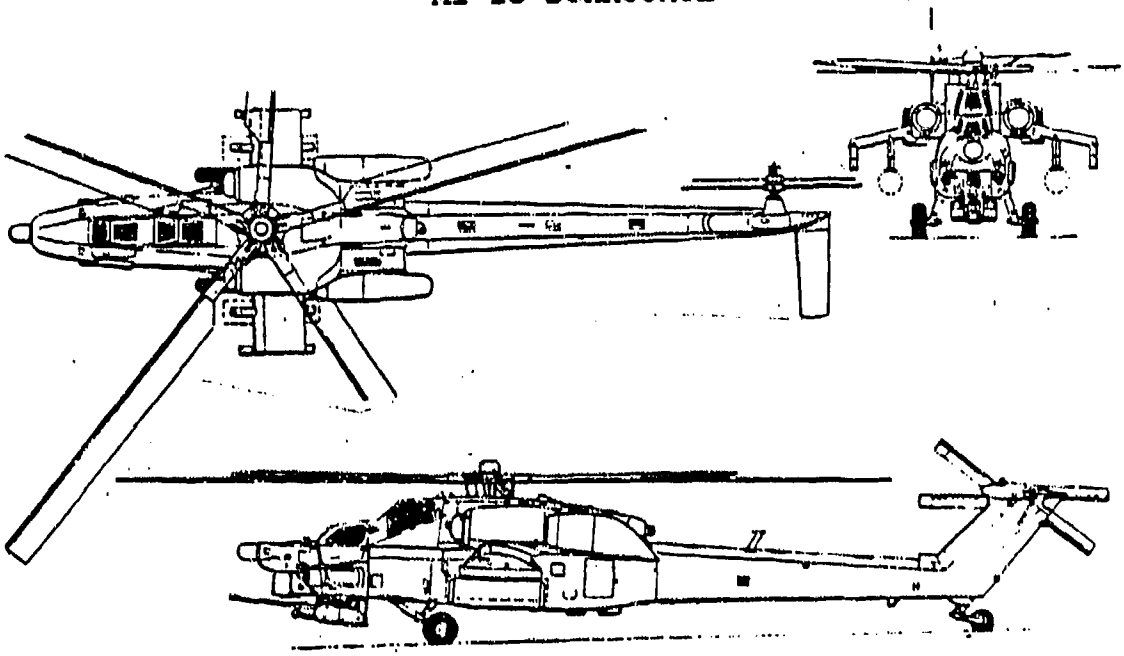
(Source: Jane's All the World's Aircraft 1989-1900 (Coulsdon, UK, Jane's Information Group, 1989) p. 271. S-61R Flight Manual (Stratford, CT, Sikorsky Aircraft, 1963) p. 19)

MI-24/25/35 SURROGATE
HIND VS. HH-3

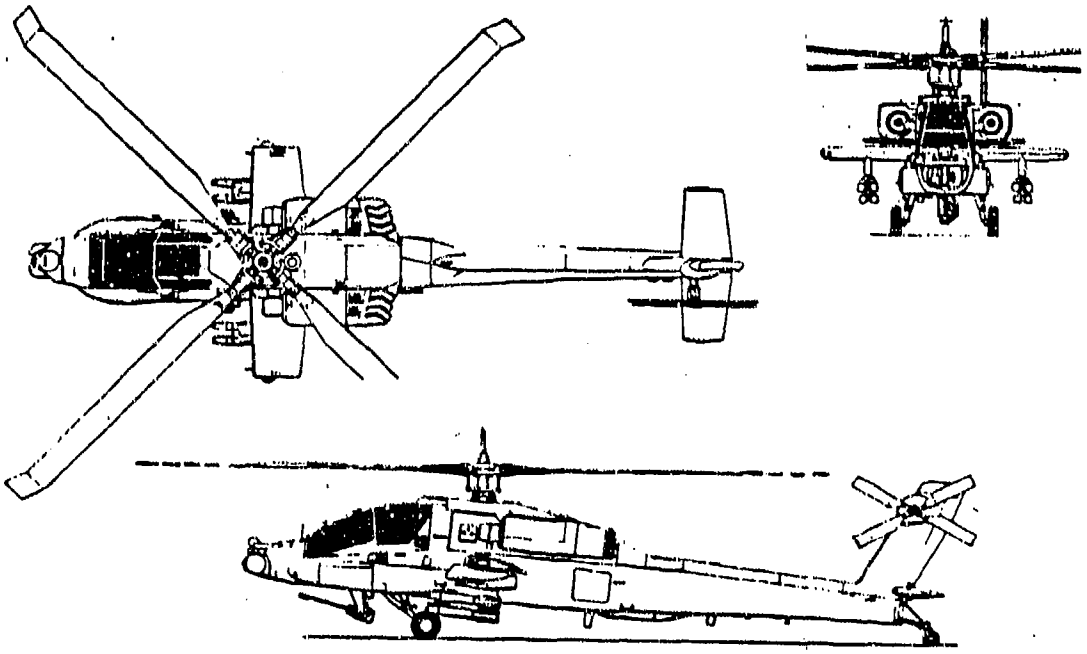


(Source: Jane's All the World's Aircraft 1989-1900 (Coulsdon, UK, Jane's Information Group, 1989) p. 274. S-61R Flight Manual (Stratford, CT, Sikorsky Aircraft, 1963) p. 19)

MI-28 SURROGATE



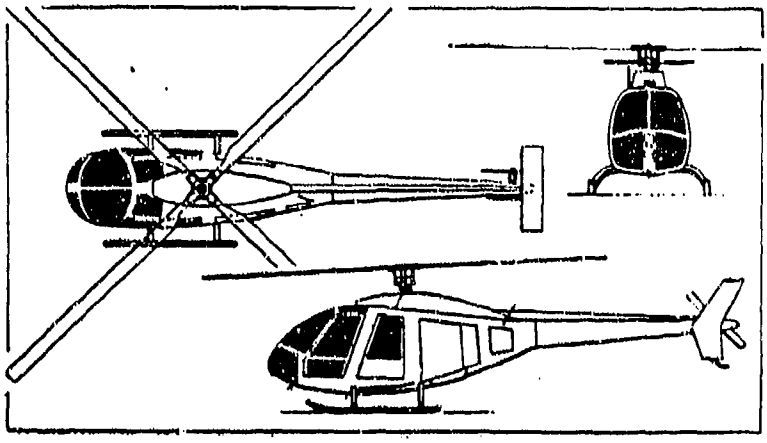
HAVOC



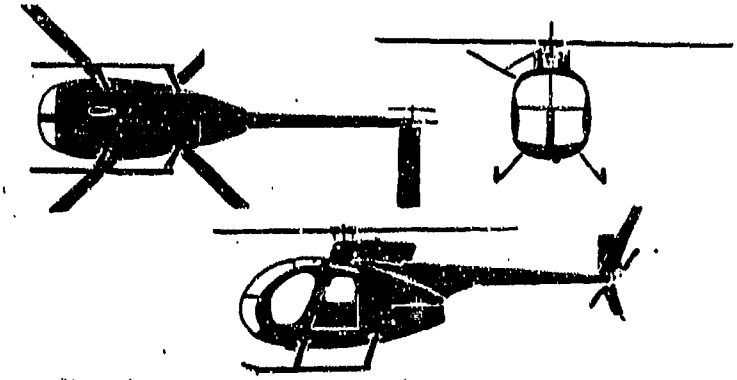
APACHE

(Source: Jane's All the World's Aircraft 1989-1900 (Coulsdon, UK, Jane's Information Group, 1989) p. 443,691

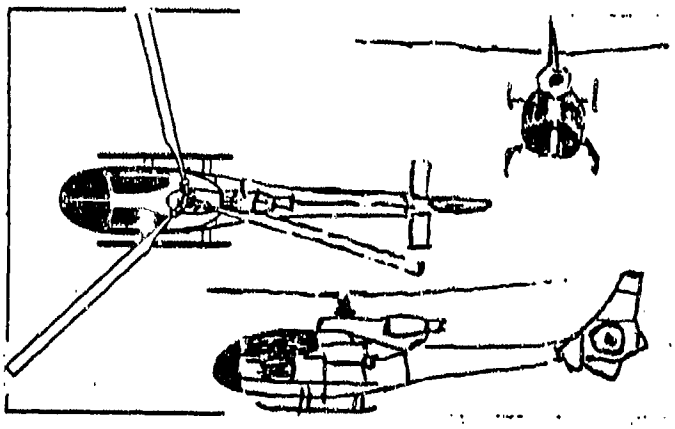
MI-34/AS-342/MD-500 SURROGATE



MI-34 HERMIT



OH-6 CAYUSE



SA-342 GAZELLE
(Source: Jane's All the World's Aircraft 1989-1900 (Coulsdon, UK, Jane's Information Group, 1989) p. 57, 276, 441.

APPENDIX C
AIRCRAFT COMPARISON

PHYSICAL CHARACTERISTICS	MI-8/17	MI-24/25/35	HH-3
FUSELAGE LENGTH FT.	59.6	57.4	57.2
OVERALL LENGTH FT.	82.7	70.5	73
HEIGTH FT.	18.5	21.3	16
WIDTH FT.	8.2	5.6	6.5
MAIN ROTOR DIAMETER FT.	69.9	55.8	62
TROOP CAPACITY	24-28	8	26
ROTOR SYSTEM NUMBER OF BLADES	ARTICULATED 5	ARTICULATED 5	ARTICULATED 5
MAX AIRSPEED KTS.	135	167	141
KEY MISSION EQUIPMENT (OR CAPABILITY TO BE MODIFIED)	SAGGER OR SWATTER ATGMs, 128-192 57mm FFARs, 12.7MM NOSE GUN, DAY ATGM SIGHT.	SPIRAL ATGM, 57-80mm FFAR, 30mm CANNON, DAY ATGM SIGHT (10-15 PWR).	SPACE AVAILABLE FOR M-65 TOW SIGHT, OUTBOARD WING STATIONS CAN MOUNT AWESS.

SOURCE: Jane's All the World's Aircraft 1988-1989, (Coulsdon, Jane's Information Group, 1988), pp. 248-251, 252-254, 154-155.

APPENDIX C
AIRCRAFT COMPARISON

PHYSICAL CHARACTERISTICS	MI-28 HAVOC	AH-64 APACHE	KAMOV HOKUM
FUSELAGE LENGTH FT.	52.5	50.7	41
OVERALL LENGTH FT.	62.5	58.2	44.2
HEIGTH FT.	13.1	12.8	17
WIDTH FT.	5.9	6.6	6
MAIN ROTOR DIAMETER FT.	55.8	48	45.9
TROOP CAPACITY	0	0	0
ROTOR SYSTEM NUMBER OF BLADES	ARTICULATED 5	ARTICULATED 4	ARTICULATED 2X3
MAX AIRSPEED KTS.	162	160	189
KEY MISSION EQUIPMENT (OR CAPABILITY TO BE MODIFIED)	SPIRAL ATGM 80-120mm FFAR, 30mm TURRETED CANNON, FLIR/TV TGT ACQ/ATGM SIGHT.	HELLFIRE ATGM, 2.75" FFAR PODS, 30mm TURRETED GUN, TADS/PNVS TGT ACQ/ ATGM SIGHT, MILES/ AGES-AD II, ONBOARD VIDEO RECORDER.	ATA MISSILES, 80mm FFAR, 30mm FIXED GUN, IRST(?), RADAR(?) FLIR/TV ATA/ATGM SIGHT.
AIRCRAFT SURVIVABILITY EQUIPMENT	IR JAMMER, CHAFF/FLARE IR SUPPRESSION SYSTEM	IR JAMMER, CHAFF/FLARE IR SUPPRESSION SYSTEM	IR JAMMER, CHAFF/FLARE IR SUPPRESSION SYSTEM

SOURCE: Jane's All the World's Aircraft 1989-1990, (Coulsdon, Jane's Information Group, 1989), pp. 429-431, 763-764.

APPENDIX C
AIRCRAFT COMPARISON

PHYSICAL CHARACTERISTICS	MI-34 HERMIT	SA-342 GAZELLE	MD-500	OH-6
FUSELAGE LENGTH FT.	26.6	31.2	25	21.1
OVERALL LENGTH FT.	42	39.2	30.9	30.1
HEIGTH FT.	8.9	10.1	8.6	8.1
WIDTH FT.	4.6	6.6	4.7	4.7
MAIN ROTOR DIAMETER FT.	32.9	34.5	26.2	26.2
TROOP CAPACITY	2	3	2	2
ROTOR SYSTEM NUMBER OF BLADES	ARTICULATED 4	ARTICULATED 3	ARTICULATED 4	ARTICULATED 4
MAX AIRSPEED KTS.	113 (+ W/TURBINE ENGINES)	151	119	190
KEY MISSION EQUIPMENT (OR CAPABILITY TO BE MODIFIED)	PROJECTED ATGMs ROOF SIGHT, ATA MISSILES	HOT ATGMs, 20MM FIXED GUN, 68MM FFARs, SAGGER/ GRAIL MISSILES, ROOF SIGHT	TOW ATGMs, VARIOUS GUN POD3, 2.75in FFARs, NOSE SIGHT	(HARD POINTS FOR AWESS WINGSTORES, PROVISIONS FOR M-65 TOW SIGHT IN NOSE, MILES/AGES KITS AVAIL)

SOURCE: Jane's All the World's Aircraft 1988-1989, (Coulsdon, Jane's Information Group, 1988), pp.80,256,438.

APPENDIX C
FLYING HOUR ASSESSMENT

AH-64 ATTACK BN.	OH-58C	AH-64A	UH-60A	UNIT TOTAL
COST PER HOUR	379	2324	1004	
NUMBER OF AIRCRAFT	13	18	3	
SUBTOTAL COST	4927	41832	3012	49771
CURRENT OPFOR AIR DETACHMENT	UH-1H			
COST PER HOUR	515			
NUMBER OF AIRCRAFT	4			
SUBTOTAL	2060			2060
TOTAL AVAILABLE HOURS (AHB+OPFOR DET)				51831
ARMY ROTARY-WING AGGRESSOR REQUIREMENT	OH-6	HH-3	AH-64	
COST PER HOUR	323	900 (EST)	2324	
NUMBER OF AIRCRAFT	17	20	12	
SUBTOTAL	5491	18000	27888	51379
COMPARISON (AHB+OPFOR DET MINUS AGGRESSOR REQUIREMENT)				+422

SOURCES: Department of the Army, "Cost per Flying Hour Reinbursement Rates for Army Aircraft," Message, dtg 292040Z Nov 89, DIRUSACEAC SFFM-CA-PC/DALO-AV, Washington DC., p. 4. Mr. James McElwain, telephone interview in February, 1990.

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REPLY TO
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24 January 2003

MEMORANDUM FOR ATTN: Larry Downing, DTIC-ACQ, Defense Technical Information Center, 8725 John J. Kingman Road, Suite 0944, Fort Belvoir, VA 22060-6218

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1. Request a distribution statement change to the following documents:

ADB148402, Constantine S. Vakas, "Soviet and U.S. Army Operational and Tactical Logistics," dated 1990.

ADB148401,Greg R. Hampton, "Army Rotary-Wing Aggressors: The Key to Counter-Helicopter Training," dated 1990.

ADB167057, Sergio de la Pena, "Analysis of the Execution of Counter-Drug Strategy in Bolivia Using the Low Intensity Conflict Imperatives," dated 1992.

ADB135594, N. Wijbrandus, "Soviet Desant Operations and US Air Base Ground Defense," dated 1989.

ADB177317, Ronald A. Newton, "Are Special Operations Imperatives Applicable to Counterdrug Operations?," dated 1993.

2. The distribution statement change, effective 15 January 2003 per Dr. Graham Turbiville, FMSO, subject matter expert and Reviewer, should read the following: (A) Approved for public release: Distribution unlimited.

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