United States Army

# Aviation Digest

May/June 1993

## Total Army Warrant Officer Career Center

Professional Bulletin 1-93-3

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# Aviation Digest

## Professional Bulletin

*1–93–3 • May/June 1993*

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**Cover: As the Army becomes smaller, efforts continue to improve the warrant officer (WO) corps along with other segments of the Force. The Total Army Warrant Officer Career Center, with specific command and control over WO candidate training, opened on 1 October 1992 at Fort Rucker, AL, with CW5 David Helton as its director. The lead article, starts on page 3. It discusses the goals for future training of WOs and the latest significant changes in how the Army will train this uniquely qualified professional soldier.**


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Major General Dave Robinson

# Assignment: Fort Rucker

In a millisecond, many of our aviation readers will have calculated a quick response to the mere suggestion of a permanent change of station assignment to the Army Aviation Warfighting Center. Why should I go to Fort Rucker, AL? I am a line soldier, you know, part of the trained and ready force—highly trained in tactics, techniques, and procedures—a battle drill expert ready to deliver decisive victory anywhere in the world!"

Well, read on because the Army Aviation Warfighting Center provides assignment opportunities unmatched elsewhere in the force. It is a place where you can make a lasting difference in Army Aviation and the combined arms team. A large number of equally dedicated professionals serve at the Army Aviation Logistics School, Fort Eustis, VA. The next edition of the ***Aviation Digest*** will have a lead article describing opportunities there.

Fort Rucker's focus is warfighting. Its energies are on the cutting edge of future concepts, doctrine, and the training of warrior leaders and aviators; harnessing distributed simulation technology; designing forces for the 21st century; high–technology materiel development; Aviation Branch proponency; and standardization. The Army increasingly is seeking ways to harness the power of land forces to break friction with the ground and maneuver in the air dimension of the ground regime.

We are at a point in history as significant as the Army's transition from horse cavalry to the age of mechanization. We are moving well beyond the innovative concepts of air assault. We will cross the threshold of the next century with operational concepts, doctrine, and forces not yet fully realized but made possible by significant technology advances. Those who underestimate the future contribution of Army Aviation will be left behind.

Fort Rucker is not a retirement community nor a place to stack arms; everyone here must pull the load. Table(s) of organization and equipment (TOE) duties are challenging and very important to near–term readiness. However, if you want to be on a team that is designing and building for the future, you should seek to become part of the professional team at the Army Aviation Warfighting Center. You should bring your creative energies and TOE experiences to help influence the future.

The Fort Rucker team is now comprised of highly respected and successful aviation leaders; i.e., past brigade, battalion, and company commanders, warrant officers, and enlisted professionals who come here for a single tour of duty to contribute operational knowledge and help shape the future across a number of important areas. Allow me to describe some of the opportunities.

Aviation brings the Army multiple "air maneuver" capabilities: armed reconnaissance, attack, assault, and special electronic mission aircraft; and medium lift, medical evacuation, and special operations aircraft. Aligned with these mission areas, dynamic changes are being made in concepts and doctrine because of technology advances and the realities of a small force. Total Force initiatives being worked at the Center offer enormous potential to harness the full power of aviation among the Active, National Guard, and Army Reserve Components.

We are part of the Army Chief of Staff's "Louisiana Maneuver" effort to determine the best land force for the future. The U.S. Army Training and Doctrine Command's (TRADOC's) battle laboratory process and advanced warfighting demonstrations will integrate the force horizontally; they will help decide what forces to maintain in the future and how they will be equipped. Aviation is playing significantly in mounted warfare concepts, deep and simultaneous operations, joint precision strike, air–to–air operations, battle command and control, and innovative combat service support concepts.

The Rucker team is hard at work on a "How to Fight Army Aviation Treatise"; the correct Apache mix, conventional and Longbow; the contribution of reconnaissance to battle; a new gunnery manual; and innovations in Army airspace command and control.

Aviation uses a systems approach to training. Our focus is on "warrior aviators," trained and battle–focused aviators with tactical and operational competence. This focus starts in the basic officer and warrant officer courses. Basic soldier skills, flight training, and a final warfighting phase completes the training. Flight training is stressed in its ultimate application—combat.

We support the on–site controller manning at the combat training centers; we are also working hard to place pre–positioned aircraft there for unit rotations. The TH–67 training helicopter will be introduced into initial rotary–wing training here with classes beginning in March 1994. There is also a high probability that all Department of Defense initial entry helicopter training will be consolidated at Fort Rucker. This will give Army Aviation broader joint credentials.

Through high–technology application in simulators, distributed interactive simulations, virtual reality presentations, and a host of other cutting edge technologies, we are leading the way in the design of your future force. Cockpit procedure trainers, crew coordination systems, combined arms trainers interactively linked with other members of the land combat team are taking shape under the direction of the Directorate of Simulation. MILES AGES II improvements, ASET IV, and gunnery scoring systems are being produced at Fort Rucker. Those of you who are "into" computers and virtual simulation do not want to miss the "golden" opportunity to put your thumb prints on this work.

The Aviation Restructure Initiative (ARI) is being documented now. Analyses on the impact of Active and Reserve Components, readiness implication, personnel distribution, training in modern systems impact, equipment distribution, logistics, and force–on–force studies are underway. ARI promises to have significant impact on the future aviation force.

You know about the RAH–66 Comanche development, Apache improvements, Longbow Apache, and the OH–58D Kiowa Warrior. We are laying the base now for an improved version of the CH–47 Chinook for the next century. Missiles, command and control consoles, a modernized air traffic system, and position location equipment round out major initiatives. There are great opportunities to serve on one of the TRADOC Systems Managers' teams bringing the user perspective to system development.

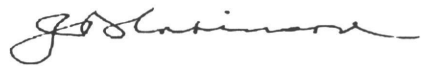
There are many opportunities in proponency work. The proponency folks have been working on women in Army Aviation, joint duty, and distribution of officer and enlisted structure issues. Standardization people have been the driving force behind crew coordination training and changing the Aviation Resources Management Survey format to assistance–type visits.

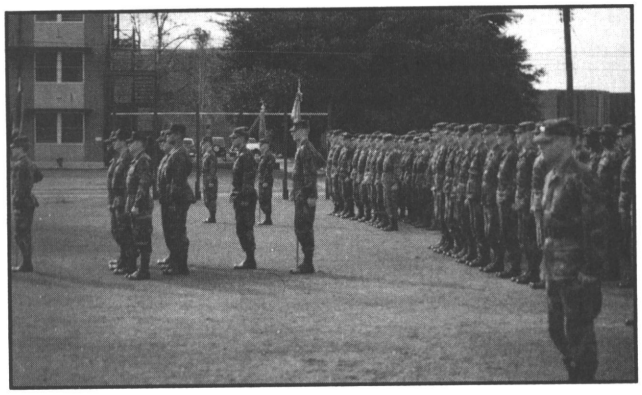
Sometimes it is difficult to see beyond the short–term goals of making gates, seeking out the "golden" jobs, and maximizing the official file for the next promotion board. Many people worry about making the right career moves to remain competitive. I can understand such motivation; however, professional soldiers should look for opportunities to influence the future. It is doubtful we would have a Branch—or many of the modern systems we now fly—were it not for visionaries who contributed to new concepts, doctrine development, harnessing high technologies, or for the dedicated instructors who teach in our classrooms or on the flight line. Imagine retiring after 20 or 30 years of service and looking back to see that you became really good at battle drill but contributed little else to our dynamic Branch.

No doubt, line command and staff duties are very important. One serves for a time in a position and then moves on to career–broadening duties. A battalion commander has a significant impact but only during tenure as commander. Each time a new commander comes on board, the battalion changes. The former commander is replaced by an equally capable and energetic officer. I do not belittle this posting; however, a time will come in a career when knowledge gained should be shared and used to influence the future.

All of us must develop as combined arms officers with operational and tactical literacy. We must be able to operate within the larger scheme of combined arms and joint operations if the Aviation Branch is to retain the credibility we have worked so hard to achieve. The Aviation Branch high ground is at Fort Rucker; it is in the hands of the professionals developing the conceptual basis of our future fighting force. The soldiers here are not oiling machinery; they are influencing the design of the machine.

No time in the history of our young Branch is more important than now to get our top–quality officers, warrant officers, and enlisted soldiers vigorously involved in the formulation of our future force. I see assignment at Fort Rucker as one with tough jobs—positions requiring vision, dedication, and energy. Branch assignment folks are seeking personnel willing to contribute 2 or 3 years in solidifying the finest and most technologically advanced fighting force in the world today. I want to see the best and the brightest our Branch has to offer, here at Fort Rucker...paving the way into the 21st century.





*CW4 George K. Gonsalves (third from left), the first warrant officer to command the Warrant Officer Candidate School, takes command of the 1st Warrant Officer Company from outgoing commander CPT Tony L. Moon on 13 January 1993. The 1st Warrant Officer Company formation performs during the change of command ceremony.*

## A Historical Update

# Total Army Warrant Officer Career Center

**CW5 David E. Helton**
Director
Warrant Officer Career Center
Fort Rucker, AL

Other than the building itself, with many great memories of the Warrant Officer Career College, little remains the same in the educational programs conducted today at the Warrant Officer Career Center (WOCC). Founded in the late 1960's, the Warrant Officer Career College was dedicated to the professional development of aviation warrant officers. In the beginning, the larger portion of the academic curriculum dealt with aviation specific subjects and was light on "common core" generic type instruction with some opportunity for elective studies at local colleges and universities.

Initial training focus at the career college was aviation specific; however, this training soon generated interest from warrant officers in other branches, commonly referred to as "technical services" warrant officers.

In the mid-1970's, the Warrant Officer Career College began training warrant officers from all branches and components. Improved training was off and running with more and more common core instruction conducted with less branch specific instruction.

The latest changes are perhaps the most significant and far reaching in its impact on the future professional development of this significant part of the force structure...the Army Warrant Officer.

In February 1992, the Chief of Staff, Army approved a document called the Warrant Officer Leader Development Plan (WOLDAP), which set clear goals for future training of warrant officers through the three pillars of leader development —institutional training, operational assignments, and self-development.

The institutional training pillar in this important document supports significant changes in how we do the business of training and is founded on the basic assumptions that—

. A continuing need for narrowly focused officer technicians in the Army of the future will exist.

. The Army's warrant officers satisfactorily fill the officer technician need, but improvements in their training and use can be achieved.

. The Army, while downsizing in an era of constrained resources, will continue its rapid high-tech spiral.

. Although the Army is becoming smaller, efforts should continue to improve the warrant officer corps along with other segments of the force.

. The Total Warrant Officer Study (TWOS) recommendations as approved by the Chief of Staff, Army remain valid. As a result modifications to the warrant officer system, not overhaul are appropriate.

. Since TWOS recommendations have not been fully implemented, efforts to do so should continue.

The Warrant Officer Career Center (vice College) was established on 1 October 1992 as a tenant activity under the U.S. Army Training and Doctrine Command (TRADOC), Fort Monroe, VA, with specific command and control of warrant officer candidate training, master warrant officer training. The primary mission of the career center is to be the executive agency for warrant officer development. Here is a brief description of changes taking place in the common core professional development arena.

Warrant Officer Candidate School (WOCS). This continues to be a 6-

week, high-stress, officer candidate training course with added focus on the "officership" skills needed to support the U.S. Army mission and its many roles. Soldiers reporting for Warrant Officer Candidate Training are representative of all components and branches of the Armed Forces. Slightly less than 50 percent of these candidates are programmed for aviation flight training upon course completion. Remaining candidates who successfully complete the demanding course attend follow-on Warrant Officer Basic Course (WOBC) training, formerly called Technical and Tactical Certification Training, at their respective branch school.

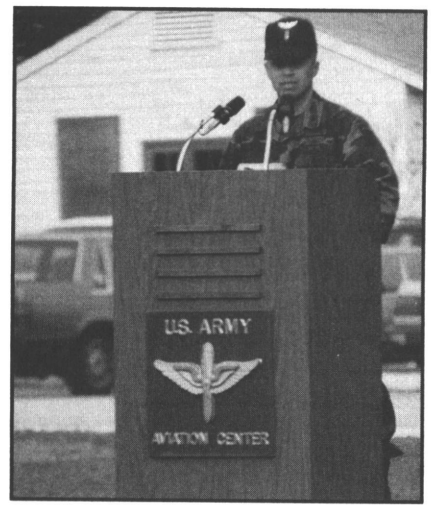
An especially significant change took effect on 1 October 1992 when all WOCS graduating students were appointed to the grade of Warrant Officer One (WO1). All WOBC course attendees are officer students rather than continuing as warrant officer candidates. These newly appointed officers are full-fledged warrant officers with all rights and responsibilities accorded that rank. If, during WOBC, the warrant officer fails to complete the required branch specific training, the appointment to officer status is then rescinded and the soldier is discharged from the Army.

Warrant Officer Advanced Course (Nonresident). Effective 1 October 1993, all Active and Reserve Component (AC/RC) Chief Warrant Officer Two's (CW2s) who have between 60 and 72 months of total warrant officer service will begin receiving a nonresident (phase one), common core, correspondence course. Completion of this 1- to 2-year correspondence program is a prerequisite for attendance at the branch-specific, resident advanced course. The WOCC will mail out Phase One material. The course begins with the most senior (72 months) and continues monthly until all eligible officers are covered. Mailing addresses are provided to the WOCC by the correct career management office (U.S. Army Total Personnel Command, U.S. Army Reserve Personnel Center); therefore, it continues to be important that all warrant officers maintain a current address with their career manager. The WOCC is responsible for all course management and grading of modules for the about 1,500 annually enrolled students.

Warrant Officer Advanced Course (Resident), (Formerly the Warrant Officer Senior Course). Each branch or proponent will conduct a resident advanced course for officers who have successfully completed the nonresident phase and who are selected for promotion to the grade of CW3. The WOCC, in coordination with the Directorate of Training and Doctrine, U.S. Army Warfighting Center, Fort Rucker, AL, will conduct the Aviation Warrant Officer Advanced Course.

Warrant Officer Staff Course (WOSC). Upon selection for promotion to CW4, all selectees, regardless of branch or component, will return to the WOCC for this important leader development training. Subjects taught in this course were those formerly presented in the Master Warrant Officer Training Course (MWOTC) and intentionally "pushed" down a step to prepare selected officers to better fulfill the needs of the senior warrant officer in their expanded roles and responsibilities supporting the mission of the Total Army.

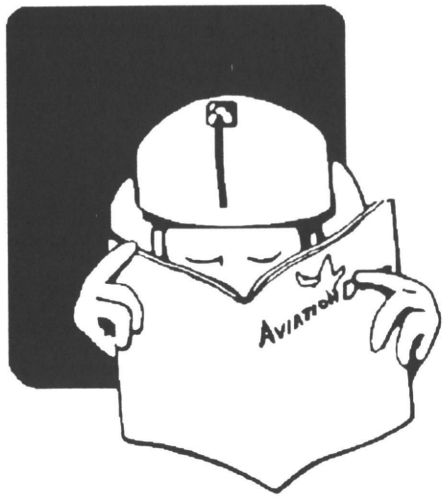
Warrant Officer Senior Staff Course (WOSSC). This capstone professional development course is totally new in concept. All AC/RC warrant officers selected for promotion to CW5 will attend the course at Fort Rucker. The focus of training will be to prepare annually about 150 of the most senior warrant officers in the Army to function in positions of increased responsibility from brigade staff to the highest levels of the Army and Department of Defense. Following completion of this instruction at the WOCC, it is anticipated that each branch will add a short visit by these CW5s to their respective branch location. The CW5s will receive an intensive branch update and any additional instruction deemed necessary as they prepare to fill the most important positions for warrant officers in the military.



*"I look forward to maintaining high standards and shooting for higher standards," says CW4 George K. Gonsalves as he gives the Change of Command speech.*

At first glance, one might become overwhelmed with the vertical professional development training objectives currently ongoing. When compared to the needs of the Army for a highly trained officer and technical expert who can support the commander at all levels for a full officer career of 30 years of individual warrant officer service, the logic and focus of this professional development scheme is eminently supportable and necessary. The Warrant Officer Corps now fully joins the rest of the **Total Army** in meeting the needs of the uniquely qualified professional soldier and officer...the Warrant Officer.

# VIEWS FROM READERS




## COUNT ME OUT!

I am writing about the article, "Aviation Personnel Notes: Why did he get promoted?" in the January/February 1993 issue.

Even though I will probably never become eligible for the sergeants major board, I am upset with some of the categories that were negative assets to have. First, I am an instructor only because Uncle Sam has "blessed" me with this job, not by choice. Second, I have been going from table of distribution and allowances (TDA) assignments to short tour assignments and back to TDA assignments for the last 10 years. Yes, I asked for the short tour assignments to Korea, but I never asked for assignments to the U.S. Army Aviation Systems Command, St. Louis, MO (now U.S. Army Aviation and Troop Command), nor did I ask for two "glorious" tours at Fort Eustis, VA.

My goal many years ago was to be a flight platoon sergeant, but thanks to Uncle Sam and his fabulous ways of doing things, I probably will never get the opportunity. According to this article, I should be penalized because of my assignments. I didn't ask for these assignments; my very "generous" Uncle (Assignments Branch) gave me these assignments. I realize there are people who homestead at assignments like this, but count me out!

**SFC Daniel T. Price**
Instructor, 1st Staff and Faculty Company
Fort Eustis, VA

## RWARC: REAL TRAINING OR LIP SERVICE?

The U.S. Army training doctrine states that all training must be oriented to accomplish the wartime mission. The wartime mission for the U.S. Army is to defeat its enemies on the battlefield. This means we must train as we fight, and realistic battlefield training must be the number one consideration that drives training. Cost factors, although a reality that the Army must consider, should be secondary. In other words, if the required training to make an individual/unit wartime mission ready is not fundable, "lip service" training should not be the alternative. This type of training does not prepare our forces to accomplish their wartime mission, which wastes defense dollars and, more importantly, soldiers' lives.

A close look at the U.S. Army Rotary–Wing Aviator Refresher Course (RWARC) reveals training that, in most cases, does not prepare the aviator to accomplish his wartime mission. In line with the Army training doctrine, the Army must change or eliminate the course.

The reason RWARC does not prepare most aviators is because of the type airframe used for refresher training (UH–1 Huey). Most aviators specialize in other rotary–wing aircraft, i.e., OH–58 Kiowa, AH–1 Cobra, AH–64 Apache, UH–60 Black Hawk, or CH–47 Chinook. Requiring aviators to conduct refresher training, in other than their specific type aircraft, does not comply with the "train as we fight" doctrine.

The three prerequisites for an aviator to attend RWARC are—

- Be on orders for an Aviation position that requires rotary–wing proficiency
- Be coming from a nonflight status assignment of 12 months or longer
- Be qualified in the UH–1H series

The program of instruction (POI) for the course requires aviators to complete a UH–1 flight evaluation, reestablish instrument qualification, and refresher training for nap–of–earth/night vision goggles. The purpose of RWARC is to provide the field unit with a refreshed aviator, who is technically proficient in his aircraft. This is supposed to relieve the Aviation units in the field of having to conduct their own refresher course. However, since most aviators have a different specialty other than the UH–1 series, Aviation units in the field still have to conduct their own refresher training. This type of refresher training puts a very heavy burden on units in the field because of instructor pilots, aircraft availability, and flying hour restraits. In fact, Fort Rucker, AL, has not done what it was tasked to do.

The Army now realizes future conflicts will be a "come as you are party." This means there will be no time to train up needed forces. The importance of Army Aviation, as was evidenced in Operation Desert Storm, makes it clear that Army aviators have to be ready to perform and accomplish their wartime mission. If money constraints prevent this, the Army must reduce the number of aviators trained and not the amount of required training. It is better to have 50 fully trained aviators than 100 aviators who cannot accomplish the mission.

Army Aviation is now moving towards requiring aviators to specialize in one of the "big four" rotary–wing aircraft: OH–58D (until replaced by the Comanche), AH–64, UH–60, and CH–47. Aviators who have an aircraft specialty in the UH–1 series will need to seek transition to one of the "big four" aircraft if they plan to stay in Army Aviation. In addition, even the Army initial entry rotary–wing course is beginning to phase out the UH–1 and will replace it with the new training helicopter.

The argument that refresher training for each type of rotary–wing aircraft would be too expensive, may not be correct when one takes a closer look. The transition and single track qualification programs at Fort Rucker could include refresher training in their POI. This would take advantage of the cost savings of eliminating a special refresher school and all the inherent costs included. In addition to eliminating the Department of the Army (DA) refresher course, the U.S. Army Reserve (USAR) refresher course also could be eliminated.

The current POI for the DA course is 6 weeks and 3 weeks for the USAR course. Refresher training in the aviator's specific aircraft, in many cases, would take much less time. The aviator could be given a written, oral, and flight diagnostic evaluation to determine what level of training would be required. Once the aviator performs to standards, he would be graduated. This also would save money, not to mention the money saved by Aviation field units not having to conduct their own refesher course.

Another major benefit of changing RWARC would be the improvement of Aviation standardization throughout the Army. This training also would provide a means to introduce new training and doctrine into the field.

The drawdown in the Army makes two things very clear: It is imperative that all Army aviators attend training that prepares them to accomplish their wartime mission, and that "lip service" training cannot be afforded at any price!

**CPT Eric L. Spangler**
Aviation Officer Advanced Course
Fort Rucker, AL

## SOLMC TRAINING

Do you have the knowledge to address maintenance, supply, and transportation program failures? Are you familiar with the preventive maintenance required on medical; communications; and nuclear, biological, and chemical (NBC) equipment organic to your unit? Can you effectively integrate maintenance into your training program?

Future commanders and primary staff officers are faced with the ever–increasing challenge of managing maintenance and logistics in battalion– and brigade–sized units. Adequate training for this challenge is a must. If you have doubts about your readiness, then make the Senior Officer Logistics Management Course (SOLMC) part of your professional development.

Taught at the U.S. Army Armor Center and School, Fort Knox, KY, the course is designed for officers of all Active and Reserve Component Army branches, U.S. Marine Corps, and allied nations. Effective 2 April 1990, the program of instruction was reduced from 2 weeks to 5 days of individually tailored instruction. This change has provided a cost savings in terms of

temporary duty expenditures for both Active and Reserve Components.

The SOLMC provides detailed, up–to–date information and hands–on equipment experience for commanders, Department of the Army civilians, and primary staff officers. Classes are currently scheduled 10 times a year. Quotas are provided through the normal U.S. Army Training and Doctrine Command, Fort Monroe, VA, channels and are limited to majors and above ranks and civilians GS–11 and above. Quotas for U.S. Marine Corps officers are given to Headquarters, U.S. Marine Corps, Washington, DC, where they are passed down to major commands. Marine Corps officers who want to attend should contact their division or group G3 through normal channels.

The SOLMC is now in its 33d year of operation. The first class was held 10 March 1958 after an extensive study by the Army maintenance board, then located at Fort Knox, concluded that the need for a commander's preventive maintenance course existed. In its findings, the board reported, "Deficiencies in preventive maintenance lie primarily in the commander–operator category. They can be largely solved by a commander's intelligent interest, a definite fixing of responsibility, and proper training and supervision of operators."

General (GEN) Maxwell D. Taylor, then chief of staff, U.S. Army, echoed the same sentiments. "Proper care of equipment by the user and command supervision of preventive maintenance at all echelons are two principles, which, when properly observed, contribute significantly to keeping repair requirements to a minimum."

What began as a commander's preventive maintenance course in 1958 has evolved into today's SOLMC. The findings of the Army maintenance board and GEN Taylor's perception are time-tested and hold true today. During the past 33 years, the SOLMC has proven beneficial to commanders of all branches of the Army and other services.

The course design is unique. The standard lecture approach is used sparingly to provide details on forms, regulations, and procedures. Classes on specific types of equipment, small arms, NBC, communications, medical, and tactical vehicles use the hands–on approach to training. The focus of equipment classes is on preventive maintenance checks and services (PMCS) as well as preventive maintenance indicators.

Although all students receive PMCS familiarization on many types of Army equipment, the thrust of the course is the elective program. Electives permit the student to tailor his training by selecting specific equipment for concentrated study and discussion of PMCS. Students are taken through each detailed step in the PMCS checklist. This approach lets students experience the difficulties encountered, the time involved, and the physical demands and techniques required for verifying PMCS has been accomplished. Equipment available for training includes M1 and M60 tanks, M2 and M3 Bradley fighting vehicles, M109 howitzers, and the newest tactical wheeled vehicles.

The equipment, training aids, instructional literature, and instructors for the SOLMC are all up to date. This is ensured by another unique characteristic of the school. Each commodity–oriented classroom is sponsored and technically maintained by one of the U.S. Army Materiel Command's (AMC's), Alexandria, VA, major subordinate commands. The major subordinate commands are responsible for the equipment design, provisioning, maintenance planning, classroom design, and construction. Highly trained instructors travel to AMC facilities and agencies to gather the latest information on changing techniques, design, field manual improvements, and other related topics.

The continuous instructor training program, coupled with recent instructor field experience, assures that SOLMC students receive the most current information available.

A quick tour will show how the course can meet the training requirements of the new commander or primary staff officer. The AMC classrooms include small arms, NBC equipment, and ammunition. The U.S. Army Tank–Automotive Command (Warren, MI) classrooms encompass vehicle–specific areas of interest, to include track systems, coolant systems, fuel systems, electrical systems, and safety. In addition, special emphasis is placed on preventive maintenance of water trailers, commercial utility cargo vehicles, and high–mobility, multipurpose wheeled vehicles. Preventive maintenance for radios, telephones, and teletype equipment is taught in the U.S. Communications Electronics Command (Fort Monmouth, NJ) room. Next door, in the U.S. Army Missile Command (Redstone Arsenal, AL) room. The U.S. Army Aviation and Troop Command (St. Louis, MO), provides training for generators; air compressors; cooking equipment; mobile kitchen trailers; petroleum, oils, and lubricants; tentage; and soldier's personal equipment.

Details on the latest antitank and air defense missile systems are available in the Missile Command room. Next door, in the U.S. Army Aviation and Troop Command room, you can get the latest information on Army Aviation capabilities and maintenance. The Army medical room features the latest in medical support equipment available within a tactical unit.

In the Army automation classroom, the ever–changing impact of logistics automation is discussed. Emphasis is placed on the impact that automation is having on unit–level maintenance and supply procedures. Included in the course is a discussion of emerging software and its supporting hardware.

In coordination with the AMC Materiel Readiness Support Activity, a commander is given a detailed analysis of his new unit's readiness status. Along with a review of how readiness

reporting is accomplished, the forms, techniques, and eventual data use are provided.

To round out the course, the student is given details on how maintenance forms and records are used to manage and control the unit maintenance program. He reviews the Army supply system, prescribed load list, dispatching procedures, and property accountability.

Recognizing that the new commander and staff officer need to concentrate on learning and not on the problems of being at school, the course administrator has worked out every detail to reduce student concern about rooms, eating, transportation, parking, and trips to the billeting office. Onpost billeting as well as transportation is provided to and from all classes.

For information on the course, call DSN 464–8152 or 7133. Written inquires may be sent to: Commandant, U.S. Army Armor School, ATTN: ATSB–MAL–LM, Fort Knox, KY 40121–5200.

## FUTURE OF FA52

With the announcement of the President's Nuclear Initiative on 27 September 1991, the Army's role in nuclear research and operations began to change. Functional Area 52 (FA52), nuclear weapons officer, is currently changing to meet this new role.

The complexity of the modern battlefield presents a demanding challenge for all concerned. Conflicts to which U.S. forces may be committed cover a wide variety of situations and conditions: threat capabilities; geographic conditions; political or strategic objectives; and the entire spectrum of conflict. When the threat of nuclear employment or the actual use of nuclear weapons is introduced onto the battlefield, it pervades military operations.

The employment of nuclear weapons can dramatically alter the balance between firepower and maneuver, accelerate the tempo and destructiveness of operations, and tends to enlarge the geographic area of conflict. Decisive battles could last hours instead of days or weeks. The challenge is to prepare to fight and win when nuclear weapons are on the battlefield.

In light of this, the FA52 is needed to help develop the most effective Army for the future. Although the Army no longer has an organic capability, it may still employ nuclear weapons sister services deliver. The FA52 will work to ensure that the Army has effective and efficient means of response in nuclear weapons, research, and survivability.

FA52 is being changed from two areas of concentration (AOCs) (52A operations officer and 52B research officer), to one AOC (52B). The new 52B will be a "nuclear research and operations officer," with strong emphasis on "research." The FA52 will work in areas related to nuclear research, survivability, and weapons life cycle management. 52Bs will take part in setting nuclear requirements; take part in developing, testing, and producing nuclear components and finished weapons systems; conduct research to predict the effects of nuclear weapons on material; recommend nuclear effects levels for survivability of battlefield equipment; manage the nuclear weapons stockpile; assist sister services in providing requirements for weapons designs; and oversee weapon retirements. Some 52Bs will assist in forming national, Army, and theater–level strategies, plans, and policies for nuclear weapons and in developing and verifying nuclear weapons treaties.

Officers may, within Army requirements, have nuclear research and operations designated as their FA. Normally, it is designated at the 7th year of service. Earlier designation, which may be influenced by an officer's previous special training or educational background, is possible. Officers designated will have, as a minimum, baccalaureate–level training in a scientific or engineering–related discipline. Competitiveness within the FA will be enhanced by obtaining formal training at the master's level (and one position at the Ph.D. level) in a scientific or engineering–related discipline as outlined below—

- Nuclear physics
- Thermal physics
- Nuclear engineering
- Laser/Microwave physics
- Nuclear effects engineering
- Engineering chemistry
- Engineering physics
- Physics
- Explosive engineering
- Nuclear chemistry
- Electromagnetism physics
- Applied science
- Mechanical engineering
- Space physics
- Radiation biology
- Electrical engineering

Graduate schooling is available, but is a highly competitive process. Officers who are chosen for graduate school usually attend upon completion of their branch's advance course or after completion of initial 03/captain assignment. About 70 percent of all FA52 positions are supported for advanced degrees (master's) by the Army Educational Requirements Board (AERB) (according to Army Regulation (AR) 621–108, ***Military Personnel Requirements for Civilian Education***). Officers, upon graduation from the fully funded advanced civilian schooling program, will be used in an AERB–validated position consistent with their grade and academic discipline. Normal use is for an initial 36–month tour immediately after graduation, followed by at least one more tour in an AERB position during their career.

Nuclear research and operations officers perform duties at the higher levels of the military and government, ranging from major Army commands to Department of Defense (DOD),

Department of the Army (DA), and Department of Energy (DOE). Some examples of where FA52 officers serve and the number that serve are as follows:

- HQDA, Office of the Deputy Chief of Staff for Operations and Plans (3)
- U.S. Army Nuclear and Chemical Agency (6)
- Defense Nuclear Agency (DNA) (22)
- DNA—Field Command (10)
- Army Forces Radiobiological Research Institute (4)
- Office of the Secretary of Defense (5)
- Joint Chiefs of Staff (2)
- Strategic Communications Command (5)
- Outside DOD (9)
- Supreme Headquarters Allied Powers Europe (1)
- U.S. Military Academy (6)
- Eighth U.S. Army (1)
- Livermore, Netherlands (NL) (4)
- U.S. Army Foreign Science and Technology Center (1)
- Los Alamos, NL (2)
- U.S. Army Field Artillery School (1)
- Sandia, NL (1)
- U.S. Army Forces Command (1)
- Intermediate Nuclear Warfare School (1)
- HQ, U.S. Army Materiel Command (2)
- HQ, U.S. Army Training and Doctrine Command (1)
- Army Research Laboratory (2)
- White Sands Missile Range (1)
- Aberdeen Proving Ground (1)
- Joint Intelligence Coordination Staff, Central Intelligence Agency (1)
- HQ, European Command (6)
- Office, Services and Information Agency (8)

Another key program that supports AOC 52B is the Army Research Associates (ARA) with DOE. Under this program, applicants are selected and assigned to research duty at one of the three national laboratories operated for the DOE. There, they conduct research in nuclear weapons and other related technologies having direct interest for the Army. Officers selected are provided with scientific laboratory research and development experience in nuclear weapons effects, design, and production; and related scientific and engineering technologies. A skill identifier (SI) of 6X is assessed after assignment to one of these laboratories. Many AOC 52B positions are coded with SI 6X to capitalize on an ARA's prior experience. Consult AR 614–107, ***Assignment of Officers as Research Associates with the Energy Research and Development Administration,*** for further information on this program.

Nuclear research and operations officers of the future will meet many challenges. The proliferation of nuclear weapons around the world will require the Army to maintain a core of nuclear experts to ensure equipment is available and personnel are ready to fight and win on the nuclear battlefield. Granted that the currently structured FA52 will get smaller, the future FA52 offers unique capabilities to ensure a strong and flexible Army exists in the foreseeable future.

**CPT James R. Palumbo**
Executive Officer
**CPT Jeffrey K. Kunkel**
FA52 Proponent Manager
**Mr. David E. Turek**
Nuclear Program Development Specialist
Concepts and Doctrine Directorate
U.S. Army Command and General Staff College
Fort Leavenworth, KS

## CRM TRAINING

Effective communication and cockpit resource management (CRM) have received widespread attention over the past 10 years as important elements of Aviation safety. Commercial air carriers, corporate and business aviation operators, and medium to heavy lift components of the U.S. Air Force were quick to integrate some dedicated form of CRM into their flight training programs. Implementing such a program into Army flight training, however, has not been so aggressive.

Studies have determined that effective crew communication and CRM skills can often be much more important than basic flight proficiency. Simple errors in interpretation or a lack of assertiveness can lead to tragedy in an aircraft. Experience in the cockpit attributes to a greater sense of situational awareness, but does not always correspond to superior communication or CRM skills. The effective use of these skills are often inherent to an individual's personality or means of personal expression. However, committed CRM training is a demonstrated method of improving crew communication and coordination.

During the 1970s, various commercial air carriers conducted studies in cooperation with NASA to identify human factor weaknesses that lead to aircraft mishaps. NASA found seven areas of breakdown in the cockpit to which most aircraft accidents could be traced. The areas included—

- Preoccupation with mechanical problems
- Inadequate leadership
- Inadequate monitoring of the flight
- Failure to delegate tasks to others
- Failure to use all available information
- Failure to communicate intent and plan
- Failure to set priorities

NASA determined that training in aircraft operations alone was insufficient to preclude aircraft mishaps and developed training programs to address situational, sociopsychological, and other factors that influence aircrew performance. These programs have grown to become "CRM" training. Most air carriers now require their crewmembers to attend extensive (CRM) training semiannually or annually.

Studies and statistics continue to emphasize the need for periodic CRM training. Humans are cited as the "causal factor" in well more than half of all aircraft accidents.

A Boeing study released in 1985 addressed air carrier accidents from 1959 to 1983. Every year of the study, 66.9 percent to 68.8 percent of the accidents linked probable cause of error to cockpit crew coordination.

***Flightfax*** affords Army aviators a specific, in–depth look at Army Aviation findings. Since 1980, human error has been identified as the causal factor in about 80 percent of Army Aviation accidents.

A ***Flightfax*** study of accidents from fiscal year (FY) 1984 through FY 89 identified violated aircrew training manual procedures and published a prioritized ranking of those most frequently violated. For rotary–wing aircraft, terrain flight led the list and crew coordination followed a tight second.

The results did not address the extensive use of crew coordination during terrain flight. Frequently occurring error areas included monitoring, decisionmaking, control actions, inspections, and communications.

The Army has taken steps to integrate limited CRM training (calling it crew resource management) into annual requirements and publications are changing to address CRM in aircrew training programs.

Enhanced training to improve aircraft communication and CRM skills is a must for Army Aviation and will ultimately save lives.

Just as it is necessary to practice flying skills to maintain aircraft flight proficiency, it is necessary to practice crew coordination skills to assure good flight crew performance.

**1LT Chad A. Krick**
207th Aviation Company
Unit 29231, Box 84
APO AE

## ...WANT TO CHALLENGE THE MTP COURSE?

***0400 hours, 6 June 1983.*** As I began my preflight inspection of a UH–1 Huey (4–13774), I paused for a moment to greet Chief Warrant Officer (CW4) Bernie Johnson. Bernie's obvious question that morning hit me between the eyes, "Are you ready to challenge the course?" I courageously answered, "yes." We loaded our overnight gear and I nervously resumed my inspection while Bernie got the weather and filed the flight plan.

***0530 hours, 6 June 1983.*** Our planned departure from the Army Aviation Support Facility Number 1, New Jersey Army National Guard (NJARNG), West Trenton, NJ, to Fort Eustis, VA, was predicated upon arriving at the Directorate of Evaluation and Standardization (DOES) before 1000 hours. Our flight included a fuel stop at Baltimore, MD. Weather on the first leg was visual flight rules. Shortly after departing Baltimore, we filed instrument flight rules because of deteriorating ceilings and visibility.

I was busy flying instrument meterological condition while Bernie, who was an instrument flight examiner, superbly handled the navigation and radios. Our teamwork was based on cockpit coordination, communication, and experience. The serenity of the moment almost became unruffled as the "challenge" word entered my mind. I did another fuel consumption check to block any other thoughts.

***0830 hours, 6 June 1983.*** Our second leg was progressing smoothly. Our previous conversations about the new DOES wave overtaking maintenance were positive. Both Bernie and I had performed test flights for years on our UH–1H, UH–1M, and OH–6A Cayuse inventories. Our experiences with outside units had indicated a need for mandated maintenance test flight task, condition, and standards. The past practices of putting your best aviator on test pilot orders were giving way to DOES certification. Thus, each new maintenance test pilot (MTP) who arrived at our facility was quizzed and debriefed by our inquisitive nature to ensure that we were "on track" with the school house at Fort Eustis. I flashed back 12 years earlier, while I was overseas, to when a "major" walked into our flight operations and asked who wanted to go on a test flight. I was the only warrant officer (WO1) in the room, so I went. I remember the power cylinder check vividly. "Make no mistake, kid," he said, "You're hooked on test flying and you know it." I was, and as the years passed, the hands–on training and repetitive experiences of troubleshooting had authorized my proud signature on the dash 13. But, in 20 minutes, I was going to have to prove to DOES for once and always I was certified. The reality of Bernie's contract with Felker Army Airfield, Fort Eustis, for a ground–controlled approach (precision approach radar) rejuvenated my purpose. At 0930 hours our aircraft hovered up to the pad in front of the door marked DOES. The "challenge" word consumed my brain.

***0945 hours, 6 June 1983.*** I started my turtle walk to the marked door, never hearing Bernie say, "I'll get us a room and have the aircraft dailied." I shut everything else out and concentrated on my greeting. I opened the door and noticed a "beehive" of activity. I offered a handshake introduction to CW4 Kurt Porter and CW3 Jim Jegel. The greeting was humane and the schedule of events was presented in a professional manner.

***1000 hours, 6 June 1983.*** The first of two written examinations allowed me to unwind from the flight,

sip coffee, and gain additional confidence. After 40 minutes into maintenance management/test flight procedures, I was informed I was the second individual to take the exam. I asked how the first guy did. CW3 Jegel replied, "He didn't." My questioning expression was answered further. "He quit during the exam and walked out." I sat tighter in my seat as CW3 Jegel told me that the length of time for each exam I took would be used as the barometer for future MP course challengers. I thought to myself, well there goes the additional confidence.

***1140 hours, 6 June 1983.*** Debriefed with a grade of "88" in my back pocket, I lunched at the snack bar on the greatest cheeseburger I had ever had in my life. Only one more exam to go and time to study the maintenance test flight (MTF) checklist before tomorrow's oral at 0630 hours. Then a preflight inspection and flight evaluation. Things were looking up.

***1300 hours, 6 June 1983.*** The second exam was very technical in nature. After 1 hour and 10 minutes, I presented CW3 Jegel with a "sweaty" answer sheet. Everything was fine up to question number 50. I remember offering an explanation for my answer to adjust the torquemeter boost pump because of a failed turbine engine analysis check (TEAC). A frowning expression was followed by, "We think the fuel control should be adjusted." I didn't press the issue; however, CW3 Jegel must have sensed that I wanted to. After a long pause, I was informed that he would review my recommendation with CW4 Porter. Looking back, I think I had passed more than the exam up to that point. I was uneasy as I prepared for the next day.

***0630 hours, 7 June 1983.*** My cards were on the table, face up, from the day before. CW4 Porter was quietly brewing coffee while making small talk. I listened between the lines, analyzing the type of individual who was about to spend the day evaluating me. The oral evaluation was a professional 2–hour question–and–answer period. I expected nothing less. During my break, CW3 Jegel called me over to his desk to discuss further my answer for the TEAC question from the previous day's exam. I was informed that additional torquemeter information would be added to the TEAC scenario, for future challenger candidates to conclude that the fuel control needed to be adjusted. I did not ask for credit for a correct answer. I smiled instead.

***0930 hours, 7 June 1983.*** Our aircraft was ready for a 2–hour preflight. My task was to announce each item I was checking and why. The questions were fast and furious. I definitely was not a turtle anymore. I sensed CW4 Porter had to be satisfied thoroughly with each response. Systems were described and discussed. The questions finally ceased and we walked to flight operations to file our flight plan. Bernie was there to greet us with, "Do you mind if I go along with you on the ride?" CW4 Porter approved.

***1200 hours, 7 June 1983.*** The 45–minute runup checks required memorized challenge and answer responses on my part until we were ready to hover. I remember Bernie pulling back on my seat, straining to see and listen to each response. Later, on the return flight home, I told him I thought the seat back would not stand more than +1G. We would laugh later but not now. The MTF evaluation left no room for second chances. You have to know it by the book.

***1415 hours, 7 June 1983.*** The blades stopped and CW4 Porter said he would meet me in the office at 1500 hours. I looked at Bernie and he said, "Great job, Jack." I felt good as we secured our weather brief and filed our flight plan for home.

***1500 hours, 7 June 1983.*** Bernie and I walked hurriedly toward the door marked DOES. Lieutenant Colonel Harry McGinness, chief MTF Standardization Division met me with a, "Congratulations Jack, first to challenge, first to succeed." CW3 Jegel walked up to me, holding a cake with sparklers, and joked, "Adjust the torquemeter boost pump, yeah right." As Bernie slapped my back and shook my hand, I heard CW4 Porter say, "Great job, Jack." This was certainly a day I would never forget. I thought, I'll write about this experience someday.

***1545 hours, 7 June 1983.*** Full of cake with certified MTP credentials in hand, I cranked our aircraft with so much satisfaction. I remember the flight home and CW4 Porter's words as we celebrated together. I told him that I did not want to use the challenge word because it might put DOES on the defensive. He said, "You did not just challenge the course, you challenged yourself." I shared that with Bernie just before touching down. If all of us challenge ourselves to be what is expected and more, Army Aviation will continue to be successful on and off the battlefield.

***2145 hours, 7 June 1983.*** I pulled out of the parking lot and headed for home still thinking the torquemeter boost pump should have been adjusted. The "challenge" word consumed my being!

**CW4 Jack Stoffa Jr.**
Maintenance Test Pilot
(AH–1S Cobra/OH–6A/UH–1H)
Army Aviation Support Facility
NJARNG
West Trenton, NJ

## STAND YOUR GROUND!

This open letter is about pressure, or perceived pressure, placed on Army aircrews. Army Regulation (AR) 95–1, ***Army Aviation Flight Regulations***, is

specific in stating: The pilot–in–command (PC) will be responsible and have final authority to operate, serve, and secure the aircraft he or she commands.

As a line pilot how often have you heard: "The mission has to go! These troops need to be on target on time no matter what. This patient is in dire straights and must be evacuated now."? Or the always infamous, "Well, call ...; they always give you better weather."?

Being a soldier first, I fully understand that, at times, a mission is of great importance and every effort must be made to complete it. I also understand it is my duty, as an officer, to support the chain of command to the best of my ability. I am a professional aviator who abides by published regulations and guidelines. I also understand my limitations and those of my crew.

I think that, for the most part, many of our crews have good command support when they feel they cannot complete a mission without undo risk. Unfortunately, one can find more than one case on file at Fort Rucker, AL, in which this was not true. These losses cover the spectum from Class A—aircraft crew, and passengers lost—to Class E, landing in a farmer's field when the crew decided the weather really was as bad as forcasted.

It is these mishaps, or near mishaps, that cause great concern to me as an "Old Timer" and an Aviation safety officer (ASO). Two cases that took place on the same day...two different units, two different missions, same problem, and same result...are as follows:

**Mission number 1** took place outside continental United States (OCONUS) in spring, late morning.

***Circumstances***: During a major field training exerise (FTX), an accident occurs. A soldier receives facial burns when a tent stove has a back flash. A high–ranking, nonaviation officer takes an interest in the conduct of the medical evacuation (MEDEVAC) mission.

With on patient status and transport requirements provided to them, the evacuation crew prepared for launch. During mission preparation, the crew was briefed to look out for less than 1/2–mile visibility at departure and 3/4–mile visibility for destination. The crew felt that departure point visibility was 1/4 mile at best. With the weather provided, the crew knew they did not have local visual flight rules (VFR) requirements. Still wishing to complete the mission, the pilots started to prepare for an instrument flight rules (IFR) flight. Again weather stood in the way; no approaches or alternate airfields were available with the weather briefed.

The crew contacted the medical facility to inform them the mission would need either to be delayed for about 2 hours or cancelled. As luck would have it, the medical facility informed the crew the patient's status was not as grave as first suspected. The soldier now would move to a larger facility by ground ambulance.

As the crew closed out the paperwork for the cancelled mission, an administrative motor vehicle drives into the area. The passenger is a high–ranking officer who asks the PC to fill him in on the mission. Informed the mission was not flown because of weather at takeoff and destination, the officer becomes a bit agitated. In the next few minutes, he counsels the crew, tells them to climb up to 4,000 feet above the fog, and fly direct. The conversation continues with such statements as: "Aren't you capable of flying this mission? Don't you want to fly this mission? Are you sure you are a MEDEVAC pilot?" Further remarks are directed at the flight medic.

At this point the crew elects to....

**Mission number 2** took place OCONUS in the spring, early morning.

***Circumstances***. As part of an FTX, several aircrews are detached from their parent units to form a task force providing support to numerous personnel. A high–ranking, nonaviation officer has taken an interest in the conduct of a mission.

One morning a young crew is in before sunrise to prepare an aircraft, complete a few maintenance tasks, and meet station time for a very important person (VIP) transport tasking. Once the crew completed all the tasks at the aircraft, they began the final stages of mission planning. The weather given was, at best, 1/4–mile fog throughout the area of operation with no improvement expected until noon or later. The weather, as briefed, was well below local VFR minimums or IFR requirements. The weather delay was called in promptly by the crew with options for pickup and route modifications.

Within 20 minutes the phone rings; it is the VIP's aide. This senior ranking officer derides the crew's weather call. He verbally pushes the crew to launch and make the original mission time flow. The pressure both to shop for weather and to launch is intense.

At this point the crew elects to....

As providence would have it, both crews were confident enough in their duties, responsibilities, and regulatory requirements to stand their ground. It shows strong unit–level training, peer support, and mentorship when these crews could withstand the pressure of a senior ranking officer pushing them to do something that they really wanted to do, but knew was not right.

What would have happened if the crews had been less confident in themselves, overconfident in their abilities, or more susceptible to brow beating? Place yourself in the shoes of these two crews. What would you have done? Could you withstand the pressure to launch? What do you do when you feel peer pressure to fly a mission you know is

beyond your capabilities or outside of the regulation? Would you join the ranks of the late great crews who tried to push the envelope, and almost made it?

As aircrews we learn to use the risk management system to determine whether or not a mission should go or requires modification before launch. Whatever the system or form you use for risk management, managing risk is organized common sense. Once a mission has been assessed and the mission modified to the best of your abilities, don't try to bend or twist the parameters to launch. Don't let someone else bend or twist the parameters for you. If you don't think you can complete the mission, or the risks out weight the benefits, say so.

As aircrews our job is to support the command, which includes turning down missions today so the aircraft will be here tomorrow. Some of the hardest missions to complete are those that are turned down.

**CW4 John L. Funk**
ASO, 377th Medical Company
APO AP

## TOLL-FREE CALL-IN SERVICE

Major General (MG) Gerald H. Putnam, commander, U.S. Total Army Personnel Command (PERSCOM), Alexandria, VA, is establishing a 1–800 number for soldiers and Department of the Army (DA) civilians worldwide to use. MG Putnam with the directors of the Enlisted Personnel Management Directorate, Officer Personnel Management Directorate, Civilian Personnel Management Directorate, and The Adjutant General will be available twice a month to personally take telephone calls.

During these dynamic times it is essential for soldiers and DA civilians to fully understand various personnel programs and how they are affected by them. MG Putnam is establishing this call–in service to enable soldiers and DA civilians to ask questions and receive immediate responses on the wide variety of personnel issues for which PERSCOM is responsible. The call–in service will be offered on a trial basis through September 1993, and at that time, depending on response from callers, a decision will be made on whether or not the service will continue into fiscal year 1994.

Soldiers and DA civilians in the continental United States, Alaska, Hawaii, Panama, and U.S. Territories can call 1–800–USA–TAPC (872–8272). Callers from overseas command may use DSN 221–0202. Local callers may use (703) 325–0202.

Call–in sessions will be recorded for later broadcast on Soldiers Radio Satellite Network.

## SEEKING FORMER ARMY OTTER/CARIBOU MEMBERS

The Army Otter and Caribou Association, Incorporated, Columbus, GA, is trying to locate former members who served with any U.S. Army Otter or Caribou aviation or support unit during their military service.

The 8th annual reunion will be held 18 through 22 August 1993 in Colorado Springs, CO. General Hamilton H. Howze (Retired) will be the guest speaker.

This is a tax–exempt, nonprofit association recognized by the Internal Revenue Service (IRS) code/section 501 (c) (19) granted by the IRS on 26 April 1990.

Membership dues are $15.00 a year with a lifetime membership available for $300.00. For additional membership information please contact Mr. Bill Hooks, P.O. Box 6091, Columbus, GA 31907-0073 or call 1–800–626–8194.

**Mr. Bill Hooks**
Executive Vice President
The Army Otter and Caribou Association, Incorporated
Columbus, GA

## HMGS CALL FOR PAPERS

The Historical Miniatures Gaming Society (HMGS) is sponsoring the "Cold Wars 1994 Military History Forum," 10 through 12 March 1994, at the Lancaster Host Resort in historic Lancaster, PA.

Papers on any aspect of military or naval history in any period are acceptable for submission. Papers will be reviewed in a blind referee system for scholarship and value as a contribution to the study of military history. Authors of selected papers will be asked to present their works at this Forum. Selected works will be published in the 1994 HMGS ***Military History Forum Proceedings***.

Papers should be 10 to 15 typed, double–spaced pages and submitted in three copies along with a 100–word abstract on a separate sheet. The author's name and address should appear only on the abstract. Complete cities and a bibliography must be included with each copy. Any maps or artwork must be completely identified.

Papers should be submitted no later than 1 November 1993 to: Editor, HMGS Military History Forum Proceedings, 4252 Woodland Drive, Augusta, GA 30907. For more information write to the address above.

## 34TH ISRAEL ANNUAL CONFERENCE CALL FOR PAPERS

The 34th Israel Annual Conference on Aerospace Sciences will be held 16 and 17 February 1994. The Conference constitutes a forum for the presentation and discussion of recent advances in the following areas:

- Aerodynamics and Ballistics
- Aeronautical Design, Computer Aided Design/Computer Aided Manufacturing), Manufacturing and Maintenance
- Materials, Aeronautical Structures, and Aeroelasticity
- Propulsion and Combusion
- Flight Control, Guidance, and Navigation (including Avionics)
- Flight Mechanics and Performance Optimization
- Simulators and Flight Testing
- Space Systems and Astrodynamics*

Papers on recent advances in basic research and technology applications in the areas mentioned above, as well as other aerospace–related fields, are invited by 15 September 1993. Undergraduate students' participation is encouraged.

Procedures for submitting abstracts/papers are—

- Three copies of complete paper draft (abstracts 1,000 to 1,500 words), and sample sheet form (write for form), should reach the Program Committee Chairman by 15 September 1993. Complete paper drafts will receive priority over abstracts.
- Scientific/technical content, importance to the field, relevance to the scope of the Conference and originality are the principal criteria for selection of papers. Authors will be notified of papers accepted no later than 30 November 1993.
- Final versions of accepted papers should be submitted to the Chairman of the Program Committee. The deadline for submission is 1 January 1994.
- Accepted manuscripts will be published in the Conference Proceedings.
- Conference will include invited lecturers.

Abstracts and complete papers should be sent to—

**Dr. A. Bar–Gill**
Chairman, Program Committee
34th Israel Annual Conference on Aerospace Sciences
Faculty of Aerospace Engineering
Technion—Israel Institute of Technology
Haifa 32000, Israel
FAX: 972–4–906878
Telephone: 972–4–908648/908596
email: AERCONF@Technion.Bitnet

*The 45th Congress of the International Astronautical Federation will take place in Israel 9 through 14 October 1994. Prospective authors in this category also may consider submitting relevant papers to this Congress.

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# Aerial Support of Air Cushion Vehicles

**Captain Dan Hokanson**
B Company, 1-229th Attack Helicopter Battalion
Fort Bragg, NC

The XVIII Airborne (ABN) Corps, Fort Bragg, NC, maintains a worldwide focus in contingency operations. The Corps must be prepared to deploy anytime, anywhere, and operate jointly with the other services to meet and defeat any threat. As a result, we as Army aviators must prepare ourselves by training for different scenarios we may be asked to perform. Operating on the commander's intent to conduct joint operations, elements of the 1–229th Attack Helicopter Battalion (ATKHB)(ABN), Fort Bragg, planned, coordinated, and executed joint training with air cushion vehicles (ACVs) from the Army and Navy.

The interest in working with ACVs was based on possible contingency operations in areas with large bodies of water or areas without docking facilities. Our objective was to learn as much as we could, develop tactics, techniques, and procedures, and share our experiences with others who may be tasked with such a mission.

Army Light Air Cushion Vehicle

The ACV training was initiated under the 1–229th ATKHB (ABN) "centers of excellence" program. The centers of excellence program allows each company in 1–229th ATKHB (ABN) to focus on an area in which they concentrate their company training, and then share their experiences with the other companies. In the 1–229th, A Company trains with the Corps Cavalry (4–17th Cav), B Company with the Navy and Marines, and C Company with the Air Force. Under this program, the companies provide each other with lessons learned and help in their respective areas when the battalion operates with any of the elements in the joint arena. This also creates a group of subject matter experts within the 229th Aviation Regiment

**AH-64 escorting Army LACV in Chesapeake Bay**

(ATK) (ABN) to support XVIII ABN Corps world–wide contingency operations. From this concept, B Company initiated coordination with Army and Navy ACV units.

To fully understand the reasons and the importance of helicopters working with ACVs, two questions must be addressed. First, why use ACVs? Secondly, why escort ACVs with helicopters?

Aside from the fact they are like aircraft in that they "fly" their missions, ACVs provide U.S. forces many advantages over conventional landing craft. Previously, only 17 percent of the world's coastline was suitable for landing craft; the ACV has increased that figure to 70 percent. Conventional landing craft, such as the landing craft utility (LCU), could maintain only 12 knots (kt) compared to 50 kt for ACVs, depending on sea state and load. ACVs actually can "go ashore" in an 8–foot surf, maintain 10 to 15 kt, and cross 4–foot obstacles.

In comparison, conventional craft cannot go ashore and often become stuck on reefs or sandbars before the shoreline. The Navy's landing craft air cushion (LCAC) can carry up to 160 troops and their equipment, or 75 tons of tracked or wheeled vehicles and their crews. The LCAC also has global positioning system (GPS), identification friend or foe (IFF), and frequency modulation (FM), very high frequency (VHF), ultra high frequency (UHF), and high frequency (HF) radios. The greatest advantage ACVs offer over conventional landing craft, however, is their range. Previously, ships embarking landing craft had to get as close as 2 kilometers (km) to the shoreline. The LCAC has a range of up to 300 miles, depending on sea state and load, which allows it to launch an assault from 150 miles out, well over the horizon. This range gives the assault element surprise and ensures the safety of the mother ship during assault operations.

The mobility and range of the ACV requires a highly mobile escort able to maintain relatively high speeds and flexible to provide protection against a variety of threats. The Army light air cushion vehicle (LACV) is unarmed, and the Navy LCAC has only two M60 machineguns. Neither craft has the capability to defend itself.

Helicopters provide a highly mobile platform with a variety of weapon systems that can defeat or suppress virtually all threats ACVs face. Helicopters can rendezvous with ACVs at a predetermined location as they approach an area where a threat may exist, thus reducing escort requirements to only the times when needed. Helicopters also provide extended visibility because of altitude and can give ACVs course changes for threat avoidance. During assault operations, helicopters can conduct an area reconnaissance at the point of landing before the ACVs enter the range of any coastally employed weapons systems. Escort aircraft also provide real–time intelligence at the critical time to assist the landing craft in selecting an exact point of landing.

The 1–229th elements conducted all ACV escort training with its organic AH–64 Apache helicopters. The advantages the AH–64 provides over other aircraft during ACV operations

are its dual engines; navigation system; Target Acquisition and Designation System/Pilot Night Vision System (TADS/PNVS), with Integrated Helmet and Display Sighting System (IHADSS); eight Hellfire missiles with Marine and Navy compatible laser designator; 38 2.75–inch rockets; the extended range and loiter time provided by auxiliary fuel tanks; and 30mm gun with its 4000–meter range and its magazine capacity of 1,200 rounds. These capabilities were briefed to all participants of operation "Resolute Venture" on 20 April 1993.

Operation Resolute Venture provided the perfect opportunity to conduct training missions that answered many of the questions raised about joint ACV training. The ACV units involved were from the Army's 8th and 331st Transportation Companies and the Navy's Assault Craft Unit 4. The training was conducted in three phases: train–up, mission execution, and after-action review.

During the train–up phase, company aircrews conducted swimming, in flight gear, for physical training; overwater aviation life support equipment gear familiarization; dunker training; ditching procedures practice; and development of escort training techniques to be tried.

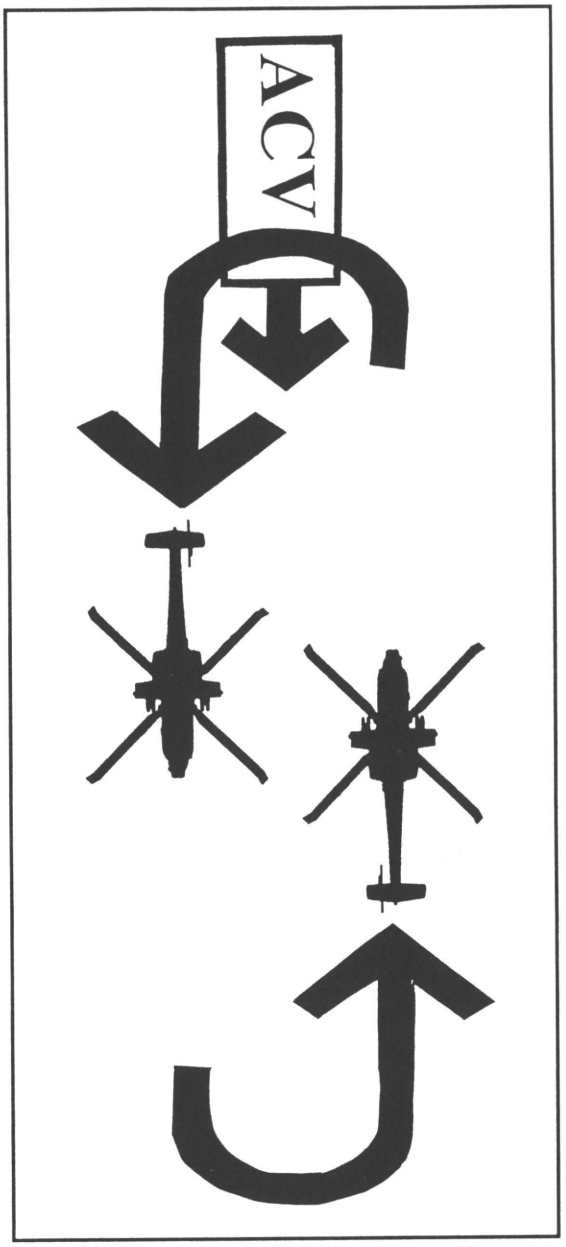



**Figure 1. Daisy chain formation**

During the mission execution phase, B Company deployed to Naval Air Station Oceana. All elements conducted equipment orientation and discussed each others tactics and techniques. Operations were conducted in Chesapeake Bay and along the coast of Fort Story, VA. Missions were planned for the day and night of 21 April and during the day of 22 April 1993. The missions involved Navy LCs and Army LACVs conducting simulated assault operations on to Fort Story beaches from locations throughout Chesapeake Bay. It was during this phase that four different escort techniques were discussed and tried. The four techniques were an echelon formation with aircraft flying about 45 degrees off either side of the ACVs, a trail formation in which one aircraft maintained forward of the ACVs and one to the rear, a "daisy chain" formation (figure 1), and a figure eight for single aircraft operations (figure 2 next page).

During the after-action phase, aircrews debriefed each mission and the formations tried. ACV personnel provided input during the training and in briefings that took place after the training. It was after a thorough review of training that the daisy chain was determined to be the best formation to use when supporting ACVs.

The daisy chain provided ACVs the best aerial coverage during our operations and the most flexibility for the aircraft involved. The formation, taken from Air Force OA–37 Dragonfly operations in Panama, is basically an oval track to the front of the escorted ACV with the forward leg extending along the ACV flight path and the return leg coming back toward the ACV (figure 1). The formation is based on two aircraft maintaining equal separation throughout the oval. The aircraft that crosses the ACV on the return leg calls "in" when he is ready to fly the forward leg. The opposite aircraft on the forward leg then turns onto the return leg, and the process is repeated. The distance of the legs depends on the threat and speed of the ACV. During our operations the legs were 1 to 2 km. The airspeeds also depend on the wind conditions and the speed of the ACV. During our training the best forward speed was 90 kt and the return leg was 70 kt. A key point is the returning aircraft must anticipate the turn over the ACV to prevent having to catch up after completing the turn. The advantages for aircraft using the daisy chain is they can maintain a higher airspeed, reducing fuel consumption and decreasing reaction time to any threat. Aircraft have 360–degree visual coverage of the ACVs and their route and always have one aircraft with weapons forward along the flight path. The formation also allows aircraft to cover each other, maintain visual contact, and pose a faster moving target to any threat.

If only one aircraft is available, the figure–eight formation proved very successful also (figure 2). It provides the same advantages as the daisy chain with the ability to "check six" more often. This formation can be flown left or right of the craft based on the threat, and the cross-point of the eight can be adjusted based on the ACVs speed. The use of either of these formations can also be readily adapted to virtually any escort situation; i.e., a convoy, other aircraft, or a ship.

There were also many other lessons learned during this training. They include: 1) The AH–64 Doppler navigation system (AN137) worked overwater in sea state one; however, GPS would be a better system. 2) Shipping buoy locations in lat long; their marker lighting can be found on nautical charts and used to update the doppler. 3) Hovering at altitudes below 100 feet can cause sea spray to cover the windscreens. (Salt spray can be thrown up to 1,500 feet.) 4) The TADS day television and forward–looking infrared become almost unusable during sunset; target acquisition is difficult along the shoreline.

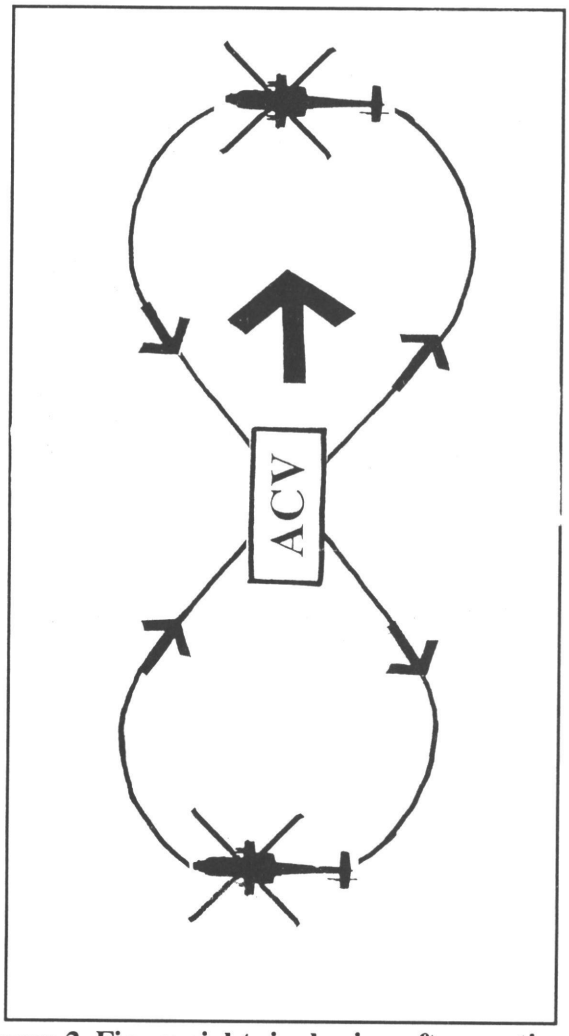



**Figure 2. Figure eight single aircraft operation**

This training initiated a working relationship between Army Aviation and assault landing craft such as the ACV. The training conducted was the first time any of the participating units had worked with helicopters. It highlighted the capabilities of the AH–64 to operate in a joint mission profile overwater. The ACV units were flexible and adapted easily to mission changes. Based on our experiences with ACVs and their units, a thorough mission brief—Naval air training and operating procedures standardization brief when working with Navy units—and the ability to adapt to changing situations will ensure mission success anytime, anywhere, day or night, when working with ACVs.

Army LACVs in wingman formation

# Restructuring the AH-64A Aviation Qualification Course

**CW3 Marc P. Cournoyer**
Gunnery Instructor Pilot
Aviation Training Brigade
U.S. Army Aviation Center
Fort Rucker, AL

Just as aerial gunnery is the pinnacle of aviation-mission readiness, the hallmark for the student in the restructured AH64A Aviator Qualification Course (AQC) is the successful implementation of basic combat skills.

Above the passageway of Building 50206 at Fort Rucker's Hanchey Army Heliport, a simple sign states, "Through these doors pass the finest attack helicopter pilots in the world." This is quite a bold statement considering that other military organizations throughout the world boast similar claims. Is this phrase a hollow claim of triumph dreamed up by some aviator long ago, or a trendy cliche that looks good painted on a sign?

To the personnel of D Company, 1st Battalion, 14th Aviation Regiment, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker, AL, better known as "The Apache Training Company," this is a statement based on fact, not fantasy.

Delta Company takes great pride in accomplishing what some view as a tremendous undertaking: taking an inexperienced aviator, introducing him to the AH-64 Apache and, in 10 weeks, producing a basic AH-64A qualified pilot/gunner.

Many have witnessed testimony to the success of past training accomplishments through the years in operations such as Just Cause, Desert Shield, Desert Storm, and Provide Comfort.

Both friend and foe alike praised the tenacity of Apache pilots and their ability to accomplish missions never before tested under fire.

So, why rewrite our current program of instruction (POI)? In essence, why change our winning ways by attempting to fix something that was not broken?

The answers to these questions can be found in countless recommendations and critiques from field commanders and students alike who, feeling the void created by the dissolved Unit Training Program at Fort Hood, TX, wanted more tactical and team skills taught during the AQC.

Program of Instruction
Aviator Qualification Course

**Contact**
**Day/Night Vision System**
**Gunnery**

Based on these recommendations, the Army Aviation Warfighting Center at Fort Rucker determined that basic AH-64A combat skills needed to be fostered and reinforced during the AQC.

Presently, the POI for AQC is 10 weeks in duration, focusing on three topics: Contact Phase, Day/Night Vision System Phase, and Gunnery.

As one can see, there is no Combat Skills Phase present. Past rated student pilots have called upon skills learned previously concerning tactics and helicopter employment.

But what happens when the student has no prior experience or skills to call upon. Suppose the student is a recent initial entry rotary-wing graduate and only has rudimentary skills to call upon?

When this particular inexperienced aviator, an aviator we have grown accustomed to seeing these last 2 years, reports to his new unit, it takes a tremendous amount of effort by the command to get the aviator "up to speed" in short duration.

Forget your 98-day readiness level progression! Knowledge of unfamiliar basic aviation tactical doctrine collected in obscure texts that sat idle in flight school becomes a reality.

Terms and procedures become a jigsaw puzzle of necessary information that cannot be readily absorbed and applied.

Witness the rude awakening to the individual and to the field unit when the new AH-64A pilot brings to his job only his acquired pilot knowledge, a small percentile of what he has to know to become an effective aviator and crew member.

This is a new problem that somebody must address.

Enter the U.S. Army Aviation Warfighting Center at Fort Rucker.

It was obvious to all concerned that if you could teach an individual the basic skills necessary to become qualified in the Apache, you could also introduce AH-64A specific baaic combat skills in a restructured POI.

## Asking the Tough Questions

Although it is very easy to rest on one's laurels while ignoring potential problems, the personnel of the Aviation Training Brigade at Fort Rucker took a hard look at the present AH-64A POI and asked the immediate question of "Why?"

Why change it?

Commanders have voiced their overwhelming support for a better mission-oriented graduate before assignment to a field unit.

Their reasoning for this is surprisingly simple when you look at the overall "big picture" of force drawdown versus retention of quality aircrews in combat cockpits.

With shrinking defense dollars and loss of land and airspace, this will ultimately equate to loss of sustainment training to maintain proficiency in even the most experienced of aircrews.

Needless to say, hands-on combat skills training and readiness will suffer.

The argument that simulators could replace or replicate training at lower costs does have merit, but it does not take into account the "human" side of realistic training... aircrews must train in realistic conditions with all the detractors and headaches that are a reality in combat.

It is no wonder that it becomes increasingly difficult for the command to get the newly assigned AH-64A graduate "up to speed."

With a volatile world situation, unit cohesion and readiness become a commander's prime concerns.

Can the unit develop the new arrival swiftly and safely?

Will the AQC graduate be able to function effectively in the cockpit with minimal training?

The challenge to the command of training the AQC graduate in a timely and safe manner in order to function as an effective member of a combat team becomes all the more difficult.

With this in mind, ATB personnel have asked the tough questions concerning a restructured POI such as:

. What skills do we need to identify that are consistent with attack helicopter operations?

. Do we have the resources (funding) to implement the necessary changes?

. How much/little training is enough?

. What role will our flight line and civilian personnel play in the development, implementation, and sustainment of this new course?

## The Instructor: Voice of Experience

TC 1-281, commonly known as Tactical Flight Procedures, states in one particular chapter that, "If there is a single most important ingredient for aviation training success, it is the instructor pilot.

The IP is primarily concerncd with teaching survival and mission accomplishment on the battlefield. This requires that he teach tactics, flight maneuvers, and emergency procedures."

Theorists reason that all learning comes through experience, so who better to teach and develop combat skills than the instructor pilot?

In the Apache - equipped unit, the IP is the subject matter expert. He has to be, since mission success or failure depends a great deal on what

is taught and passed on to the unit's aircrews.

Such skills as multiship operations, voice secure operations, team integrity, low visibility operations, and aircraft survivability equipment (ASE ) employment have to be taught and mastered. In the current Apache POI, these areas are not even addressed.

Currently, AH-64A trainers at the Army Aviation Warfighting Center have the opportunity to reshape the structure of the basic POI and tailor the course according to the wishes of the field commander.

They have scrutinized excellent field input and the new 12-week POI is taking form.

With an emphasis in the latter phases of qualification on front seat skills, attack helicopter operations, ASE employment, tactical flight procedures, and mission planning, the AH-64A Aviator Qualification Course will challenge instructor and student alike. This adds realism to training.

Integration of the Apache Combat Mission Simulator (CMS), to include full tactical integration with mission profiles, will add greater challenges to the AQC student while reinforcing basic combat skills.

## Decision Making

It is apparent that all possible subject areas should be incorporated into the new POI, but cannot until certain obstacles are addressed and overcome.

For instance, current Aviation Center AH-64A aircraft have no voice secure equipment installed (albeit HAVE QUICK), 137 Doppler, or ASE gear; hence, actual hands-on training with the equipment is still a shortfall.

However, a future fix could be in the form of bench "mockups" similar to the present doppler navigation training aids used by the academics branch, Also, liberal use of ASET II trainers as well as more up-to-date video presentations could aid the student.

Naturally, use of the Apache CMS during the tactical phase of training would challenge the student to apply ASE and voice secure techniques, as well as terrain flight masking in order to fight and survive.

**"Through these doors pass the finest attack helicopter pilots in the world."**

Use of HAVE QUICK could be introduced in the AH-64A as the radio currently fielded in the Aviation Center aircraft are fully HAVE QUICK capable.

Other areas such as multiship operations and basic formation flight could be incorporated in conjunction with gunnery skills to add a sense of realism to training.

Using operations orders, simulated threats, forward area refueling points and proper mission planning techniques, the student would in effect be exposed to actual conditions but in a supervised, controlled environment.

As one can see, even with limited resources, the objectives of the 12-week POI can be met and the student can be trained effectively.

## Training the Trainers

Obviously, we must intelligently accomplish any training that is to take place. Because of the present structure of the Army Aviation Warfighting Center as the U. S. Training and Doctrine Command entity, resident instructor pilots in the school tend to lose their combat mission skills over time.

To fix this trend, the instructor pilots are currently engaged in professional development classes in subject areas such as ASE and ASE employment, threat weapon systems, voice secure procedures and attack helicopter operations.

In short, Apache instructor pilots are going "back to basics" concerning tactical helicopter employment.

It is through these instructors that the new 12-week POI will produce a more mission-oriented, mission-qualified, and safety conscious aviator.

The Apache Training Company will also benefit greatly from the steady influx of new AH-64A instructors and trainers assigned over the past 2 years.

These trainers, along with their mentors, will provide an infusion of new thinking and ideas on how best to communicate the needs of the field commander to the classroom and to the student.

It is a challenge to the Army Aviation Center and Fort Rucker to incorporate these ideas to give shape and substance to the new POI.

Hopefully, as our predecessors did so commendably during the conflict in Southeast Asia, we too can pass along experience and insights that will produce more effective mission results, increase safety, and save lives.

The door of opportunity to implement this dynamic restructuring is wide open. Current global unrest makes it a practical necessity.

Let's not close the door; rather, we must build on our successes and implement these new training concepts so that all aviators, friend or foe, will see that the sign on building 50206 states with conviction: "Through these doors pass the finest attack helicopter pilots in the world!"

# Maintenance Training at its Best

**Captain William J. Travis**
4th Squadron, 6th Cavalry Brigade
Fort Hood, TX

Training soldiers is the key to sustaining the mission. Finding new and imaginative ways to get the best training for the least expenditure of time and money is the challenge faced by every military leader.

Once the soldier graduates from his advanced individual training (AIT) and arrives at this first unit, he is ready to put to good use the training he has already received.

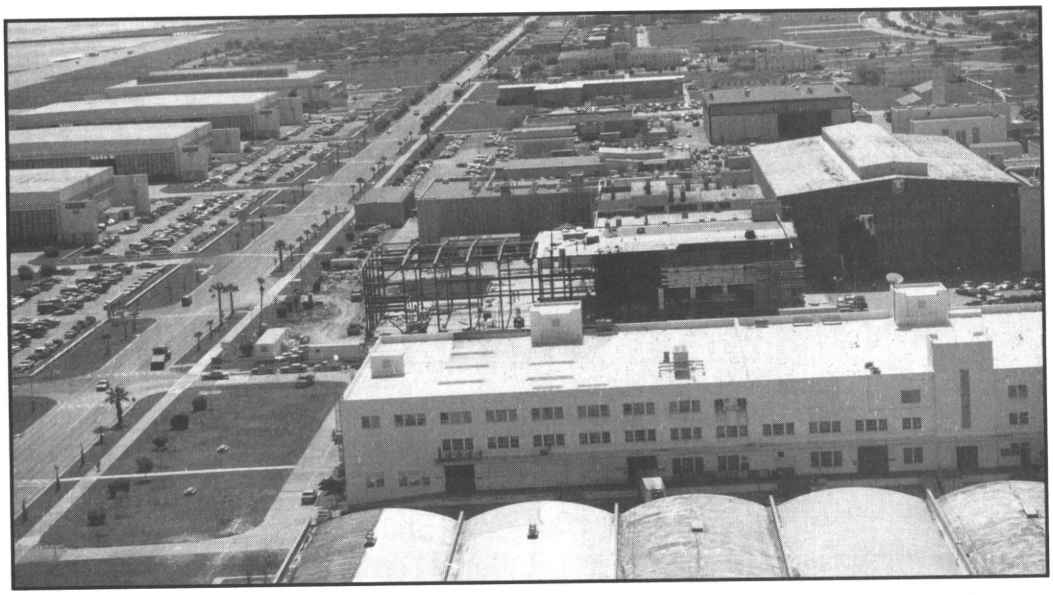
His unit usually places him under the watchful eye of a more experienced soldier until he has mastered the local policies and has convinced his supervisors he is ready to tackle the more difficult tasks with less supervision.

Through continuation training, the soldier's technical abilities improve as he spends more and more time working in his military occupational speciality (MOS). This continuation training is a difficult task for many units to implement and manage, especially in the low-

density MOSs.

But, there is a training facility available to all Active, Reserve, and National Guard soldiers, especially those located in and around Texas, that can aid commanders with this training.

In southern Texas, there is an extraordinary facility called the Corpus Christi Army Depot (CCAD). Located on the Gulf of Mexico, it is the Army's primary aircraft repair and maintenance facility.



*The Corpus Christi Army Depot, TX, located in the Gulf of Mexico, is the Army's primary aircraft repair and maintenance facility. This extraordinary facility is available to Active, Reserve, and National Guard soldiers.*

CCAD repairs and overhauls the UH-1, AH-1, OH-58, CH-47, and the UH-60, as well as supplies the Army with rebuilt engines, transmissions, rotor heads, and many other aircraft components.

Everyone knows this, but did you know they also have an MOS enhancement and sustainment training program. This program will provide individual training for more than 2,600 National Guard, Reserve Component, and Active duty soldiers this year alone.

You may have known this, but I didn't and I am sure there are many other Army aviation maintenance managers who don't know either.

MOS enhancement is available for the following specialities: *43M, 44B, 44E, 62F, 66J, 66N, 66S, 66T, 66U, 66V, 66Y, 67N, 67S, 67T, 67U, 67V, 67Z, 68B, 68F, 68G, 68H, 68J, 68K, 68L, 76C, 76D, 76P, 76V, and 94B.*

Within each speciality there are many areas of emphasis in which the soldier can be trained.

For example, if you are a maintenance officer of an AH-1 attack battalion and have a powertrain repairer (68D) that you would like to provide more in-depth training, you can design a program to match your unit requirements.

He could spend a day rebuilding main rotor heads, representing each type of aircraft in the unit, then spend a day or two rebuilding each type of transmission. He could then finish up the program with the final installation of these components.

**Maintenance is the lifeblood of any unit, especially aviation.**

The recommended training period is 2 weeks with some specialized programs lasting up to 30 days. Billeting is normally available within walking distance from the depot making a personal car not required.

The bottom line is that you can send a soldier to tremendous training for minimum cost, especially if you use military transportation.

Scheduling training is relatively easy with some coordination. The most difficult time to arrange training is during the summer months when the National Guard and Reserve have their 2-week annual training. Most other times during the year can be accommodated.

To arrange training for you soldiers, all you have to do is contact the training coordinator at DSN 861-2606/2617 or commercial (512) 939-2606/2617.

Or write to Commander, CCAD, ATTN: SDSCC-RP, Corpus Christi, TX 78419.

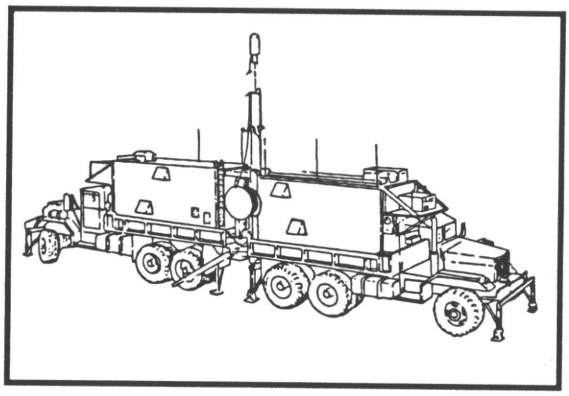
Maintenance is the lifeblood of any unit, especially aviation.

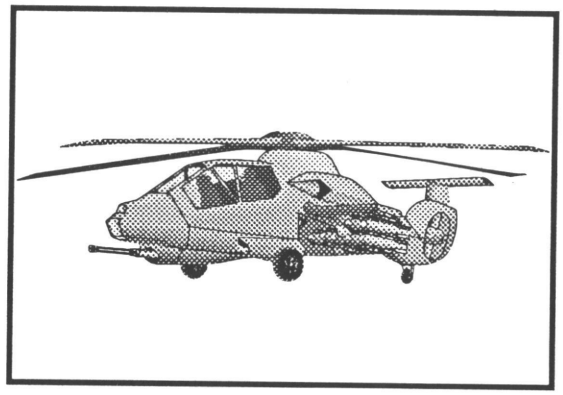
Training of those maintenance personnel is critical to sustaining an effective maintenance program and a direct reflection of an unit's operational readiness.

The training capabilities at CCAD can help any commander enhance his maintenance mission and, in turn, improve his combat readiness.

# COMBAT DEVELOPMENTS UPDATE

**Colonel Stephen S. MacWillie**
Director
**Colonel Robert M. Stewart**
Chief, Battle Lab Support Team
**Lieutenant Colonel Jerry Brecher**
Chief, Materiel and Logistics Systems Division
**Lieutenant Colonel Mark Danielson**
Chief, Organization/Force Development Division
**Mr. Ed Bavaro**
Chief, Threat Support Office
**Mr. Richard Maccabe**
Chief, Concepts and Studies Division
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL





The mission of Combat Developments is to ensure the soldier maintains a modern, effective combat capability by developing operational concepts, organizations, and requirements for warfighting systems to support the Total Force.

In a perfect world, all we would need to do is present this mission to trained acquisition, materiel development, and force development professionals. We would then stand back and watch great things happen. As we know, nothing is as simple as it sounds. Organizations must deal with enumerable variables that detract, slow, and possibly prevent the mission from being done. To minimize disruption requires detailed internal procedural road maps and effective and responsive communication with external agencies. In our case, it requires soldiers in the field(users), acquisition personnel, and the civilian industry.

Shortly after assuming the duties of the Director, I became acutely aware of the realities of budget and personnel reductions and their effects on the mission. I was pleased to see the Directorate of Combat Developments (DCD) staff assuming added responsibilities and working hard to overcome current and future shortfalls. In our continuing efforts to do those

functions that must be done, however, we may have lost our focus on the information exchange between the user community and the combat developer. Or at least we may have given that impression. Whether this is fact or fiction is irrelevant. No organization can operate successfully in an information vacuum. I am happy to report that, in most cases, we were not working in a vacuum, a thin atmosphere perhaps, but not a vacuum.

In some cases, we tended to focus efforts within our own areas of responsibility and expertise. We forgot we had relevant information useful to others or others had relevant information useful to us. Needless to say, limiting communication is not a very effective way to conduct business. Other agencies on Fort Rucker play key roles in DCD's mission. We were not communicating effectively with these agencies. To assist in correcting this shortcoming, we created the Combat Developments Team. We are making every effort to improve information exchange. The Combat Developments Team players are depicted in the wiring diagram (figure 1).

Another important addition within DCD is the Aviation Battle Lab Support Team (ABLST). The need for a smaller Army—based primarily in the United States and capable of responding quickly to contingency missions worldwide—caused the U.S. Army Training and Doctrine Command (TRADOC) to explore warfighting concepts, and materiel and developing technology, to define new warfighting capabilities. Our current methods of determining requirements and establishing priorities cannot keep pace with the shrinking budget, and will not allow us to maintain the edge in technology necessary to win wars; therefore, we must change the way we think and determine requirements by looking at capabilities across the force and not just by branch. TRADOC's answer to these challenges is the Battle Lab.

The six battle labs derived from five battlefield dynamics of General Frederick M. Franks Jr, Commander, TRADOC, are Early–Entry Lethality and Survivability, Depth and Simultaneous Attack, Mounted Battlespace, Dismounted Battlespace, and Battle Command and Combat Service Support. The ABLST will be addressed in more detail later in this article.

As I have said, we cannot provide the best warfighting systems for our soldiers, nor ask industry to provide these systems, if we don't know what they need. Knowing what they need is crucial. I urge, open communication and renewed cooperation with all those responsible for aviation performance on the future battlefield.

To this end, I have directed my staff to make every effort, within legal bounds, to share information and aggressively seek dialogue with our soldiers in the field and civilian industry.

These articles present a snapshot of the work going on within DCD. These efforts will shape aviation organizations and equipment to support land force dominance from a continental U.S. Army–based power projection Army. The Army modernization objectives—project and sustain the force, protect the force, win the information war, conduct precision strikes, and dominate the maneuver battle—are the foundations for the future.

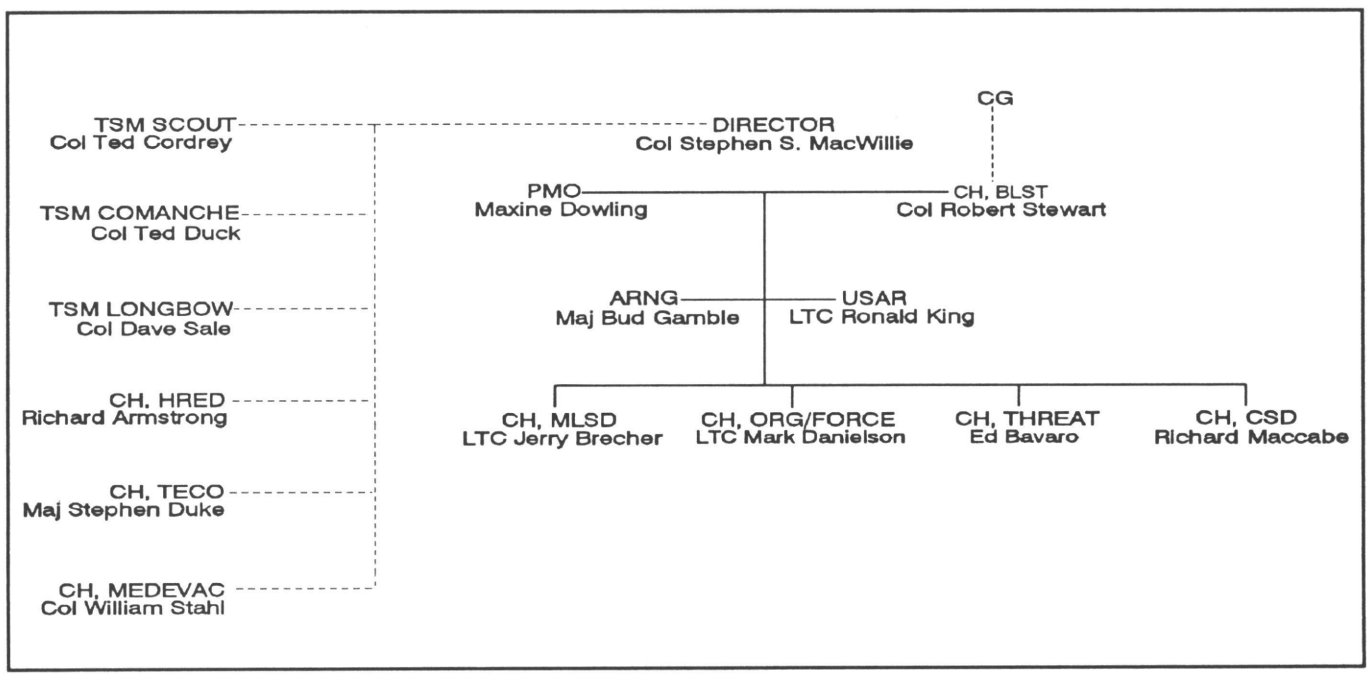



**Figure 1: USAAVNC Warfighting Center Combat Developments Team**

# AVIATION BATTLE LAB

***Aviation Battle Lab Management Office.*** The Army Aviation Warfighting Center is not a host for any of TRADOC's six battle labs. However, Major General John D. Robinson has recognized the importance of battle labs in the evolution of Aviation in today's changing Army by creating the Aviation Battle Lab Management Office. Within the office are two branches: The Aviation Battle Lab Support Team (ABLST) and the Systems Integration and Prioritization Team (SIPT).

Colonel Robert M. Stewart leads the office, which is organized with six supporting teams. Each is designed to interact with one of the TRADOC battle labs (figure 2). Each team has a team chief and three more members from various directorates to address warfighting capabilities as they relate to doctrine, training, leadership development, organization, materiel, and soldiers (DTLOMS).

The U.S. Army Reserve (USAR), Army National Guard, U.S. Marine Corps, and U.S. Air Force (USAF) are also represented on these teams.

***The Aviation Battle Lab Support Team.*** The mission of the ABLST is to orient on warfighting initiatives and analyze capability requirements, which is done by applying capability requirement solutions to the battlefield dynamics addressed by TRADOC. Efforts in battle labs will result in rewriting doctrine; harnessing emerging technology, to offset further reduction in military end strength; and horizontally integrating doctrine and material developments.

Aviation has the unique capability to provide a lethal, deployable force that will enhance early entry operations. This battle lab focus is force structure; doctrine and tactics; and techniques and procedures for warfighting systems that enhance the maneuver commander's ability to project, protect, deter, and fight, if required. Joint interoperability with other services and allies creates flexible force packages and highly deployable aviation logistical organizations. Our reconnaissance and security operations—and command, control, communication, and intelligence ($C^3I$)—all contribute to a more survivable early entry force.

The ability to see deep and mass effective fires at greater ranges without massing forces allows the commander to shape the battlefield and attack simultaneously at depth with multiple weapons systems. Aviation brings, to the Combined Arms Team, the capability to maneuver in the third dimension throughout the depth of the battlefield. This combination of maneuver, increased lethality, and near real–time battlefield information allows for precision targeting. Our emphasis in this battle lab is on high–technology systems, doctrine, and force structure that will enhance the ability to maneuver, increase lethality, and locate short dwell targets.

Recently, the Depth and Simultaneous Attack laboratory demonstrated digital communications linkage. The linkage was among an Army Tactical Missile System (ATACMS) firing battery; a multiple

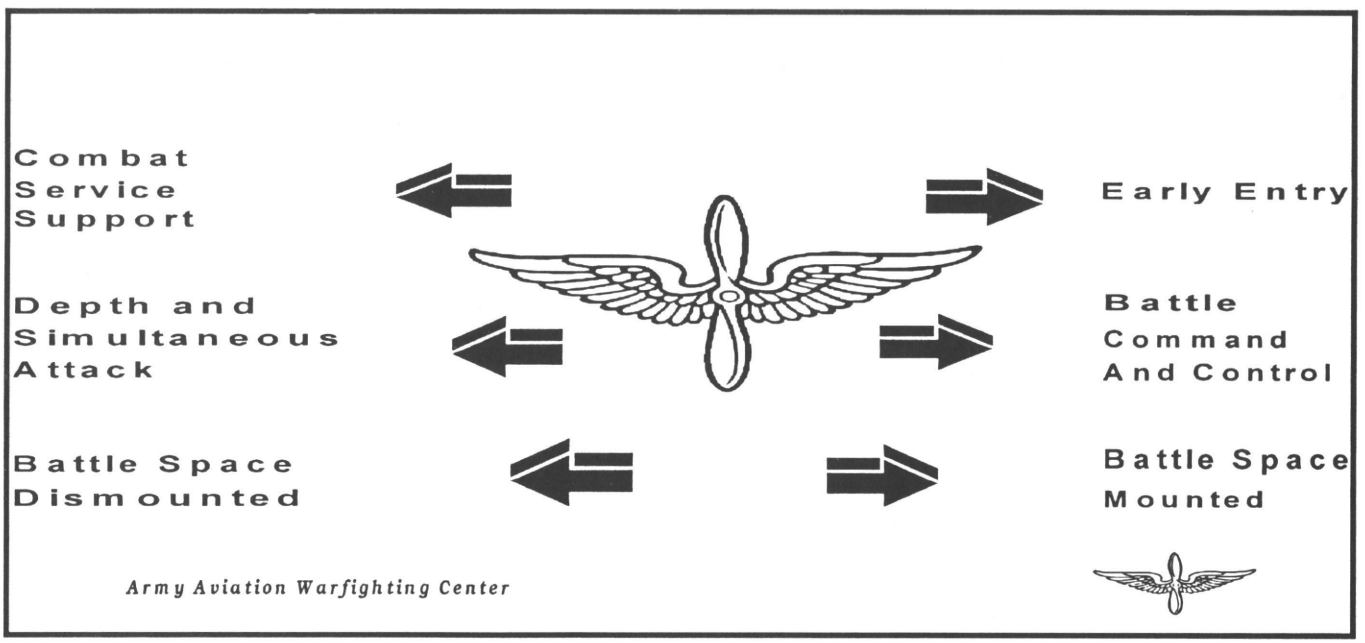



**Figure 2. Aviation Battle Lab Support Team**

launch rocket system (MLRS) fire direction center; a UH–60 Black Hawk $C^2$ aircraft, equipped with an ASC–15B console; and two AH–64A Apaches equipped with an airborne target handoff system (ATHS) and Hellfire missiles. The Apaches were given a frag order to attack the threat mobile launcher after radars located the launch site. The ground station module (GSM) processed a simulated launcher target from the Joint Surveillance and Target Attack Radar System (JSTARS). Then GSM forwarded the information to the ATACMS fire direction center. Later a Q–37 firefinder radar acquired the live missile launch. The radar processed and transmitted the simulated enemy launcher location to a fire direction center.

The ATACMS launcher reversed roles in the exercise and simulated a suppression of enemy air defense mission in support of the Apaches. The MLRS fire direction center was able to communicate digitally with the ATHS with current radio range limitations. The Patriot system acquired, tracked, and simulated a launch against the surrogate theater ballistic missile. All $C^2$ within this demonstration was achieved by digital communication. Demonstrations like this will enhance our ability to maneuver and attack in depth; process, and use, near real–time battlefield information; exercise joint inter–operability; simulate extended range $C^3I$ system; and improve precision weapons systems.

Aviation units operate as members of the Combined Arms Team in the mounted warfighting, maneuvering, and massing lethal fires. To operate in this environment, we must be able to detect, acquire, identify, and kill the enemy in adverse conditions at ranges outside of his effective fires. Emphasis is placed on situational awareness; survivability; horizontal integration of the digitized battlefield with all members of the Combined Arms Team; reconnaissance and security operations; target identification and handover; and the role of unmanned aerial vehicles (UAVs). Recent work in this lab has already shown, through simulation, the ability for the Armor Intervehicular Information System (IVIS) and the Aviation Improved Data Modem (IDM) to pass target data digitally, creating the foundation for a "digitized battlefield." Digitizing the battlefield and improving situational awareness will reduce fratricide, pass real–time tactical information, reduce the decisionmaking cycle time, increase maneuver and planning time, and improve target handovers.

As a member of the Combined Arms Team, Aviation can most influence dismounted warfighting through maneuver and massing lethal fires. Army Aviation can provide lift mobility during day/night operations, battlefield obscurances, and various environmental conditions. These factors are essential for conducting air assaults and air movement operations. A continuing emphasis must be placed on our night fighting capabilities as part of the Combined Arms Team. High–technology systems such as second generation forward–looking infrared (FLIR), advanced night vision goggle systems, focal plane array, and sensor fusion contribute to this capability.

Aviation assets provide the maneuver commander the ability to dramatically increase the battle tempo. Our efforts in the Battle Command Lab concentrate on those means to increase our ability to quickly task organize and maintain the flexibility to execute short reaction time missions. The capability to communicate over extended ranges; joint interoperability; and the capability to receive, and analyze, near real–time battlefield information are some examples of Army Aviation's ability to increase battle tempo.

Sustained aviation operations require streamlined maintenance procedures and a mobile logistical system. Our focus in the Combat Service Support Battle Lab is on those systems that will enhance a power projection force capable of operating in an austere theater or split base operations. Having total repair part visibility; rapid distribution of parts and supplies; the ability to quickly move class III and V around the battlefield; mobility of maintenance systems; and a two–level maintenance structure are examples of increasing the flexibility of aviation logistical support.

***The Systems Integration and Prioritization Team (SIPT).*** The SIPT was organized to coordinate, consolidate, and disseminate aviation issues. The SIPT's mission is threefold: 1) To provide centralized management of the Concept–Based Requirements System (CBRS) process and Army Aviation Center issues; 2) To coordinate, Army–wide, on combat development concepts, organization, materiel, and modernization products; and 3) To prioritize and integrate concepts, organization, and materiel requirements for the aviation user community.

The SIPT's broad range of integration responsibilities include:

Combat development process management; science and technology base management; materiel change; materiel change review and system improvement plan development; the Army Aviation Modernization Plan; the Long Range Research, De–velopment, and Acquisition Plan (LRRDAP); the Program Objective Memorandum (POM); combat developments and research, de–velopment, and acquisition policies; and tactical application of National Space Program capabilities.

These areas will be integrated into battle labs, and throughout the Aviation community, to ensure a coordinated and cooperative approach to modernization; information gathering and flow; improved access to

technology; and efficient use of scarce resources.

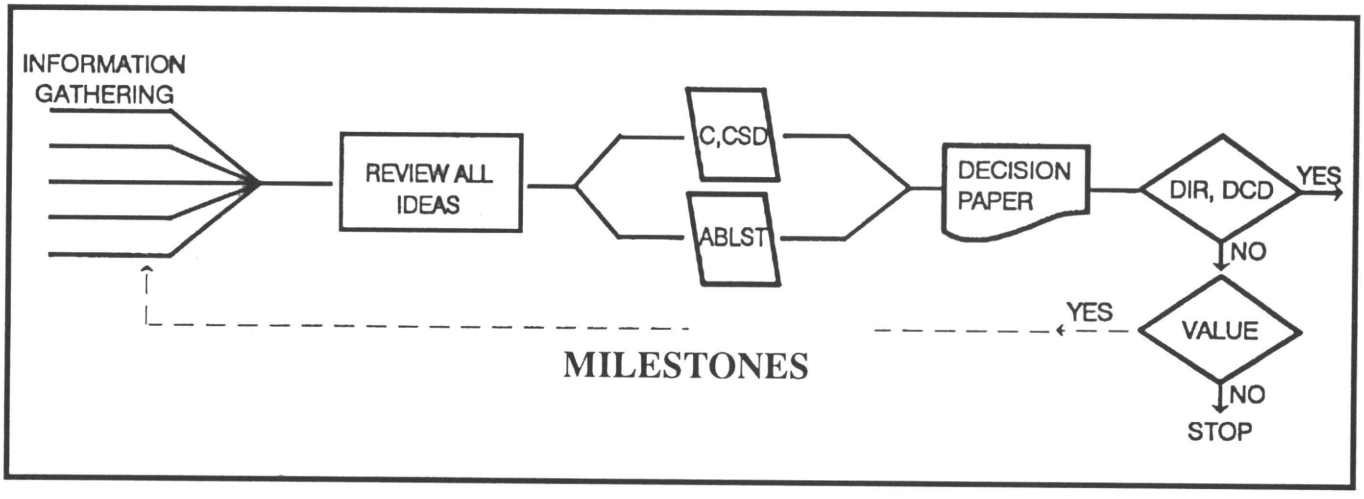
Accomplishments of SIPT include the Army Aviation Modernization Plan (AAMP). The AAMP supports the Army's modernization objectives: Project and sustain the Force; protect the Force; win the battlefield information war; conduct precision strikes; and dominate the maneuver battlefield. The Aviation vision and modernization strategy develops essential warfighting capabilities, maintains a strong technology base, and contains inherent flexibility to cope with future changes.

Prioritization of user requirements in coordination with the materiel developer is a necessity when confronted with limited resources. Increasing efficiency and economy in the management of System Improvement Plans (SIPs) with integration has improved our warfighting capabilities. Development of user prioritization of research, development, test, and evaluation (RDT&E) efforts and user input into the aviation section of the Army Science and Technology Base Master Plan ensure that Army Aviation's operational needs are addressed.

SIPT is the focal point for providing the user requirements and justifications to the Army budget process. The objectives are to identify systems that support the Army and Aviation plans; prioritize and coordinate them with the materiel developer; and look for means to reduce costs. Preserving essential Aviation capabilities through more efficient use of declining defense resources is the goal. In pursuit of these objectives, SIPT will coordinate with several agencies to obtain information, and coordinate and consolidate that information to achieve a single Aviation position.

The ABLST is committed to the kind of experiments that take full advantage of new technology and soldier capabilities. The ABLST serves as a road map for new, better ways of doing business that has brought about centralized management; and Army–wide coordination, prioritization, as well as integration of DTLOMS requirements for the U.S. Army Aviation Warfighting Center.

## MATERIEL AND LOGISTICS SYSTEMS DIVISION




An old maxim states there are three things in life that cannot be avoided: death, taxes, and change. Change is inevitable and the materiel developments process has witnessed a number of significant changes in recent months.

TRADOC's battlefield laboratories are fully operational now and key to the way we do business. The battle labs located at designated TRADOC schools and centers examine the impact of battlefield dynamics on warfighting. The dynamics include: early entry of forces into a theater; the notion of battlespace on a mobile, extended battlefield; simultaneous attack in depth; $C^2$ on the move; and combat service support. Materiel requirements are now staffed with the battle labs to identify opportunities for combined arms enhancements.

Two programs that provide a sample of Aviation's role in the battle lab's horizontal integration mission are digital communications and precision strike. The digital communications initiative shows the technology linkage between the Intervehicular Information System (IVIS), planned for the M1A2 tank, and the Aviation Improved Data Modem (IDM), planned for tactical aircraft. An operational demonstration in March 1993 at the Battlespace Mounted Battle Lab, Ft. Knox, KY, determined the compatibility of the two systems and their contribution to $C^2$, and situational awareness.

The second initiative is a series of deep strike demonstrations conducted at White Sands Missile Range, White

Sands, NM. Attack helicopters receive real–time targeting and survivability data through a $C^2$ aircraft to effectively strike mobile targets simultaneously with the Advanced Tactical Missile System (ATACMS). Besides the battle lab initiatives, we have been working closely with the Program Manager, Aviation Electronic Combat, on a number of avionics programs.

In a joint effort, we set priorities for avionics improvements. Figure 3 shows the top 10 of 23 modernization programs. In the past, the acquisition of communications and electronics systems has been disjointed. There was no single manager who controlled common avionics. High–priority programs went unfunded, while lower priorities received support. Acquisitions were relegated to a "black box" architecture of individual components. Establishing a single set of priorities focused programs toward a capability–based architecture. The priorities were set based on contributions to situational awareness, $C^2$, and operational tempo.

1. AVIATOR NIGHT VISION IMAGING SYSTEM/HEADS–UP DISPLAY (ANVIS/HUD)
2. SINCGARS
3. GLOBAL POSITIONING SYSTEM
4. HIGH FREQUENCY NAP–OF–THE EARTH COMMUNICATIONS
5. HAVE QUICK II
6. IMPROVED DATA MODEM
7. ARMY AIRBORNE COMMAND AND CONTROL SYSTEM (AACCS)
8. AVIATION MISSION PLANNING SYSTEM (AMPS)
9. IMPROVED FREQUENCY MODULATED AMPLIFIER
10. FLIGHT DATA AND MAINTENANCE RE–CORDER (FD/MR)

**Figure 3.Top 10 Avionics Priorities**

Army Aviation's requirement for automated mission planning was established in August 1992 with the approval of the Aviation Mission Planning System (AMPS) operational requirement document. The AMPS will provide Army Aviation with a rapid means of generating flight plans, communications cards, strip maps, and performance planning and weight and balance forms. From brigade to company level, a light–weight computer unit (LCU), equipped with a color screen, will host the AMPS software. The system will include several peripherals such as a color printer, tactical scanner, mass storage expansion unit, and large screen display. The first unit equipped (FUE) is currently planned for the fiscal year 1994.

The IDM is a USAF–led joint program that will soon replace the Airborne Target Handover System (ATHS) as Army Aviation's primary communications modem (figure 4). The functions of the IDM are similar to those of the ATHS; however, the IDM is superior in transmission rates, message handling capabilities, and interoperability. Army Aviation recently demonstrated the backwards compatibility of the IDM with the ATHS at Edwards AFB, CA. An ATHS–equipped OH–58D successfully passed target information to an IDM–equipped F–16 Fighting Falcon during a close air support scenario developed for this demonstration. The IDM will replace the ATHS in the OH–58D, and also will go into the AH–64C/D, RAH–66 Comanche, Aviation tactical operations center, and the Army Airborne $C^2$ System.

The radar frequency interferometer (RFI) is Army Aviation's target acquisition device for locating radar–emitting targets. The RFI will detect, range, classify, and prioritize radar emitters well beyond the lethal range of threat weapon systems. The RFI provides

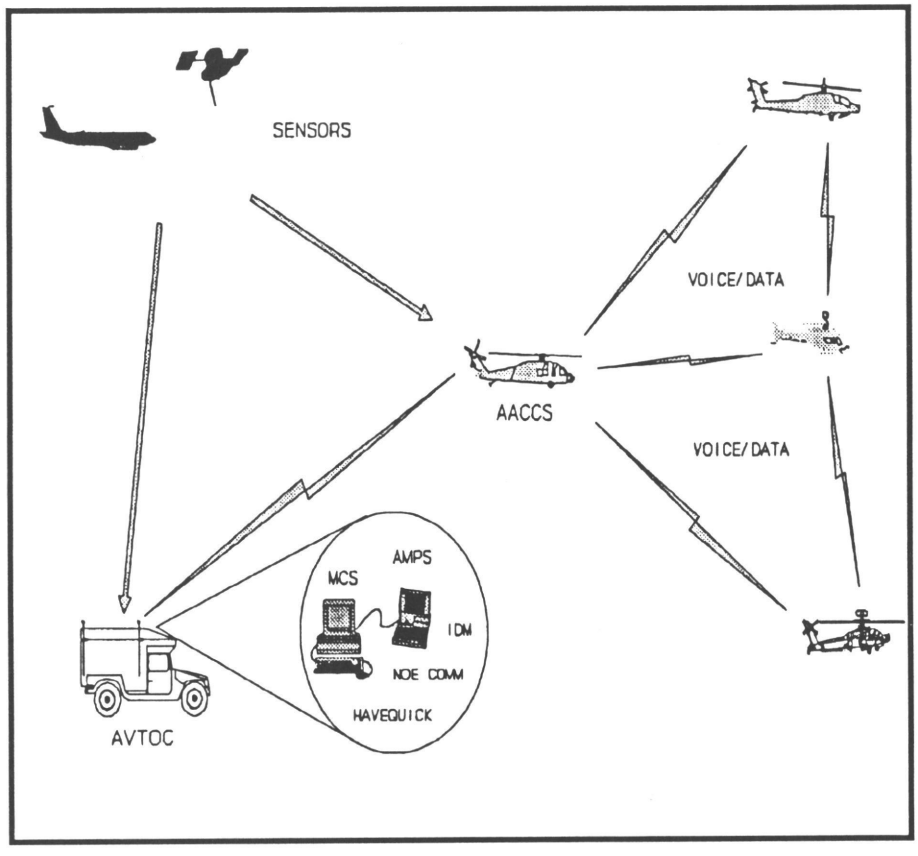


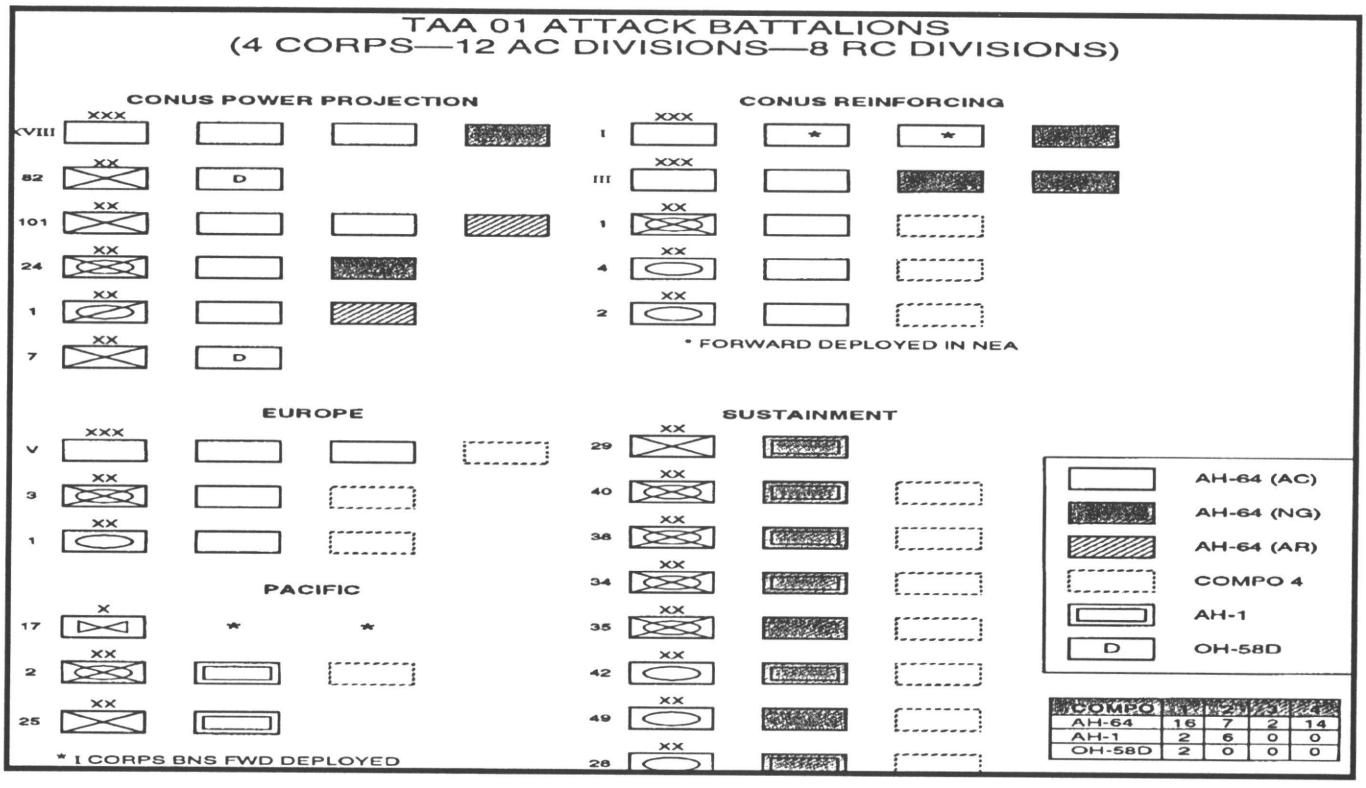

**Figure 4. Data Communications Potential**

accurate data for weapon systems and handover to other attack systems. Night and adverse weather do not degrade the RFI's capability. Initial application of the RFI will be on the OH–58D and AH–64D. Possible later applications are in the AH–64C and RAH–66. When used in conjunction with fire and forget weapons, the RFI becomes a system extremely difficult to counter. Operational testing is scheduled for June 1993 and will follow approval of the requirements document currently in staffing at HQTRADOC.

We collaborated with the Army Air Traffic Control Activity to complete an operational requirement TRADOC approved in October 1992 to replace the AN/TSQ–97 (communications for forward landing sites). The Army will field the forward landing site system, known as the Tactical Terminal Control System (TTCS), in early 1996. This replacement system is like the communications pallet that air liaison officers bring to maneuver units now with upgraded communications, a remote capability, and local weather data.

It is easy to resist change because we get comfortable with our environment. However, change will occur with or without us. I believe these program changes contribute to shaping the future and in doing so will better serve the needs of the Army. As the user's representative, input from the field regarding future needs is always valued. There is no better assessment of the fleet than from the soldiers who live and work with these systems in an operational environment. If you have recommendations ideas or questions about the Army Aviation modernization programs, call us at DSN 558–2914, commercial 205–255–5511, or write to: Commander, U.S. Army Aviation Center, ATTN: ATZQ–CDM, Ft Rucker, AL 36362.

# ORGANIZATION/FORCE DEVELOPMENT DIVISION




***Management of Change.*** Army Aviation experienced a decade of dramatic change during the 1980s, including development of divisional and corps Aviation brigades as part of the Army 86 Studies; establishment of Army Aviation as a basic branch of the Army; and fielding of modern combat and support systems, such as the UH–60 Black Hawk, OH–58D Kiowa Warrior, AH–64 Apache, and CH–47D Chinook.

The Organization/Force Development Division performs necessary front–end work supporting these and other changes in Aviation. It integrates Aviation requirements into the Total Force through several formal processes including Functional Area Assessments (FAAs) and Total Army Analysis (TAA). These processes will be described in detail later in this article.

These force development processes support personnel management functions, including recruiting, retention, and promotion; Army training program management, including training seat requirements

at the TRADOC schools; and the materiel development systems, including aircraft and support equipment.

The processes support these functions by providing force structure manning and equipping requirements for table of organization and equipment (TOE) units of the Army. Recent changes in the international environment have resulted in transition to a smaller, more continental United States (CONUS)–based, power projection Army. These changes will almost certainly make the decade of the 90s as turbulent and interesting as the 80s in the force management business.

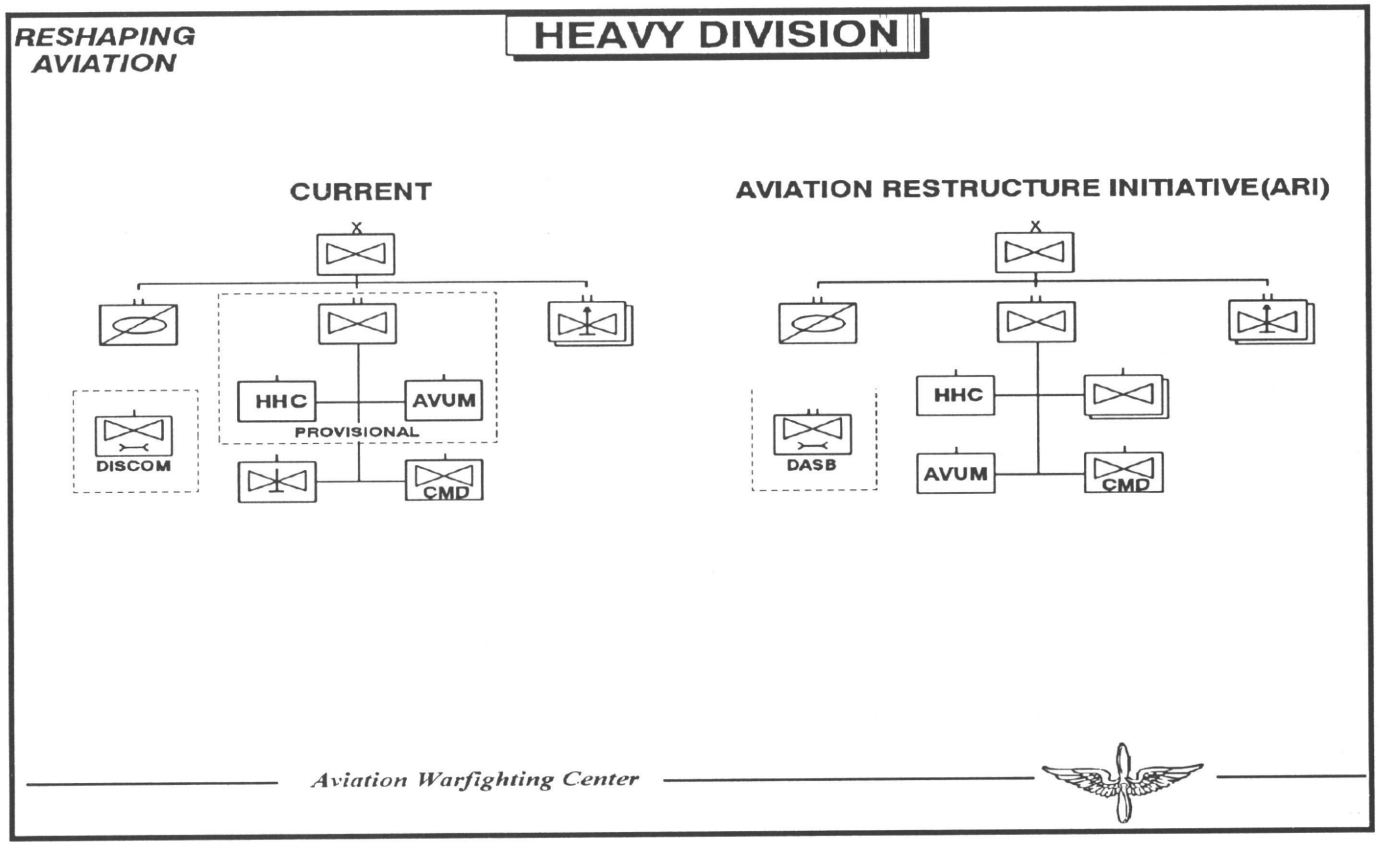
## PROCESS

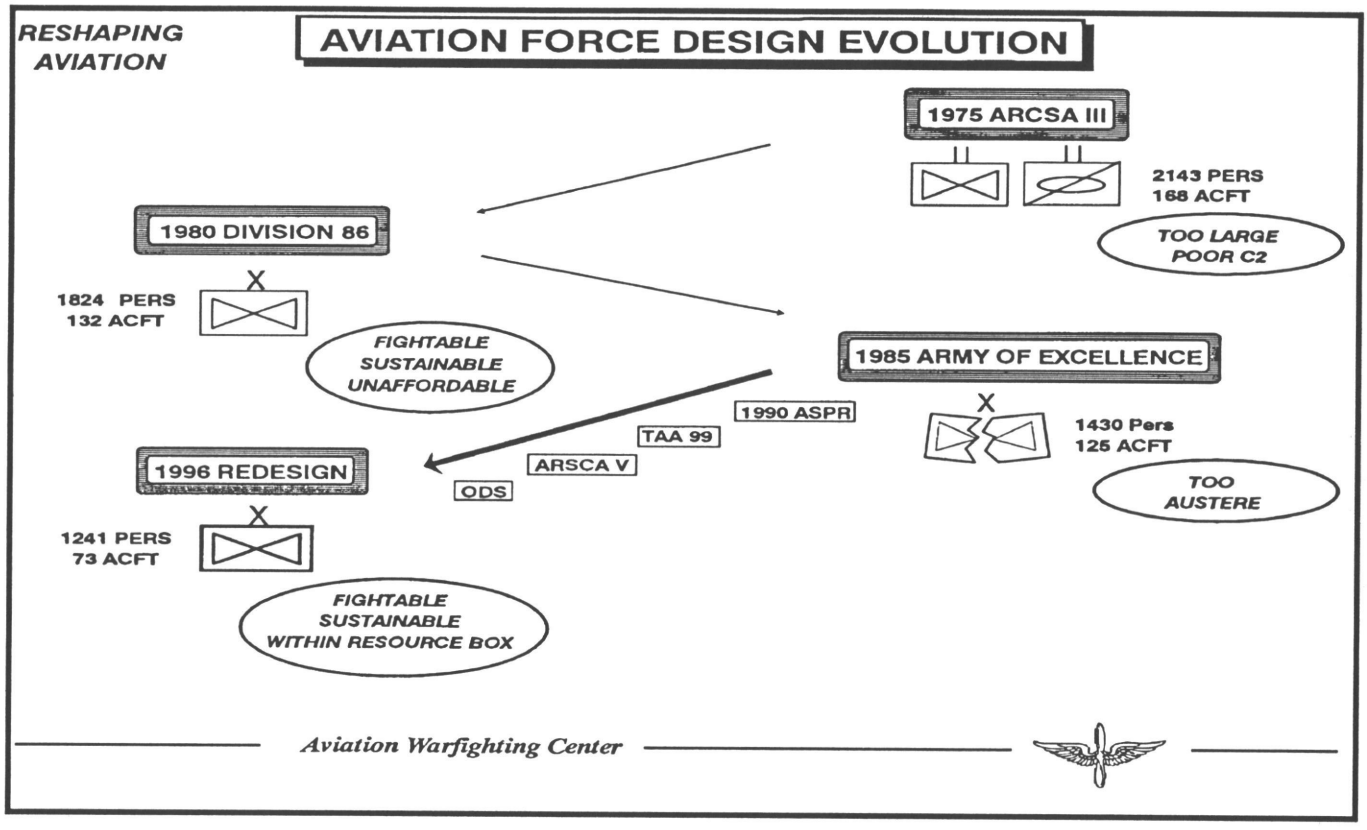
***Force Design.*** The force development process begins with force design. Force designs usually are developed at the proponent TRADOC center as a combat developments function for brigade, battalion, and company/troop level organizations. Division and above design work normally is sponsored by the U.S. Army Combined Arms Command (CAC), Fort Leavenworth, KS, with representation from proponent centers and schools.

At the U.S. Army Aviation Center (USAAVNC), this function is located in the Organization/Force Development Division. Designs can result from field input on existing organizational deficiencies, formal studies such as Army 86, "top down" guidance such as the Army of Excellence, or simply from "good ideas" introduced into the force development process.

Force designs must be coordinated within TRADOC, combat and combat support organizations approved by CAC, or combat service support organizations approved by the U.S. Army Combined Arms Support Command (CASCOM). They then must be coordinated with other major Army commands (MACOMs). The commanding general, TRADOC, approves the designs. They are presented later, in briefing format, to the senior Army leadership for final approval and resourcing. Once approved, force designs become the basis to develop or change TOEs.

***Tables of Organization and Equipment.*** CAC and CASCOM are responsible for actual TOE development. This is a recent change driven by Army downsizing and restructuring to achieve management efficiencies. TOE development responsibilities were moved from the centers and schools. Since then, the Organization Division reviews the documents produced by CAC, while our DCD counterparts at the U.S. Army Aviation Logistics School, Ft. Eustis, VA, review the documents developed at CASCOM. As might be expected, we are experiencing some growing pains with the new system, both at the schools and the integrating centers. However, it remains the goal of TRADOC to produce the best TOEs possible for the units in the field. Closely related to






TOE development are the basis of issue plans (BOIPs) and qualitative and quantitative personnel requirements information (QQPRI).

***Basis of Issue Plans/Qualitative and Quantitative Personnel Requirements Information.*** A BOIP is a requirements planning document. It states the placement of new or improved equipment items and personnel in TOEs. It contains the required quantities of equipment, associated support equipment, and personnel as well as equipment being replaced with application of the BOIP. Organizational, doctrinal, training, duty position, and personnel information for the BOIP is contained in QQPRI. This information is required to assess the need to develop or revise military occupational specialties (MOSs). It provides the basis to plan training requirements. Force designs, BOIPs, Army regulations, and policies and leadership guidance, including any constraints not covered by regulation or policy, become the TOE development framework.

***Modification Tables of Organization and Equipment/Tables of Distribution and Allowances.*** Once developed and approved, the TOE is the authoritative Army requirements document prescribing the manpower and equipment needed for warfighting. As such, TOEs, aggregated across the Total Force, provide the basis to plan and program everything from recruiting specific MOSs to identifying requisite training seats in the schools to budgeting the proper dollars across all Army programs to sustain the Force.

In addition, the TOE is the base from which MACOMs write modification tables of organization and equipment (MTOEs), which authorize a unit to exist along with specified manning and equipping levels. This is actually matching manpower and equipment resources to TOE requirements. The Army as authorized under MTOE comprises about 85 percent of the Total Force. The remainder is authorized under tables of distribution and allowances (TDAs) as general support forces, such as TRADOC and the U.S. Army Health Services Command, supporting the MTOE force. The TDA force requirements and authorizations are developed by the MACOMs and approved by HQDA.

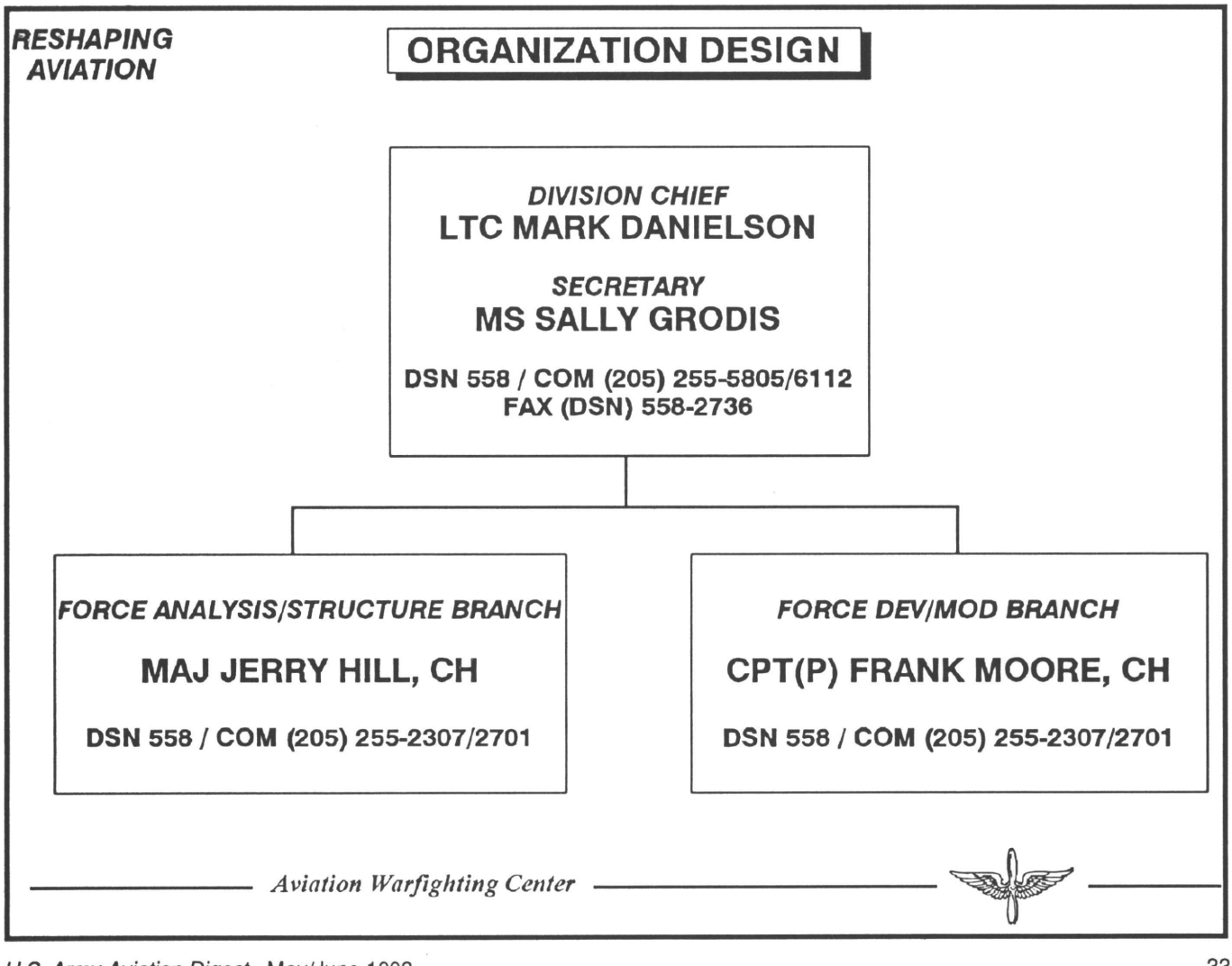
***Functional Area Assessments/Checks and Balances.*** Even with all the planning and good intentions, things can and do go wrong when newly organized or equipped units are put on the ground. The FAA was instituted by the Army Vice Chief of Staff in the mid–1980s to review all aspects of fielding units. Included were requirements and authorization documentation, doctrine, institutional and unit training requirements, equipment availability and personnel issues, to identify and preclude fielding problems. In fact, the Apache Training Brigade was set up and the total package fielding concept was adopted to further ensure problems identified in the FAA process were mitigated before fielding the Apache. The

Organization/Force Development Division is the USAAVNC lead for preparation and conduct of the FAA. The division coordinates and integrates issues developed by the MACOMs, materiel developments community, personnel management community, and Aviation Center Directorates.

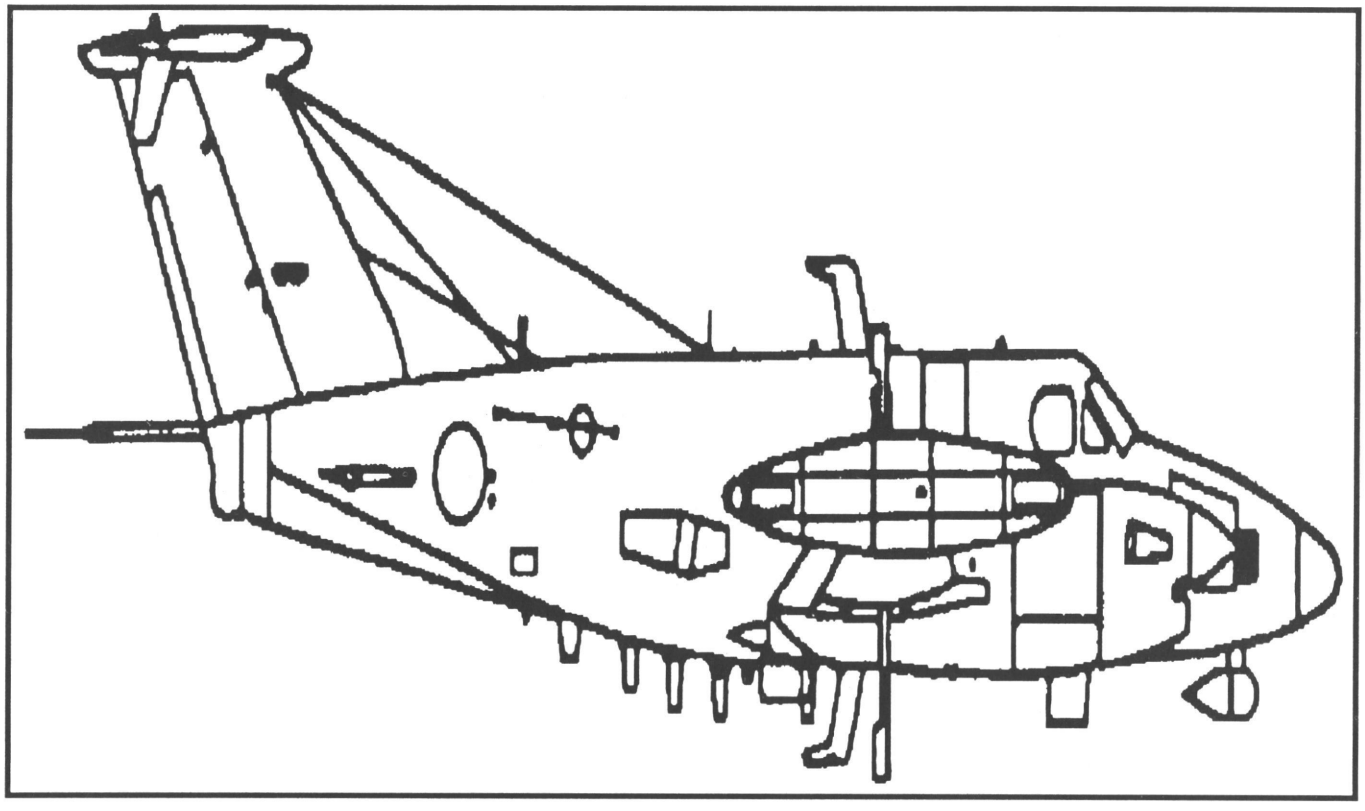
***Total Army Analysis—Bringing It Together.*** The Army structures its warfighting capability from a set of requirements defined by TOE and TDA into the force we are all a part of through the TAA process. The TAA process uses "above the line" forces—generally divisions and separate brigades/armored cavalry regiments—defined by Department of Defense guidance as required to support the National Military Strategy. The TAA process develops "below the line" support structure—generally combat support, combat service support, and some nondivisional combat—needed to sustain above the line organizations. Two distinct phases of TAA are the requirements identification and resourcing. Support force requirements are generated through computer warfight modelling of the Force in one or more Joint Chiefs of Staff–approved illustrative scenarios. This results in a force requirement that generally is larger than affordable. Thus, a set of colonel and general officer level meetings conduct tradeoffs in open forum with Army MACOM and Staff representation to determine the most capable Total Force that fits resource, generally manpower and dollar, constraints. The Organization/Force Development Division is the USAAVNC lead for TAA.

**Our Unit**

The dedicated, professional military and civilian men and women of the Organization/Force Development Division, look forward to these challenges and their continuing support to Aviation Forces in the field. The organization chart below lists the names and telephone numbers. If you have questions, recommendations, or just want to talk about the force structure business, give us a call or drop by building 513.



# USAAVNC THREAT SUPPORT OFFICE



***Defining Future Threats to Army Aviation.*** The end of the Cold War and increasing worldwide instability have changed the focus of current and future threat assessments to potential adversaries in five major regions. Army aircrews in Operation Desert Storm faced threats from systems originating in the former Soviet Union, systems built by our North Atlantic Treaty Organization allies, and captured U.S. systems. It is impossible to predict with accuracy who our future adversaries will be. It is possible to define the weapons and technologies that these potential foes may possess. Army Regulation (AR) 381–11, ***Threat Support to U.S. Army Force, Combat, and Materiel Development,*** defines threat. The definition is "the ability of an enemy or potential enemy to limit, neutralize, or destroy the effectiveness of a current or projected mission, organization, or item of equipment." With that definition in mind, the Threat Support Office (TSO) gears its activities to enable the Army Aviation Warfighting Center to chart the future of the Aviation Branch.

Our mission is to provide timely and accurate portrayal of the threat in the Enhanced Concept Based Requirements System (ECBRS) and in support of the TRADOC missions. Further, our mission is to document the threat to Army Aviation, and ensure accurate, consistent threat is integrated into concepts, doctrine, training, training development, and combat development activities.

***Our Experience Base.*** The Threat Manager's staff has three civilian GS–132 Intelligence Research Specialists; all of them are former Army aviators with military intelligence backgrounds. We also have two Military Intelligence Officers (35D) and two Intelligence Sergeants (96B). We maintain the installation's intelligence reference files, which include finished intelligence documents and current intelligence message traffic. These files enable our analysts to compile threat assessments, and remain cognizant of ever–changing world situations affecting the Aviation Branch.

***Army Aviation Threat Environment.*** The Army Aviation Threat Environment (AATE) serves as our baseline threat assessment. Our senior analyst reviews recent finished intelligence and significant messages to compile this assessment of threats to the Branch, and projects threats we will likely face 10 to 20 years hence. Our goal is to update and publish the AATE annually. The AATE is useful in the Branch Planning Process. It serves as a threat appendix for studies like the

Aviation Branch Assessment and the Army Aviation Modernization Plan.

***Threat for Combat Developments.*** The TSO is part of DCD. Its project officers and analysts are our primary customers. The combat developments process begins with ideas. We use the AATE as a threat foundation upon which DCD's thinkers identify advanced, futuristic technologies, and join them with tactical sense to form new concepts. As concepts are applied to paper, the TSO provides an analyst to write a threat statement for each concept. TRADOC'S battle labs are enhancing and streamlining the early stages of the combat developments process. They too require branch–specific threat. When required warfighting capabilities become apparent, DCD's Materiel and Logistics Systems Division drafts a Mission Needs Statement (MNS). We describe the threat to be countered and the projected threat environment for each MNS.

Approval of an MNS signals us to begin a System Threat Assessment Report (STAR) for Acquisition Category (ACAT) I and II systems. The STAR summarizes the approved threat provided to combat and materiel developers for a specific system. It provides an assessment of potential adversaries' capabilities to neutralize or degrade a specific U.S. system or system concept. We submit STARs for ACAT I systems through Army Intelligence channels to Defense Intelligence Agency (DIA) for approval. The Office of the Deputy Chief of Staff for Intelligence, Headquarters, DA, reviews and approves STARs for ACAT II programs.

Less expensive systems fall into ACAT III or IV. They require us to write a system threat assessment (STA). STAs include all elements of a STAR, but are normally much shorter. CAC's Threat Directorate reviews and approves STAs originating at USAAVNC. Throughout the process of developing a STAR or STA, we coordinate our products with our U.S. Army Materiel Command (AMC) counterpart, the U.S. Army Aviation and Troop Command (ATCOM) Foreign Intelligence Office, at St. Louis, MO. Proponency for STARs/STAs shifts to AMC after developmental systems reach Milestone I.

During concept exploration and definition, DCD's Concepts and Studies Division calls on us to provide threat to cost and operational effectiveness analyses (COEAs) for proposed systems. We also assist the CAC Threat Directorate on COEAs that the TRADOC Analysis Command (TRAC) is conducting. Our tasks are to formulate threat tactical laydowns for scenarios developed in support of computerized wargaming; array threat forces during wargaming; verify threat data and tactics, techniques, and procedures used during the study; and write a threat subanalysis for inclusion in the COEA report. The system's STAR or STA serves as the primary threat reference during the COEA process.

When prototype hardware is available, or when enough is known about a system to test it in computerized simulations, we support the User Testing process. We write threat test support packages (TTSPs) to describe the threat new systems will be tested against. We also provide early input to the threat section of the test and evaluation master plan (TEMP).

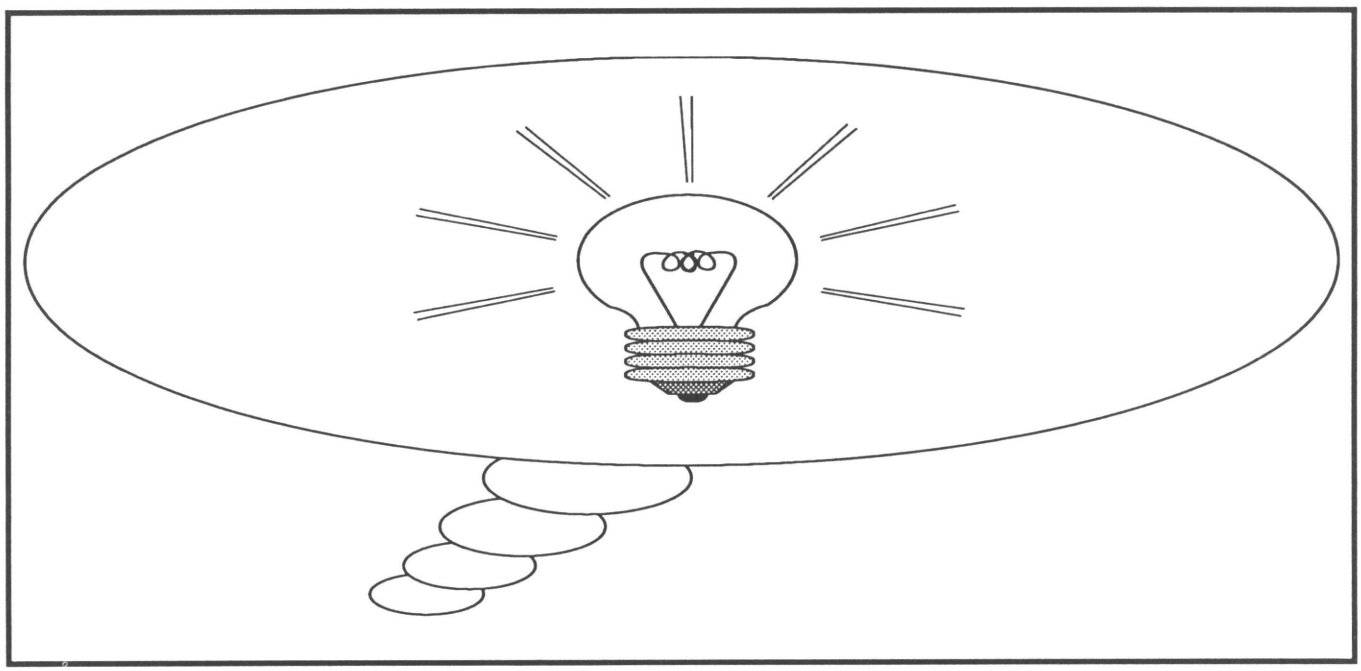
During a test, we arrange threat force schemes of maneuver and dispositions for use at the test site; train the test opposing force (OPFOR); and monitor test execution to assure valid threat portrayal. We have recently supported tests of the Longbow Apache; Air–to–Air Stinger; and Air–to Air Combat, Phase II (ATAC II). Future tests include the OH–58D Kiowa Warrior, Longbow Apache, and the RAH–66 Comanche.

***Aircraft Survivability Equipment and Reprogramming.*** The Army is developing capabilities to rapidly reprogram software embedded in target sensing systems, to include aircraft survivability equipment (ASE). Reprogramming is necessary when a new threat appears in a theater, or when a known threat is operating outside expected parameters. The TSO interfaces with the Army Reprogramming Analysis Team (ARAT) at Eglin Air Force Base, FL, during exercises or contingencies. We gather USAAVNC experts to respond when confronted with a reprogramming decision; or when new tactics, techniques, and procedures (TTPs) are needed to counter a threat. The Army will implement reprogramming capabilities over the next 5 years. Our task at USAAVNC is to ensure the Aviation Branch has soldiers trained and equipped to receive reprogramming data when transmitted to a theater. Soldiers will expeditiously load the data into ASE devices on Army aircraft.

***Doctrine, Training, and Training Developments.*** The TSO reviews doctrinal literature developed at USAAVNC for threat content. When necessary, the TSO writes the threat sections of that literature. We assist academic instructors with threat references and lesson plans, and monitor classroom instruction. The Directorate of Simulation calls on us for threat expertise and data to support new training devices and simulators, and for threat updates to existing devices.

***Aviation Branch Threat Bulletin.*** We publish a classified quarterly ***Threat Bulletin*** and mail it to most Army Aviation units, research and development activities, and support facilities around the world. If your unit would like to receive the ***Threat Bulletin***, or if you have questions on the threat to Army Aviation, feel free to write or call at this address or telephone numbers: Commander, USAAVNC, ATTN: ATZQ–TSO, Fort Rucker, AL 36362–5195. Telephone: Commercial (205) 255–5671/3506 or DSN 558–5671/3506.

# CONCEPTS AND STUDIES DIVISION



Mr. Richard Maccabe, who also serves as the Directorate technical advisor, is responsible for the Concepts and Studies Division (CSD). The mission of the CSD is to conduct analytical studies, proposed dynamic conceptual analysis, and perform scenarios and wargaming to support Army Aviation. The Division is comprised of these three branches:

• ***The Studies Branch.*** The chief of this branch, Major Dale Maddox, has a full–time job analyzing replacements for today's attack, reconnaissance, utility, and cargo aircraft. This includes related communications, armament, and utility systems.

The branch is looking into unmanned aerial vehicles (lethal/nonlethal), rocket lethality, communications needs on the modern battlefield, the proper mix of AH–64C/D aircraft in future attack units, and the issue of developing methodologies that determine the contributions of reconnaissance to warfighting. The branch also accomplishes USAAVNC's test and evaluation function.

• ***The Concepts Branch.*** The chief of this branch, LTC Keith Gay, is involved in determining the best tactics, techniques, and procedures to use while conducting future air–to–air combat; how we will use unmanned aerial vehicles (UAVs) in future conflicts; how Aviation will detect and avoid antihelicopter mines; and how combat aircrews will refuel and rearm in a 15–minute proposed turn–around time. All conceptual data focused on future doctrine of the AirLand Battle and within the enhanced concepts based requirements system.

• ***The Scenarios and Wargaming Branch (SAW).*** The chief of this branch is Major Bob Raichle. He is busy using the JANUS 3.1 system of force–on–force modeling to provide analytical support for ongoing concepts and studies. The branch is responsible for realistically portraying scenarios and accurately wargaming futuristic forces and equipment engage one another on tomorrow's battlefields. The branch also performs all international standardization actions for USAAVNC.

Our sister division MLSD ensures Aviation forces around the world are outfitted with the best possible equipment available. CSD works on the future, using it's three branches—Concepts, Studies, and Scenarios and Wargaming. CSD develops concepts (5 to 15 years out), validating materiel requirements and researching alternatives to give Pentagon decisionmakers the best possible solutions.

# Antihelicopter Mines: The Emerging Threat To Helicopter Operations

**Captain(P) David R. Alexander**
Research and Development Staff Officer
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL

This article discusses various roles of Army Aviation in minefield detection and employment. It describes how Army Aviation will augment Army engineers and air defense artillery (ADA) to support maneuver commanders as they execute mine warfare operations. It also provides insights for future aerial mine warfare (AMW) doctrine, training, leader development, organization, materiel, and soldiers.

As the Army become smaller, Army Aviation's role in joint and combined arms operations will become increasingly larger. A significant risk in performing these operations will be the development and employment of the antihelicopter mine (AHM) by both enemy and friendly forces. These AHMs will have a significant impact on future Aviation operations.

Thus, it is expected that Army Aviation will become more involved in minefield emplacement and detection, and countermine operations. This new mine technology will require Army Aviation, ADA, and combat engineers to rethink tactics, techniques, and procedures, and change the way they interoperate.

## BACKGROUND

***The Threat.*** The most likely threat facing the U.S. Army in the future consists of subversive and insurgent forces, and the national armies located in Southwest Asia, Latin America, the Pacific Rim, and Europe. Conflict with these types of forces probably will be low–to–medium intensity. However, a high–intensity environment also must be considered.

The worse case scenario continues to be a war or conflict with enemies structured and equipped like forces of the former Soviet Union. Warfare using mines designed to destroy aircraft is likely to begin in the near term. Systems capable of smart and indiscriminate destruction of helicopters already exist. (For example, Sensys, a German company, has developed HELKIR.) In the hands of terrorist organizations, this capability likely will profilerate.

The need for an AHM is a direct result of the inherent capabilities of the helicopter. Helicopters give an enemy force high–tactical mobility, increased firepower, improved flexibility, and greater shock effect capability. At the tactical level, threat helicopters extend the three–dimensional character of combined arms operations. They make it possible for an enemy force to carry out a variety of missions that compensate for a smaller ground maneuver force.

Primary helicopter missions include attacking friendly formations and ground targets; suppressing friendly air defense (AD) assets; inserting air

assault and airmobile combat units; and attacking friendly helicopters, ground attack aircraft, and other slow–moving or stationary targets.

The overall number of military helicopters around the world continues to rise. Only now, we don't expect to face the masses and firepower of the entire modernized Russian army helicopter fleet. In the past year, the Russian helicopter industry has made considerable progress toward entering once closed markets.[1] Russian companies are strapped for cash. The Russian government recently decreed that military and other facilities could sell their assets independently of the central government to generate hard currency.

Russia's two helicopter companies—Mil and Kamov—are pressing ahead with new and improved designs. They are demonstrating their desire and determination to compete in the West (and elsewhere around the world).[2] Could any of our possible adversaries be receiving deadly KA–50 Hokum Werewolf and Mil–28 Havoc aircraft now or in the future?

Also, there has been, and is forecasted to be, an increase in sales of civilian–type, rotary–wing aircraft around the world.[3] The myriad of civilian–procured helicopters available and existing in the world today, and those designed for the future, are easily adapted for use as military (attack, reconnaissance, and lift) aircraft. These somewhat inexpensive and easily attainable helicopters may become a significant enemy force to be reckoned with.

***The Needs.*** An unmanned, "smart" capability is needed to detect, acquire, positively identify, and engage low–flying, terrain–masked, enemy helicopters in the deep, close, and rear battle areas. The need also exists to cover the dead space that current AD weapon systems inherently cannot cover. A wide area, "smart" AHM that can be employed by hand, Volcano [multiple delivery mine system] dispensers (air and ground), and the multiple launch rocket system (MLRS), or Army tactical missile system (ATACMS), is proposed to satisfy this need (Figure 1).

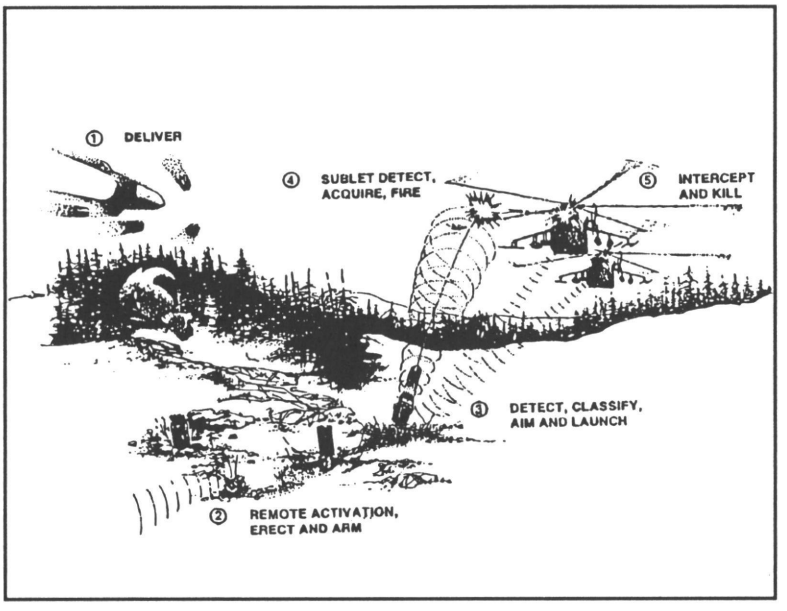



**FIGURE 1. Smart AHMs can be employed by hand, Volcano, MLRS, or ATACMS.**

Central to achieving this need will be a viable command, control, communication, and intelligence ($C^3I$) network linked to the AHM minefield(s). That network must interface with the maneuver control system–Engineer (MCS–ENG) and the forward area air defense system (FAADS) $C^3I$. It will provide battlefield information (sensor data) and target acquisition data in near real–time to users of the Army tactical command and control system (ATCCS).

The Army's newest "smart" weapon, the wide area mine (WAM), an antiarmor mine, recently finished its first stand–alone test against a moving target. The system detected, aimed at, fired on, and destroyed a moving, Russian–built, T–62 tank at Yuma Proving Ground, AZ.

The U.S. Army Aviation Center, Directorate of Combat Developments, Fort Rucker, AL, with the U.S. Army Engineer School, Fort Belvoir, VA, and U.S. Army Air Defense Artillery School, Fort Bliss, TX, is working on the concept that describes the future of AHM warfare and Army Aviation operating in an AHM warfare environment. This departure from normal warfare requires one to look at tactics, techniques, and procedures for employing AHMs using Aviation. We also must look at unconventional ways to counter and operate against mines designed to destroy our low–flying aircraft.

## OPERATIONAL CONTEXT

AHMs will be employed throughout the depth of the battlefield and integrated into the FAADS, the engineer obstacle plan, or a combination of both. AHMs normally will be employed along those likely aerial avenues (AAs) of approach that may not be suitable for combined arms operations. They also may be used to reinforce antitank and antipersonnel minefields. Since airspace management and terrain assessment are so critical to the effective use of AHMs, the employment authority most likely will rest with the corps commander.

AHMs will be used primarily as point obstacles on terrain–masked

AAs. They will be used to disrupt, turn, or block the low–altitude passage of enemy helicopters. In the close and rear battle areas, combat engineers and air defenders will plan for AHMs. Combat engineers, field artillery, or aviation assets will emplace them in coordination with maneuver forces. AHMs also can disrupt enemy employment of helicopter–mounted, scatterable mine–dispensing systems; complicate enemy heliborne tactical command and control ($C^2$); and protect friendly close air support and attack aircraft from enemy combat helicopters.

In the deep battle, long–range artillery and special operations personnel will emplace AHMs. In addition, unmanned aerial vehicles (UAVs) and deep strike (U.S. Air Force (USAF)) and U.S. Navy (USN) aircraft may possibly employ AHMs. Based upon the intelligence preparation of the battlefield (IPB), and the employment of other ADA systems, AHMs will be emplaced to deny access to air AAs and enemy helicopter battle positions.

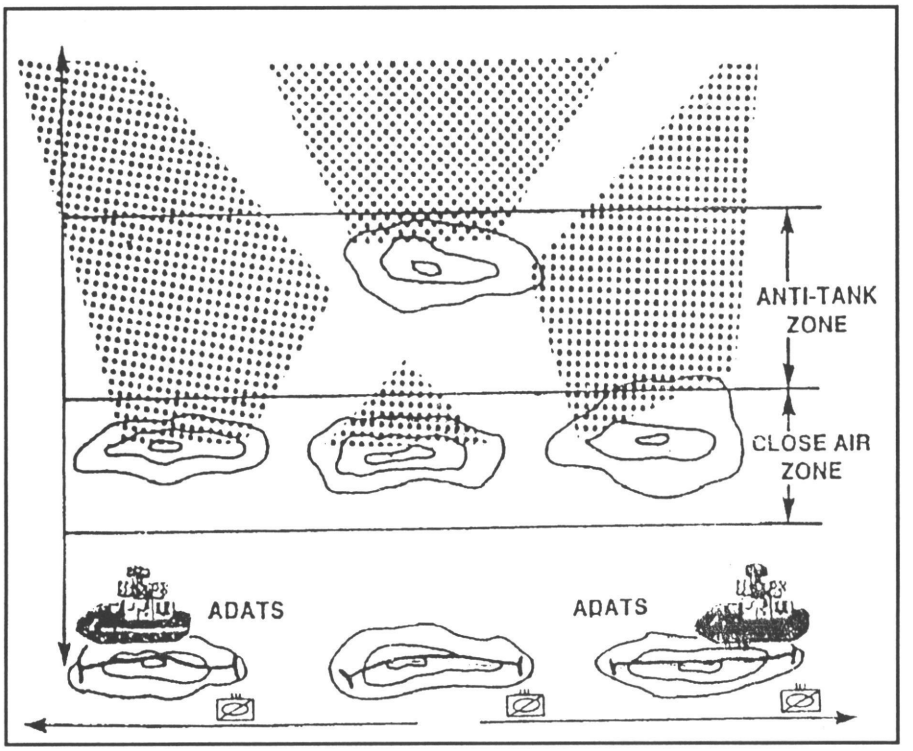


FIGURE 2. Terrain masks air defense artillery threat simulator (ADATS) radars.

## MISSION OF AHMs

AHMs will expand the concept of a minefield into the low–altitude airspace above the battlefield. The primary mission of the AHM will be to enhance current AD capabilities.

***Primary AHM missions will—***

- Deny threat helicopter pilots the safe use of terrain–masked air AAs (Figure 2).
- Force threat helicopter pilots to face a significant attrition risk much earlier in their mission, either directly or by forcing them to fly at higher altitudes where they are more likely to be engaged by manned AD systems, or denying them a specific area or avenue, thus forcing them into a designated ADA kill zone (Figure 3, next page).
- Provide coverage in areas without AD protection (dead space), such as on the flanks of an advancing maneuver force while their AD units move from one fixed firing position to another.
- Report combat information (sensor data) to air defenders to focus them on known threat helicopter movements; provide early warning of an enemy attack to friendly forces in the open, allowing them to seek cover, orient their weapons, and prepare a defense.
- Use AHMs instead of manned AD systems in areas of high–risk exposure to personnel.
- Allow units to emplace AHM minefields before the outbreak of hostilities and arm them when required through their countermobility remote control system (CIRCE).

***Secondary AHM missions will—***

- Disrupt the enemy's heliborne $C^2$, operational timetables, resupply, and reconstitution efforts.
- Use mine threat helicopter forward arming and refueling points and airfields.
- Overwatch friendly scatterable and conventional minefields.
- Protect friendly critical fixed assets.
- Support the IPB process and reconnaissance, intelligence, surveillance, and target acquisition operations.

## ARMY AVIATION'S ROLE IN AHM WARFARE

Army Aviation's future role in AHM warfare can be described best in terms of the U.S. Army Training and Doctrine Command (TRADOC) Battlefield Dynamics, and Field Manual (FM) 100–5 (Preliminary Draft, dated 21 August 1992), ***Operations***, Chapter 3, Force Projection, and Chapter 4, The Environment of Operations.

***Early Entry Lethality and Survivability***

- ***Definition***: Early entry operations are the initial opposed or unopposed projection of forces or capabilities into a theater to deter aggression or protect U.S. interests.
- ***Description***: Before, during, and after lodgement in a theater, the intelligence system will continue to

refine the situation, protect the force through early warning, and perform target development and targeting. The goal is to know the location of significant enemy forces at all times. This will enhance the security of the force and its ability to target and maneuver against the enemy. To facilitate this goal, the corps commander initially may establish a security area oriented on the enemy's approximate location. If the enemy should attack before deployment of adequate force, the security and deploying force must be prepared to defend, or conduct a delay, withdrawal, or retirement. Minefield planning, emplacement, and detection begin here and continue throughout other battlefield dynamics.

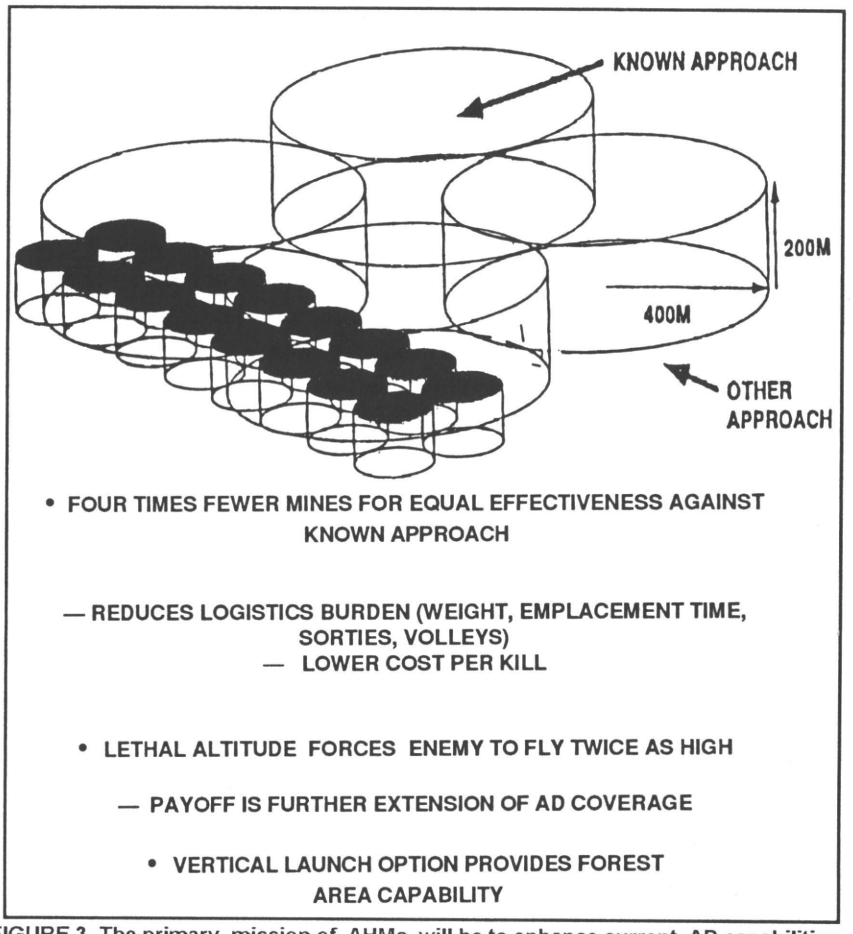



FIGURE 3. The primary mission of AHMs will be to enhance current AD capabilities.

As early entry operations are initiated, the commander's main focus shifts to building up his capabilities to prepare for the conduct of decisive operations. This includes skillful positioning and maneuvering of the force, ensuring security of the force, and expanding the IPB process. The commander must retain flexibility and agility to respond to any crisis. AHM warfare will support and enhance the early entry lethality and survivability of our forces. The focus of this battlefield dynamic is to[4]—

• *Optimize Lethality of Early Entry Forces.* AHMs optimize the lethality of early entry forces by providing the commander with an additional all weather, day/night, unmanned AD capability unavailable otherwise.

• *Optimize IPB Capability.* Enhance the AHMs and the IPB process by providing the commander with an additional source of battlefield information through AHM sensors/detection devices.

• *Optimize force mix configurations for early deployment to improve mobility, survivability, and sustainability of early entry forces.* AHMs improve the mobility and survivability of early deployment forces by providing additional AD coverage for the force.

• *Capitalize on unique capabilities of special operations forces (SOF) and other services to enhance lehality and survivability of early entry forces.* Employ AHMs by SOF-type, and improve their lethality and survivability.

**Army Aviation will support/enhance this battlefield dynamic by—**

• *Detection and Countermine.* Reconnaissance units perform minefield detection as part of the overall reconnaissance and security mission. Army aircraft begin to assist combat engineers in identifying locations of enemy minefields and activities from standoff and close-in vantage points within the security area. Aircraft can begin using the technologically advanced, lightweight Standoff MineDetectionSystem (STAMIDS). STAMIDS is capable of operating on all Army aircraft flying at altitudes as low as nap-of-the-earth (NOE). Aircraft can use STAMIDS, which is capable of detecting buried and above ground metallic and nonmetallic mines outside the threat AHM's detection range. This detection mission can be accomplished as an integral part of the unit's mission. UAVs also may be able to use STAMIDS during deep reconnaissance operations. This effort is critical if the enemy has employed AHMs and we plan to conduct intensive aviation operations.

• *Employment and Emplacement.* Besides mine detection, aviation assets assist engineers as they conduct mobility operations, and assist air defenders as they conduct forward area AD to protect the

force. In the security area, this task is accomplished by air assets transporting barrier material, personnel, and construction equipment and by emplacing scatterable mines (Volcano), to include AHMs , in selected areas of the security zone to prepare for decisive operations. AHMs also are employed to operate as sensors and detection devices, capable of passing combat sensor data, combat information, and early warning back to the maneuver commander.

**Depth and Simultaneous Attack**

• ***Definition***: Depth and simultaneous attack is the application of combat power against an enemy throughout the depth of the battlefield.

• ***Description***: Initiation of simultaneous and deep attacks to establish conditions for decisive operations is the second battlefield dynamic. It also includes security operations. The operational commander synchronizes available fires and air maneuver forces to project firepower against targets throughout the enemy's depth. During this activity, the operational tempo of AMW increases. Support of combat operations continues with full–scale involvement in mine and countermine operations. AHM warfare will support amd enhance depth and simultaneous attack. The focus of this battlefield dynamic is to—

• ***Engage, simultaneously, enemy forces throughout the depth of the battlefield in all three dimensions.*** AHMs can be delivered deep by artillery, aircraft, or UAVs and enhance the simultaneous engagement of enemy forces deep and in the third dimension.

• ***Use leverage emerging technology to increase accuracy of attack systems, thereby increasing first–round kills.*** AHMs, a technologically advanced weapon system, increase the accuracy and lethality of AD systems.

• ***Detect enemy systems and formations at maximum depth and provide near real–time intelligence to commanders and targeting information to attack systems.*** AHMs candetect enemy aircraft at maximum depth and also provide real–time battlefield information to commanders and attack systems.

• ***Link intelligence and electronic warfare (IEW), and attack systems in near real time to optimize precision targeting, particularly against moving and short dwell target.*** AHMs and AHM $C^2$ interface can link with IEW and attack systems through MCS in near real time to enhance targeting of enemy aircraft.

**Army Aviation will support/ enhance this battlefield dynamic by—**

• ***Detection and Countermine.*** Timely detection/verification of both close and deep enemy minefield locations by UAVs and aviation assets using STAMIDS continues. The confirmation of enemy minefields allows engineers and maneuver forces to conduct countermine operations in preparation for decisive operations. This also allows aviation assets to counter enemy AHMs in support of deep aviation operations/attacks.

• ***Employment and Emplacement.*** Since shaping the battlefield is the major objective in depth and simultaneity, enemy centers of gravity are targeted by long–range artillery fires, and joint Army/USAF air attack teams. Joint AHM operations are employed to channel, separate, attrite, and fix enemy aircraft for future engagement. Commanders may have the capability to employ UAVs that are designed to deliver AHMs and scatterable mines on selected enemy elements at predetermined engagement areas throughout the battlefield. They also may decide to use a small portion of our utility helicopters equipped with mine dispensing systems to deliver scatterable AHMs at engagement areas as a part of the joint mine operation. UAVs can continue to operate throughout the breadth and depth of the security zone while utility helicopters can operate primarily in the battle zone and along the flanks of the dispersal and logistics areas.

Field artillery platforms (MLRS and ATACMS), and USAF/USN attack aircraft can begin to deliver AHMs deep, targeting enemy aviation bases/sites and possible AAs. All of these platforms have the ability to deliver AHMs that can be remotely activated, deactivated, or command–detonated as the situation dictates.

The AHMs in the deep security zone will deny enemy aircraft the freedom to travel in his rear area, disrupt his logical operations, and act as sensors to provide early warning against threat helicopters. AHMs in the battle zone complement and synergize friendly ADA, engineer, and Army Aviation efforts and create effective ambush areas against enemy air assault and attack (antiarmor) aircraft, thus creating simultaneity. Reconnissance aircraft using radios capable of remotely activating AHMs can decoy enemy aircraft into ambush zones within the detection zone.

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**Short, violent, and decisive close operational maneuver ... will complete the enemy's destruction with minimal friendly casualties.**

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**Battlespace**

• ***Definition***: The area in which opposing forces engage in combat actions.

• ***Description***: When mission, enemy, terrain, troops, and time available permits, deep and security operations may continue to condition the enemy until a favorble force ratio exists. Short, violent, and decisive close operational maneuver coupled with synchronized deep operations will

complete the enemy's destruction with minimal friendly casualties. Simultaneous close, deep, and rear operations occur in this activity. Upon the initiation of decisive operations, the force moves rapidly to ensure decisive defeat of previously targeted enemy formations. The focus of AHM warfare shifts to protecting a rapidly moving force and to supporting destruction of the enemy's combat capability. The focus of this battlefield dynamic is to—

• ***Engage enemy outside of his engagement range capabilities, both day and night.*** AHM is an all weather, day/night system that can engage enemy antiarmor helicopters outside their engagement ranges.

• ***Expand multiplier capabilities to acquire and kill an armored threat in all weather, day/night at long range with an increased probability of destruction out to the extent of the brigade commander's battle space.*** AHMs expand our AD capabilities to acquire and kill antiarmor helicopters in all weather, day/night, and at long ranges.

• ***Determine optimum force design of reconnaissance and security forces, brigade through corps.*** AHMs can enhance the reconnaissance and security forces of brigade through corps by providing additional AD coverage and an additional source of battlefield information/intelligence.

• ***Optimize night fighting capability of combined arms force.*** AHM is a night fighting system that can increase the night fighting capabilities of the combined arms force.

• ***Improve target acquisition capabilities for the combined arms force.*** AHMs improve the target acquisition capabilities of the combined arms force by detecting, locating, and tracking enemy aircraft. They again can do this 24 hours a day, in all weather conditions.

**Army Aviation will support/enhance this battlefield dynamic by—**

• ***Detection and Countermine***: UAVs and utility aircraft (with engineers) using STAMIDS will ensure friendly force mobility by the continued detection of minefields along the friendly axis of advance. This is key to ensuring aviation mobility.

• ***Employment and Emplacement***: Utility helicopters can begin dispensing scatterable mines along the flanks of fast–moving maneuver forces in the main battle area as the force moves forward. UAVs also can deliver smart and scatterable mines to deny the enemy freedom of maneuver and/or slow or stop his retreat. Field artillery platforms (MLRS and ATACMS) continue to deliver AHMs deep, targeting enemy aviation bases/sites and possible avenues of approach or battle positions. This activity continues for as long as the maneuver commander dictates.

**Restoration (FM 100–5).**

• ***Definition***: The restoration phase of the operations focuses on those activities following the cessation of open conflict.

• ***Description***: The emphasis in this phase is on restoring order and minimizing confusion following the operation, reestablishing host nation infrastructure, and preparing forces for redeployment. And yet, the cessation of open conflict may be interrupted by the resumption of hostilities. During this time, security remains a paramount concern to prevent isolated enemy forces from bringing harm to the force. When elements of the operational force complete decisive operations, they reconsitute the force on a localized or overall basis, and afterwards or concurrently resume or terminate combat operations. Units disperse and establish security so that regeneration of the force can restore combat power for future battles should they prove necessary. Our involvement in AHM warfare will support and enhance the restoration phase.

**Army Aviation will support and enhance this operation by—**

***Employment and Emplacement.*** This is the main AHM effort during this phase. Protection and replenishment of the force following decisive operations are two major functions performed by aviation units in this phase. Aviation assets focus their reconnaissance efforts on future operations. Utility helicopters can begin dispensing scatterable mines, as necessary, to protect dispersal and logistics areas. At the same time, Army aircraft can tactically position AHMs to detect and engage any enemy helicopters attempting to disrupt reconstitution efforts.

**Peacetime engagement and military operations other than war (FM 100–5).** Operations in this diverse environment are classified into peacetime operations and conflict. Typical peacetime operations include nation assistance, security and advisory assistance, counterdrug, antiterrorism, arms control, support to domestic civil authority, and peacekeeping operations. AMW in these environments will be somewhat limited in scope and directly linked to the category of support required by the host nation or ally. Since these types of operations will most likely be supported by some type of Army Aviation (or other service helicopters), AHMs can provide friendly forces with a means of providing active security and could also very possibly pose a threat to friendly helicopter operations. A major consideration during these types of operations is the use of AHMs by unfriendly terrorist organizations or guerrilla forces against friendly helicopters.

**Through the $A^2C^2$ staff elements at division, corps, and echelons above corps, AHM employment must be coordinated and incorporated into the $A^2C^2$ fire support, engineer, and intelligence annexes to operation plans and operations orders.**

## SPECIFICS ON AHMs

*AHMs will—*

• Automatically detect, track, identify, engage, and destroy or disable an enemy helicopter flying at speeds from 0 (hovering) to 350 kilometers per hour and at altitudes and slant ranges up to 100 meters (m) required, 250m desired. The AHM should perform these functions through 360 degrees of azimuth and 0 to 90 degrees of elevation.

• Accept new or changed threat target signatures that improve or increase system performance.

• Be equipped with CIRCE transceivers. These transceivers will provide the user with the following capabilities—

1) Recyclable remote turn **ON** and **OFF** switch or device with status confirmation.

2) Recycle mine self-destruct times and command destruct times.

3) Autonomously conduct coordinated attacks.

4) Send real–time combat information (target sensing and engagement data) to the user.

5) Sense, identify, track, and engage a multiple–threat helicopter environment (up to four helicopters within 50m of the mine).

6) Remotely turn **ON** and **OFF** by friendly aircraft passing near or over friendly antihelicopter minefield. if necessary.

## CONCLUSION

Integration of AHM efforts among Army ADA, engineers, and Aviation is critical. The integration of joint, host nation, and multinational helicopter operations to the AMW plan also is critical. Through the Army airspace command and control ($A^2C^2$) staff elements at division, corps, and echelons above corps, AHM employment must be coordinated and incorporated into the $A^2C^2$ fire support, engineer, and intelligence annexes to operation plans and operations orders. AHMs must be integrated with the overall goals of ATCCS, to include FAADS, MCS–ENG, MCS-Aviation (aviation mission planning system), and MCS–Military Intelligence.

For countermine operations, aircraft and UAVs must be able to detect enemy AHMs at NOE and low–level altitudes. Airborne employment systems like STAMIDS should meet this requirement. Further development of our tech base on the use of high–energy weapons (i.e., high–powered microwave) capable of destroying all mines (pressure, magnetic, and multisensor) also will be necessary.

For years minefields have adversely affected the armor and infantry community. This form of warfare has placed enormous battlefield stress, and the development of mines and countermines on friendly and enemy forces. AHMs will bring a new threat into the already deadly and effective AD threat posed against helicopters. How will Army Aviation respond? ❐

### NOTES


1. Kristen Foster, ***Soldiers***, What's New; New Mine System Passes Test, October 1992, page 5.
2. Bill Carey, ***Rotor and Wing***, Russian Helicopter Designs; Still Trying to Win The West, January 1993, page 38.
3. Günter Endres, ***Interavia***, Who's Buying Helicopters?, February 1992, page 24.
4. General Frederick M. Franks Jr., commander, TRADOC, message, Subject: Commander's Intent: Battle Labs, August 1992.

# ANVIS Adjustments and Aviator Visual Performance

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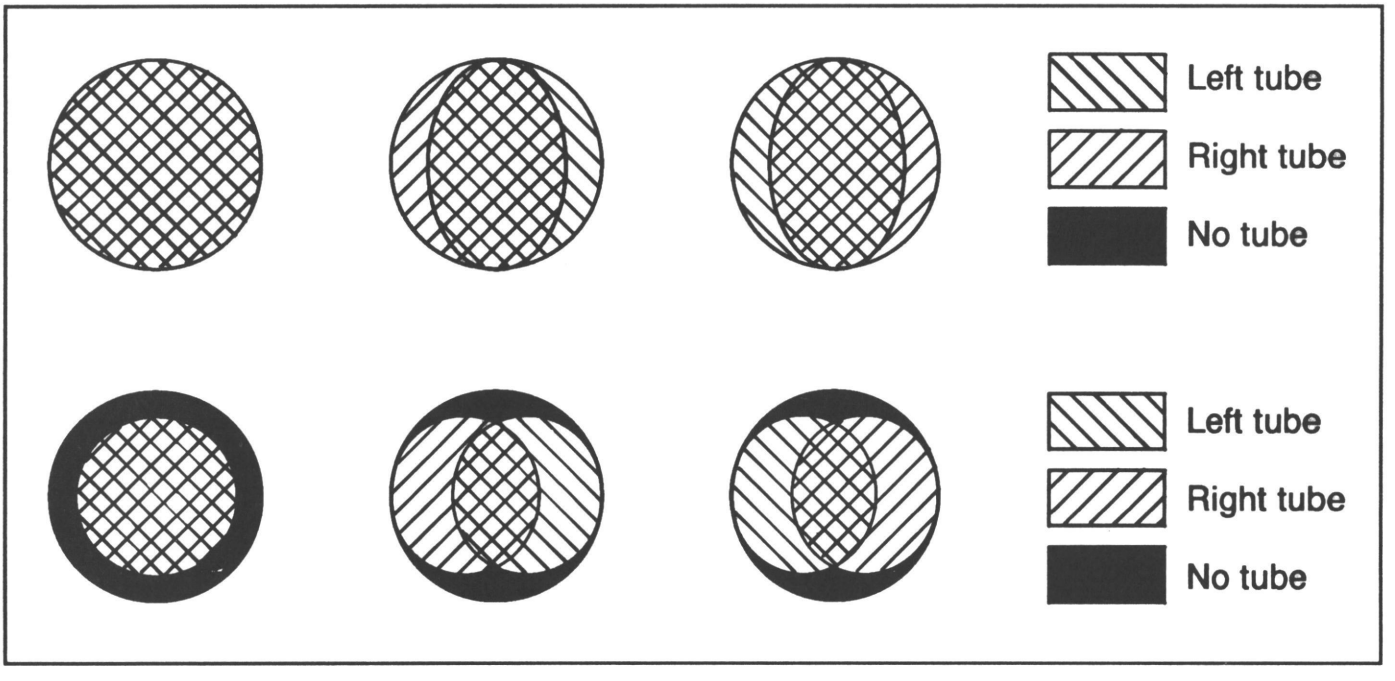



*Figure 1. Field of view refers to the size of the area one can see. This figure shows the predicted parts of ANVIS field-of-view at 18mm vertex distance (top) and at 32mm vertex distance (bottom). Moving from left to right, the diagrams in each row show the makeup of the fields-of-view at optimal IPD, reduced IPD, and increased IPD. The binocular field-of-view decreases and the size of the monocular lobes increases as ANVIS IPD is changed from optimum. At extended vertex distances (greater than 18mm), varying IPD can restore total horizontal, but not total vertical, field-of view. The outer circle in the lower row shows a 40-degree field-of-view; the black area cannot be seen through either tube.*

*This article emphasizes the impact of vertex distance and IPD on the performance of ANVIS.*

## Introduction

One must perform several adjustments to optimize performance of the Aviation Night Vision Imaging System (ANVIS, AN/AVS-6).

These adjustments include vertical alignment, tilt, interpupillary distance (IPD), vertex distance, and focus.[1,2,3] This article emphasizes the impact of vertex distance and IPD on the performance of ANVIS.

Vertex distance is distance from the eye to the back of the ANVIS.

IPD is the separation between the centers of the ANVIS tubes.

Optimal IPD for ANVIS is the same as the distance between the centers of the eyes. This study was conducted to answer questions about the impacts of ANVIS adjustments in the context of a Class A mishap.

Three measures for the field-of-view:

binocular

monocular lobe size

total field-of-view

ANVIS field-of-view is normally 40 degrees. Field-of-view refers to how much area you can see. Several ANVIS adjustments have impacts on your field-of-view.[4]

For example, increasing vertex distance from 20 to 40mm decreases field-of-view from 40 to 27 degrees.[5,6,7] In general, vertex distances greater than 18mm restrict the field-of-view in proportion to the increase in the vertex distance.

We will describe three measures of field-of-view. They are binocular field-of-view, monocular lobe size, and total field-of-view. These are shown in Figure 1. Binocular field-of-view is the area visible through both tubes simultaneously, and is important for judging depth and distance.

Monocular lobe size is the area visible through only one tube. Total field-of-view is the total area visible through both tubes. It consists of the binocular field-of-view plus the monocular lobe size.

Theoretical analyses of the effects of changes in vertex distance and ANVIS IPD, such as adjustments away from the optimal values, on ANVIS fields-of-view were conducted at USAARL. It predicted that changing ANVIS IPD from optimal would increase the total field-of-view at 32mm vertex distance, but not at 18mm vertex distance, where it would remain 40 degrees.

At 18mm vertex distance, changing the ANVIS IPD from the optimal value should reduce the binocular field-of-view.

Finally, at 32mm vertex distance, we expected a reduced total field-of-view which should be restored to 40 degrees by changing the ANVIS IPD from its optimal value.

These predictions are illustrated in Figure 1.

Previous research at USAARL indicated there is a loss in visual acuity, or how well one can see, at the edge of the ANVIS field-of-view compared to its center.[8]

The binocular field-of-view, the area visible to both eyes, was greater at 18mm vertex distance than at 32mm vertex distance.

However, this was never formally documented. Object contrast, or brightness compared to the background, influences acuity with the AN/PVS-5A and with ANVIS.[9,10]

Thus, we expected lower acuity for low contrast as compared to high contrast objects.

Some workers have suggested that one's ability to see using night vision devices is severely reduced by missetting IPD.[11]

They report that missetting ANVIS IPD by 10mm can produce Snellen visual acuities of 20/200[12] compared to the 20/40 which is generally considered "normal" for ANVIS.[1] This compares to "normal vision" at 20/20.

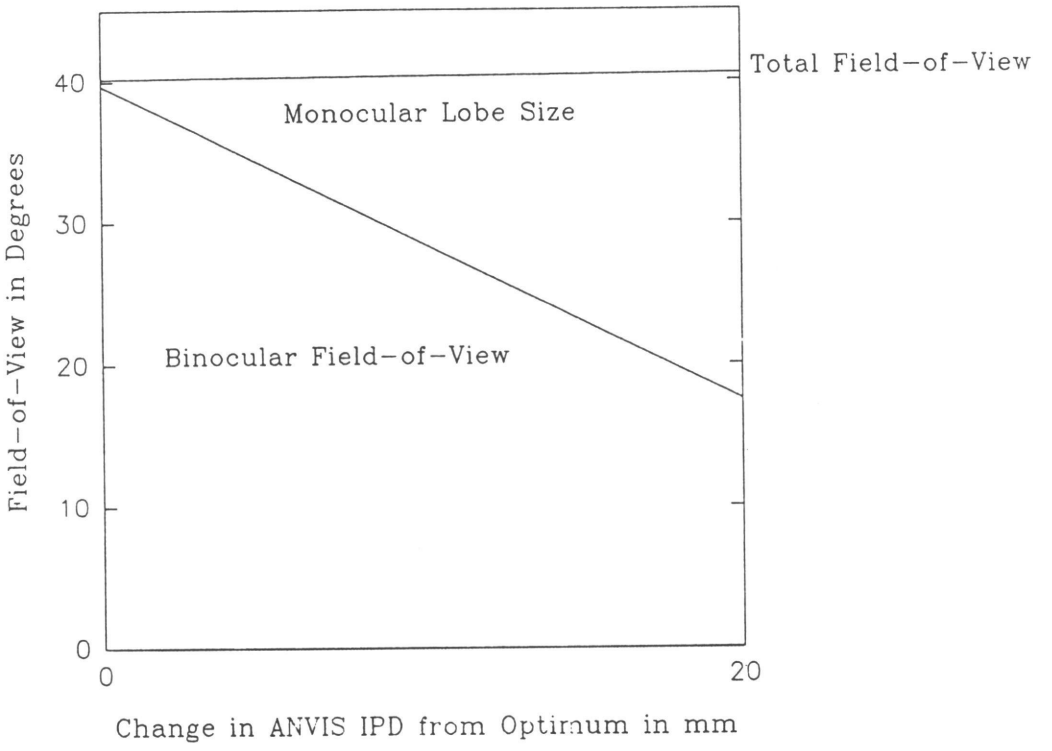
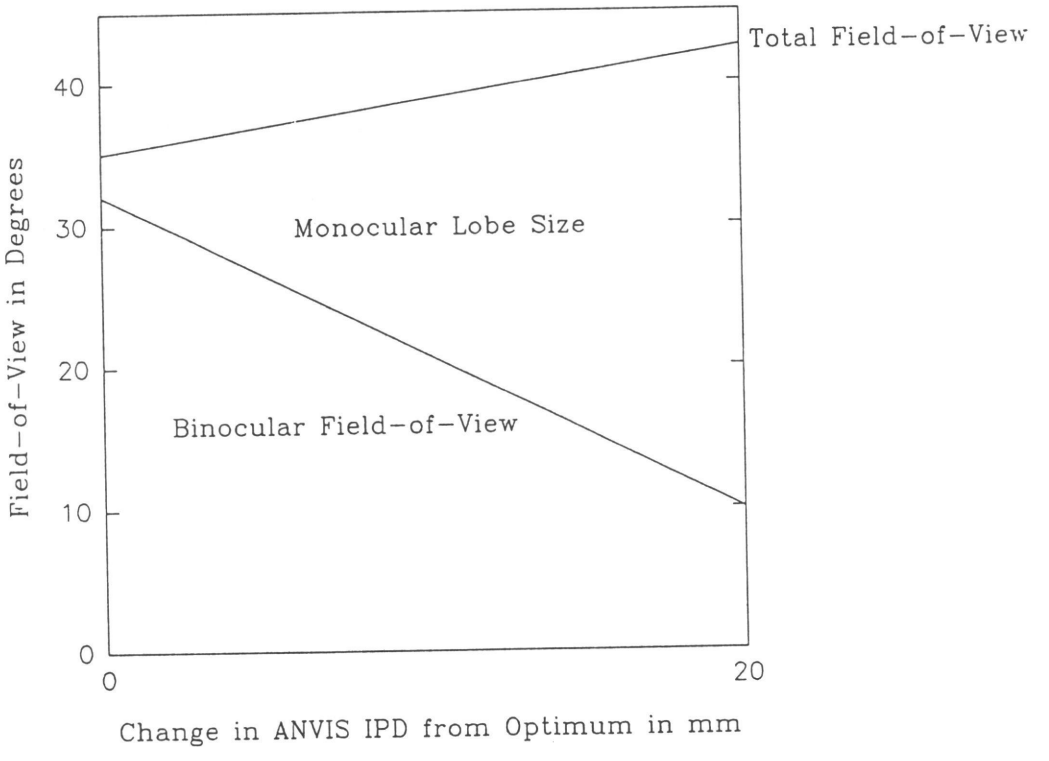



*Figure 2. Observed sizes of the parts of ANVIS field-of-view at 18mm vertex distance (top) and at 32mm vertex distance (bottom). At 18mm vertex distance, changes in ANVIS IPD did not alter total horizontal field-of-view, but it did increase monocular lobe size and decrease binocular field-of-view. At 32mm vertex distance, changing ANVIS IPD increased total horizontal field-of-view and*



However, the available data suggest this report is based on unpublished studies of the AN/PVS-5A, a device which is more sensitive to changes in IPD, that were conducted at USAARL in the early 1980s.

Ten volunteers participated in the field-of-view sessions, and eight volunteers participated in the acuity sessions. All data were collected through a single flight certified ANVIS. Objective (front) and eyepiece (back) lens focusing, and tilt, vertical, IPD, and vertex distance adjustments were accomplished using current procedures.[1] The ANVIS were used with filters over the objective lenses to control light levels.[13]

> Changes in vertex distance do not change ability to see through ANVIS.

A spot of light was used to measure field-of-view. Acuities were measured with both high and low contrast objects centered and against the edge of the visual field.

## Results and Discussion

The binocular field-of-view, the area visible to both eyes, was greater at 18mm vertex distance than at 32mm vertex distance, and was greater at the optimal IPD setting than at the extreme 51mm (adjusted all the way in) or 72mm (adjusted all the way out) IPD settings for both vertex distances.

Monocular lobe size, the area visible to only one eye, was smallest at optimal IPD settings and at 18mm vertex distance. Monocular lobe size grew more rapidly with changes in IPD at 32mm vertex distance than at 18mm vertex distance.

Total field-of-view generally was greater at 18mm vertex distance than at 32mm vertex distance. At 18mm vertex distance, the total field-of-view did not change with changes in ANVIS IPD.

But at 32mm vertex distance, the total field-of-view increased when ANVIS IPD was changed from optimum.

While changing ANVIS IPD from optimum appears to restore total field-of-view at 32mm vertex distance, this applies only to the horizontal field-of-view. The vertical field-of-view remains reduced even when the ANVIS IPD is changed, and the total area visible through ANVIS remains significantly reduced.

The field-of-view results are given in Figure 2. They support the predictions in Figure 1.

Our results on visual acuity, how well one could see, are presented in Figure 3. Changes in vertex distance did not change ability to see through ANVIS.

Changing IPD from optimum did slightly reduce acuity. However, the acuity changes are not operationally meaningful. Thus, we found a small effect of changing ANVIS IPD on ANVIS acuity, rather than the substantial impacts others had suggested.[12]

Our results support the notion that the earlier report was based on AN/PVS-5 and not on ANVIS data. Our results also strongly suggest that missetting ANVIS IPD will not seriously reduce one's ability to see through ANVIS.

However, subjects in this experiment used ANVIS under conditions of changed IPD for relatively brief periods. Some over the course of a long mission.[14] Research into this question is needed.

We found that the relative loss of visual acuity, or ability to see, at the edge of the ANVIS field-of-view is greater than previously reported.[8]

Greater acuity was observed with high contrast than with low contrast charts. The impact of low-object contrast was smaller at the edge than in the center of the visual field.

## Summary

Vertex distances, the distance between the eye and ANVIS, greater than about 18mm reduced the total field-of-view, or area that you could see. These losses can be recovered by changing the ANVIS IPD setting, the distance between tube centers, from its optimal values, the distance between the centers of the eyes.

This is at the expense of reduced binocular field-of-view and increased monocular lobe size. At 18mm vertex distance, the total field-of-view does not change as IPD is varied, but binocular field-of-view is reduced and monocular lobe size is increased. Binocular field-of-view is particularly important for judging depth and distance.

Visual acuity was not substantially reduced by changes in vertex distance or IPD, but was sharply reduced at the edge of the field-of-view.

Thus, maintaining scan is crucial when using ANVIS. Minor errors in setting IPD or vertex distance are unlikely to reduce one's ability to see through ANVIS in a meaningful way.

A more detailed presentation of these findings is available.[15] Interested readers should also refer to the other sources listed.

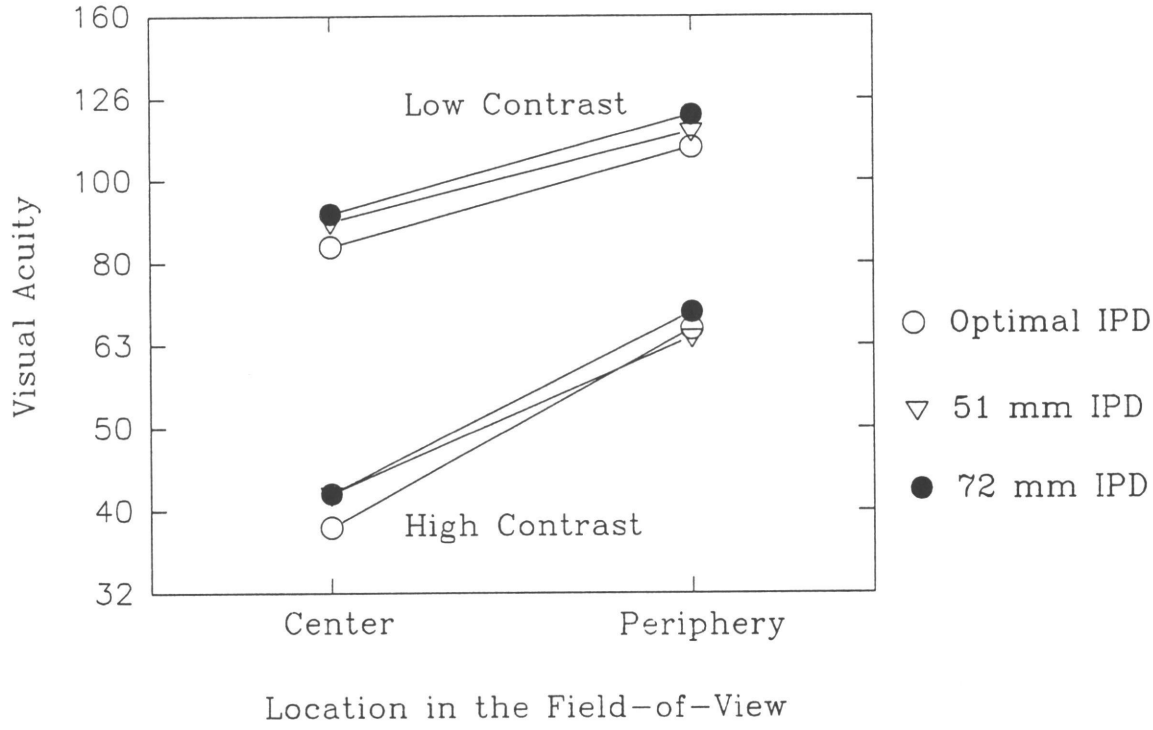
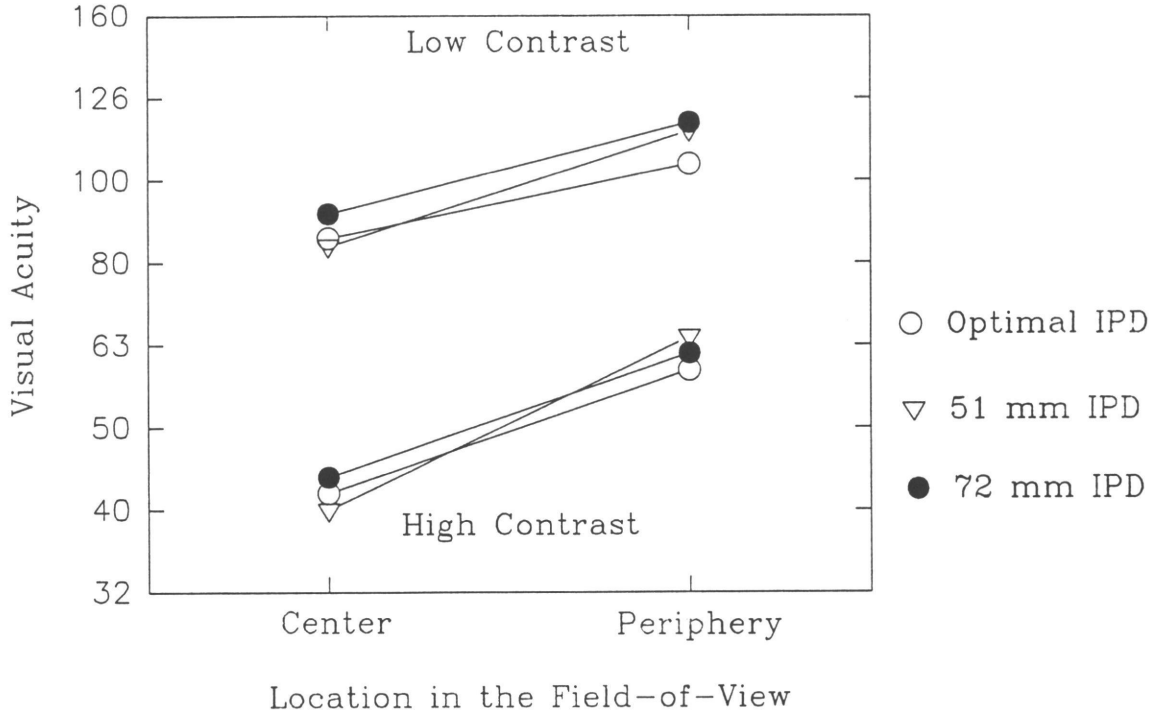



*Figure 3. Visual acuity refers to how well one can see. This figure shows observed ANVIS visual acuities at 18mm vertex distance (top) and 32mm vertex distance (bottom). Changing vertex distance did not alter acuity, and changing ANVIS IPD decreased acuity only slightly. Acuity for low-contrast objects and for objects at the edge of the field-of-view were both significantly reduced. Visual acuities are in Snellen denominators (20/-), where 20/20 is "normal" vision and 20/40 is "normal" for ANVIS.*



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# ARMY'S FIRST AIRMOBILE OPERATION

**CW2 Michael M. Alberich**
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U.S. Army Aviation Museum
Ft. Rucker, AL

*"Where is the Prince who can afford so to cover his country with troops for its defense, as that ten thousand men descending from the clouds might not, in many places, do an infinite deal of mischief before a force could be brought together to repel them?"*

*Ben Franklin, 1784*

## The Place:

The Panama Canal Zone.

## The Date:

20 March 1931.

## The Mission:

To deploy Battery B, Second Field Artillery, from Fort Davis on the Atlantic side of the Isthmus to La Venta ranch near Rio Hato on the Pacific side.

Once there, the battery would set up and fire tables to support the exercise and test some new types of fuzes and shells.

Also, they would be firing for the coveted Knox Trophy and taking part in an experiment that would change warfare as they knew it.

Movement of artillery had been traditionally slow. Even the new 75mm howitzer, weighing in at just over 1,260 pounds, had to be towed by tractor, horse, or mule. It also could be broken down into five loads and packed by mules.

A normal rate of march, over good terrain, was 4 miles per hour. The rugged terrain of Panama would only add to the difficulty. Captain (CPT) Henry E. Tisdale, B

Battery commander, wanted to go by air.

"...The idea of such a movement came as a result of a proposed march across the Isthmus by B Battery. This had taken A Battery 13 days in 1923," reported First Lieutenant (1LT) Louis B. Ely in his article "Flying Batteries," Field Artillery Journal, volume 21, 1931.

He continued, "I had proposed cutting this to 8 days by careful reconnaissance of the route, assisted by maps not heretofore available."

The article continued, "A week or two to get here, mused the battery commander. We were on maneuvers near Chorrera. Even with the railroad out, there must be some quicker way. Why couldn't we do it by air?"

And the thing was started. CPT Tisdale asked Major (MAJ) Wogan who was enthusiastic. MAJ Wogan found the division commander, General Roberts, also enthusiastic. CPT Tisdale busied himself and his personnel with the task of coordination with the Army Air Corps.

As in any military mission, advanced planning and practice would be necessary. Two days before the event, a practice load-out was conducted.

"...Arriving at the hangar of the 25th Bombing Squadron, we found the big ships had been pulled out and were waiting for the experiment. We met CPT James A. Healy commanding the squadron and a large group of interested Air Corps officers. The Air Corps officers apparently were enthusiastic about the prospect."

The consensus of their remarks to CPT Tisdale was, "We've carried most everything else. We can certainly carry your guns and be glad to."

After a few practices the aircrews and the cannoneers were able to load the guns into the big Keystone bombers within 6 minutes. The Ford trimotors were a little more difficult to load, because they lacked a bomb-bay.

*Captain (later Colonel) Henry E. Tisdale, Gatun, Panama Canal Zone, March 1931*

Eventually, the crews were able also to load these aircraft within 6 minutes as well. Then crew selection was made.

"It was settled that a pilot, mechanic, and three artillerymen could ride in each bomber. The chief, gunner, and one cannoneer thus went with each piece.

"The giant, graceful Ford, we found had less lifting capacity and could take only the chief of section in addition to its howitzer and aircrew."

The additional artillerymen required were to be flown in Sikorsky amphibians. Evidently, CPT Tisdale and 1LT Ely felt one more amphibian load of cannoneers would have been better, "Total 20 men. Had we one more Sikorsky, we would have been pretty well fixed."

The tactical scenario had the 33d Infantry, moving by truck, making contact with the enemy near Rio Hato. Its mission was to delay the enemy.

At 6 a.m., 20 March, the commanding officer, 1st Battalion, 2d Field Artillery, received the following order:

"The General directs that you

arrange with the commanding officer, France Field, to move one battery to the vicinity of Rio Hato by plane immediately."

By 6:15 a.m, the battalion commander had given CPT Tisdale his marching orders. CPT Tisdale was to leave all of his pack animals and 10 men at the post at Gatun, take the flying detachment by truck to France Field, and have the remainder of the battery entrain (constructively) on the siding at 7 a.m.

Once the flying detachment arrived at France Field, they would be furnished three Keystone bombers, a Ford transport, two Sikorsky amphibians, and one 0-2 observation plane. These aircraft would carry the flying detachment.

"Battery commander, executive, reconnaissance officer, four chiefs of section, four gunners, 12 cannoneers, six detail men, the four howitzers with their accessories, a little wire, and instruments," the article stated.

At 6:30 a.m. 20 March, the detachment was entrucked in two class B trucks: three howitzers, and nine men in one truck; the remaining personnel in the other. The battery arrived at France Field at 7:15 a.m.

Lieutenant Ely left in the O-2 reconnaissance aircraft about the time the battery arrived at France Field. Loading preparations started at 7:45 a.m.

The signal to enplane was given at 7:47 a.m. The fourth section was loaded into the Ford in 5 minutes. The bomber sections loaded in 6, 7, and 8 minutes, respectively. Parachutes were put on, sections reported, and the battery commander reported his battery ready. The planes left their parked positions, one by one, taking off between 8 and 8:03 a.m.

The artillerymen were amazed at the speed they covered the terrain.

"Over the jungle here, 10 minutes of flight was a full day's march," CPT Tisdale remarked. "Our 10 minutes here is an hour for ordinary portee, half an hour for the material in light trucks."

Lieutenant Ely had landed at La Venta Ranch where he met Mr. Kierulf, the owner of the ranch; Colonel Ho-neycutt, G-3 of the Department, and cameramen. They all waited and watched the eastern sky.

"At 8:50 a.m., the planes were over us." The Ford landed first, followed by the bombers. Lieutenant Ely was amazed at how close to his chosen battery positions the aircraft were able to taxi.

Artillerymen and aircraft crew members poured out of the machines and went to work, assembling the guns. The fourth section was ready to fire at 9:05 a.m.

"The other pieces, drawn by two men each, and followed by the

remaining cannoneers with gunsight and all accessories, came down the line of planes at a run to their positions. The Captain shouted the fire commands, and the first salvo went at 9:12 a.m.

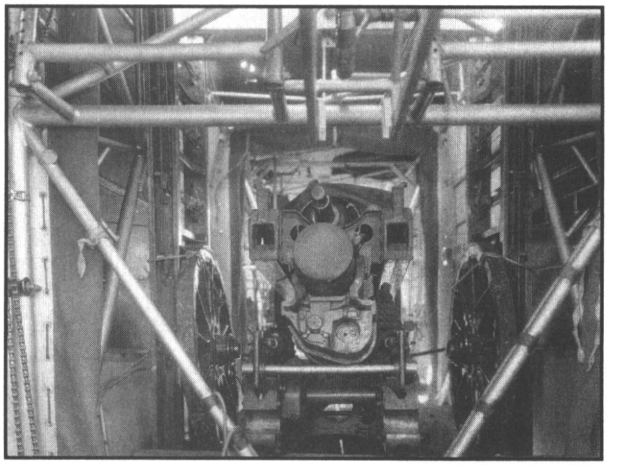
"We had a new type of mobility for the battery. Our 'rate of march' was 80 miles per hour. The obstacles it can pass include mountains, lakes, jungles, and enemy front lines."

CPT Tisdale, 1LT Ely, and the others involved held a thorough debrief. Although they were extremely impressed about the pros of airmobility, they had the foresight to look at the cons.

"But why rave about the obvious advantages. Soberly, the disadvantages: lack of cannoneers, of ammunition, of ground transportation, of air fields, and of course, air transportation."

The lack of cannoneers was solved by the new, lighter weight howitzers and new shell and fuse combinations. Two cannoneers per section could be easily cut.

The lack of ammunition was another matter as was the lack of ground transportation for the batteries' logistic needs. But, as 1LT Ely deduced, "Either of these shortages can be solved by more planes, of course."



"Lack of airfields and ground transportation has many remedies with this light howitzer. From wherever it lands, it can be carried by a light truck or towed behind a light passenger car.

"The regions where there are no practicable landing fields, natural or artificial, and no cars or trucks of any kind obtainable are in the minority of our probable future theaters of operation.

"And, even in such regions, experiments will likely prove that guns and crews can be dropped by parachute, and then the men can pull these guns for considerable distances. We expect to make the two latter experiments in the near future."

If CPT Tisdale or 1LT Ely ever took part in the "airborne" experiments, this writer does not know. We do know that the United States and Great Britain did not get involved in airborne testing until 1935, after the Union of Soviet Socialist Republics' successful parachute maneuvers near Kiev.

Although the news of the Russian airborne maneuvers created quite a ferment among military theorists in the United States and Great Britain, it did not have any lasting results.

"Interest in both countries centered more on air transportation or airmobile operations—moving troops and equipment by air to already secure landing fields." Airborne, by Charles MacDonald, Ballantine's Illustrated History of World War II,

Book No.12.

The 2d Field Artillery did take part in another airmobile operation in February 1933. This time, the entire battalion was moved across the Isthmus of Panama by bombers and transports protected by 29 pursuits and 12 observation aircraft. On this occasion the battalion, ...

"In 6 hours.... made two changes of position going 30 miles each and was able to execute a fire mission at each position." Transporting the 75mm Howitzer by Plane. CPT William P. Merry, F.A. (ORC), Field Artillery Journal, volume 23, pp. 343-345, 1933.

Thus, began America's airmobile concept. Its future was uncertain; not through a lack of imagination, nor technology, but rather characteristically through interservice rivalry. The critical question was who would have control of the aircraft?

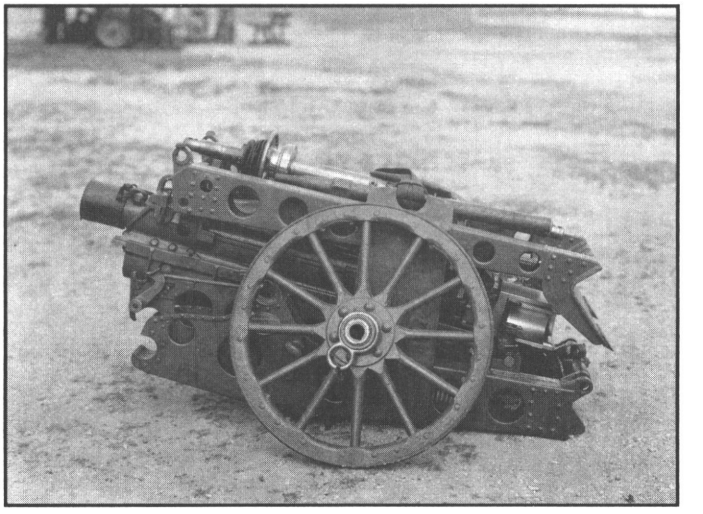
Naturally, the Army Air Corps felt they should command any airmobile operation, the Artillery deemed it their show, and even the Corps of Engineers made a bid of power. Meanwhile, the Germans created an airborne division.

Where did the Germans get the idea for their airborne or airmobile units?

We know that the German Military attache to Moscow wired a report to Berlin upon witnessing the Russian Airborne drop of 1935. As for airmobile operations, the Germans had been watching the United States and Great Britain closely.

In a letter to the U.S. Army Aviation Museum, Fort Rucker, AL, referring to the Airmobile experiment, LTC Pierre Tisdale (ret), CPT Tisdale's son, recollects...

"Only a few of the participants realized what they had been part to.... It was noticed, however, that a number of German 'tourists' arrived a few months later to inquire into it (the airmobile experiment)."



# TQM

**Mr. Samuel B. Hayes**
TEXCOM TQM Coordinator
U.S. Army Test and Experimentation Command
Fort Hood, TX

One of the most significant aviation acquisitions in the last several years has been the AH–64 Apache helicopter. Before the decision was made to go into full–scale production of the Apache, however, it had to be operationally tested. For this to be done, an Outline Test Plan (OTP) had to be prepared estimating the cost of resources necessary to run the test.

As money becomes tighter, estimates have to be more and more exact. Any changes necessary after the OTP has been developed create problems for everyone involved in the process. A group of U.S. Army Test and Experimentation Command (TEXCOM) employees recently came up with a "pat" answer to make the cost estimates of conducting tests more exact.

A quality management committee (QMC) formed a process action team (PAT). The PAT analyzed the OTP cost–estimation process and recommended recommendations for improvement. The PAT, chaired by a military plans analyst, consisted of operations officers and test officers from various TEXCOM test directorates.

To improve the OTP process, the PAT developed a detailed flow chart of the existing process. After completing the flow chart, the group began to analyze it in detail, paying particular attention to endless loops, redundancies, and gaps.

They brain–stormed how the process should work and then they investigated methods for streamlining the entire process. Consensus was even–tually reached on how each part of the process fit together, which actions could be eliminated, which actions could be improved, and how the entire process should be done.

At this point, the PAT briefed the QMC on their progress. Convinced that the work was worthwhile and that significant improvement could result, the QMC directed the PAT to continue.

The PAT then determined what changes would be necessary to implement their recommendations. They decided which directorates would be impacted by the changes, and how best to communicate the changes recommended.

The result was a detailed "guidance" memorandum, for each affected directorate. The memorandum indicated the necessary changes, the rationale behind those changes, and the benefits that would result in the changed process.

After a second and final briefing to the QMC, which supported the PAT's recommendations, the group briefed the Executive Steering Council, chaired by TEXCOM's commanding general. The council also supported the recommendations. TEXCOM's chief of staff was directed to implement the changes and provide the PAT with periodic updates.

The OTP PAT effort took almost a year to complete. The results will affect numerous people for years to come.

The moral of the story is this: If you need a quick decision on a simple process, make it. But if you have a complex process involving many people and different functional areas, TQM is the perfect way to solve the problem.

**Test and Ex–perimentation Command**

**Readers may address matters con–cerning test and experimentation to: Headquarters, TEXCOM, ATTN: CSTE–TCS–PAO, Fort Hood, TX 76544–5065**

# YOU, AVIATION LAW, AND AN AVIATION TRADE SECRET

**Mr. Terry Van Steenbergen**
Air Traffic Control Specialist
Airspace Support Division
U.S. Army Aeronautical Services Agency
Cameron Station, Alexandria, VA

Lieutenant (LT) Snuffy's platoon needed some night convoy training. During the driver's briefing, LT Snuffy told the drivers to use blackout lights and described the route, which included 5 miles of Autobahn training. The platoon sergeant's vehicle, with a flashing yellow light, was to follow the convoy...but that vehicle had maintenance problems and became disabled before the convoy reached the Autobahn. A Porsche, traveling at only 120 kilometers per hour, crashed into the trail deuce and a half truck.

Were those lawful orders, issued by LT Snuffy, for the platoon to drive with blackout lights on a public road? Was LT Snuffy at fault for operating unlighted vehicles on the Autobahn, operating without a convoy clearance, and failing to ensure adequate safety measures? Did the U.S. Army have to settle an expensive law suit? You can fill in the details and the answers...this is fiction.

LT Snuffy's older sibling, Major (MAJ) Snuffy, is an Army aviator. MAJ Snuffy's unit needed some *night vision training*. Major Snuffy directed the position lights be covered on the four aircraft the unit would fly. The trail ship was to have its rotating beacon on until the flight reached the training area...but the light malfunctioned as the flight lifted into the night sky. Somewhere on the downwind departure, a Cessna 210 crashed into the trail aircraft. The accident investigators found the covered position lights on the Army aircraft the next morning. Did the U.S. Army have to settle a large law suit? You can supply the details...this is fiction again.

The point of both stories is that, as military members, you may be subject to local laws as well as Army regulations (ARs). Even in a combat theater, portions of your flight may be governed by local laws beyond ARs. Specifically, when you fly, there are laws, international rules, or host country procedures that apply to Army aircraft. ARs govern only a portion of your activities.

When you fly, what laws apply to you? It depends on the country in which you are operating...but you better find out! Check out AR 95–1, paragraph 5–1, for a start; however, more Federal Aviation Regulations (FAR) apply to Army aviators than just FAR Part 91.

We will address only the U.S. laws in the remainder of this article; however, the Commander, U.S. Army Aeronautical Services Detachment, Europe, or the Eighth U.S. Army Air Traffic Control (ATC) Office, Korea, can assist you in determining laws for operations in their part of the world. We will lump the terms law, rules, and FAA orders under the term "law" for this article even though there are technical legal differences.

Did you know—

• When you are looking at an instrument approach chart, you are reading a law? (See Code of Federal Regulations (CFR) Title 14, Part 97.20)

• Criteria are specified for an aircraft's position lights to illuminate the aircraft? (See CFR Title 14, Part 27.1385 through 27.1397)

• When that civil airport person is trying to charge you a $20.00 landing fee, and the crew only has $12.00, including the quarter you found lying in the chin bubble, you may not be required to pay? And it's not because you're broke...(See CFR Title 14, Part 152, appendix D, paragraph 26).

• We changed from writing FAR Part 91 to using CFR Title 14, Part...whatever? You're saying to yourself, I have never heard of these references. Well, it is time to share the first part of an aviation trade secret with you. Use the CFRs to stay ahead of the changes to the flying regulations.

What are the CFRs and how do they work? Here is the short, overly simple answer. The CFRs are rules that supplement the more formal law. Most of these rules have the force of law. When the Federal Government wants to impose a rule on the public (someone/you), the government agency with authority over a group of like rules begins rulemaking action. The Federal Aviation Act of 1958 lets the Federal Aviation

Administration (FAA) make laws that affect aviation. We will use the FAA as the example to explain how the CFR process works. For example, the FAA (at someone's request) proposes a rule in the Federal Register. This process gives citizens and other government agencies the opportunity to comment. After the comment period, the FAA reviews and considers the comments. If no changes are made to the proposed rule, the rule becomes final and is printed in the Federal Register. When the rule becomes final, you are expected to follow the rule after the effective date. The rule is then printed in the CFR sometime within the next year.

But, wait a minute...something is a little funny here, you say to yourself...I'm expected to follow the rule before it is published in the CFRs (or I receive the change in the mail)?

Yes! You sure are. You must comply with applicable rules from the rule's effective date published in the Federal Register.

Here is more of the trade secret. In your installation's Judge Advocate General (JAG) office law library, you can find about five bookshelves filled with the CFRs. They are easy to spot because they have colored paperback spines. (The 1992 issue has an aqua blue spine and 1993,a purple spine.) If you can't find the CFRs, ask someone in the library for help. Once you have found the CFRs, then look for Title 14. The number 14 is in the middle of the spine. Immediately below the number 14 are the parts contained within each book.

Okay, now you are looking at Title 14. What do you do with it? It depends on your interests. For example, an Army aviator could be interested in the book containing Parts 1 through 59 if the aviator were involved in a flight violation. (Look at CFR 14 Part 13) Or, look in the book containing Parts 60 through 139 where you find the Part 91 for General Operating and Flight Rules. You may be planning a career in airport management after you leave the Army. If so, you will find money for airports can be obtained by using the information in Part 152. However, when you have found the paragraph you think contains the "now I've got that Instrument Examiner" fact of trivia, you're not finished looking for the most current rule.

Now look on the bookshelf for the List of CFR Sections Affected (LSA). It has LSA printed on the spine of the book with the month and year. Normally, it is filed with the CFRs. With LSA in hand, flip to the middle of the book. Find the pages containing **"TITLE 14 — AERONAUTICS AND SPACE"** in bold print. The first part of the Title 14 entries are the paragraphs affected and then the page numbers in the Federal Register where you will find the change. (Example: 91.155.....22456.)

The second part of the Title 14 entries (about half way through Title 14 section) contains the page numbers for proposed rules. Let us say for example: You were looking in Part 91 of the CFR at 91.155. You know it is the paragraph you need to use, but you have to ask yourself the question, Is it current? To answer that question, you then must look in the LSA to see if any changes have been made to 91.155. If 91.155 is listed, you will have to go to the Federal Register page number(s) listed.

Okay, but an entire wall has bookshelves filled with Federal Registers. Those lawyers never throw anything away! How do I find page 22456? No problem, flip to the last page of the LSA (Table of Federal Register Issue Pages and Dates). Figure out the page range where your page number is located. You will have the date for the Federal Register in which to look.

Now you are current...right? Not yet. Here is the last part of the trade secret. The LSA is published monthly. Go to the last Federal Register the JAG office has received. On the last page, you will find a table just like the LSA, except it is for the current month. Look to see if anything was listed for Part 91. Now you are current.

This procedure seems like a lot of hassle to be current. It can be... but, so can a flight violation for operating in Class D airspace without proper approval (or any other violation). Your organization can beat the hassle by sending one person each month to the JAG office to do the research and brief everyone at a standardization or safety meeting. If you can figure this system out, remember, knowledge is power and power is money (in that second career of course).

Other than giving away a trade secret for staying ahead of all the instrument examiners, this article was written to remind you that you are subject to more than just ARs (flying and on the ground). Soldiers need to know they can't walk onto an airliner with an undeclared loaded pistol(Class B airspace) without the proper aircraft equipment and ATC authorization. It does not work to say my military mission required me to break the law.

We hope this helps you find those laws that affect you. You may be required to comply with the laws of the nation you are in, so stay informed of changes to the law. Remember, a lot more is at stake than winning the instrument examiner question–and–answer game.

**U.S. Army Aeronautical Services Agency**

USAASA invites your questions and comments and may be contacted at DSN 284–7773/7984 or write to: Commander, U.S. Army Aeronautical Services Agency, ATTN: MOAS–AI, Cameron Station, Alexandria, VA 22304-5050.

# So You Want To Go To Flight School

ACT NOW! Are you a 93B thinking about applying for flight school? Stop thinking about it and begin your application paperwork. Warrant officer flight training applicants must submit their application packet for boarding at the U.S. Army Recruiting Command before they reach their 29th birthday. Personnel who have already reached their 29th birthday cannot submit an application packet without an age waiver.

The Aviation Proponency receives many age waiver requests each year from some excellent soldiers, but normally disapproves them all. Why? The Aviation Branch needs young aviators for the maximum use and the longest payback. Many commanders and soldiers mistakenly believe becoming an Aviation warrant officer is a reward for outstanding enlisted service. Rewarding soldiers by making them aviators gradually creates an aviation force of older aviators. This situation reduces Aviation Branch selection rates to Chief Warrant Officer 4 (CW4) and CW5 for those who have difficulties in maintaining a Class II flight physical.

Why grant an age waiver to a person who is too old when hundreds of 18– through 22–year-old men and women are competing for the same flight slot? For every 30–year–old person appointed as a WO1, the Aviation Branch loses one young person that could have been selected. The majority of these young people will be able to serve at least 20 years as an Aviation warrant officer, some as long as 30 years.

This may sound unjust but there must be value added to the branch warfighting capability to grant an age waiver. Warrants are now managed by years of warrant officer service, which means a 30–year old WO1 aviator can become a 50–year old CW4 aviator! A little long in the tooth to be deploying to a combat zone as an attack helicopter team leader. This is compared with a 20–year old WO1 aviator who will be a 40–year old CW4 aviator.

The ideal warrant officer flight training applicant is between 20 and 26 years of age. He has an associate degree, a Flight Aptitude Selection Test (FAST) score above 124, a general technical (GT) above 115, and is in good physical condition.

If you are too old to become a warrant officer aviator, or your vision is 20/50 or better, you may want to consider applying for Officer Candidate School (OCS). The age limit for OCS is 35. Upon graduation from OCS you will have to request an exception to the 30–year age limit in AR 611–110, ***Selection and Training of Aviation Officers.***

**Aviation Proponency Office**

Readers may address matters concerning aviation personnel notes to: Chief, Aviation Proponency Office, ATTN: ATZQ–AP, Fort Rucker, AL 36362–5000; or call DSN 558–5706/2359 or commercial 205–5706–2359.

# Allied Shops AIT Graduate and The Field Commander

**Major Richard R. Caniglia**
Director, Department of Aviation Trades Training
U.S. Army Aviation Logistics School
Fort Eustis, VA

Field commanders want advanced individual training (AIT) to produce journeymen mechanics. The schools are chartered and resourced to produce apprentices. This situation does not help the unit commander much, especially when he has only one person in a 68–series military occupational specialty (MOS) and that person is fresh from AIT. What do we do when circumstances in the field foul up the carefully planned training strategies of the U.S. Army Training and Doctrine Command, Fort Monroe, VA? What are our options? And how can the field help?

The school can do two things for the commander. First, we can make the training as relevant as possible. We can change with the changing needs of the field. Second, we can find ways to increase the flexibility of the soldiers we are graduating. We are trying to do both.

Our primary mission is to meet the needs of the field. To do that we need to teach what the field needs. We need to teach as much as possible to the greatest proficiency possible. But it starts with knowing what the line unit commander needs.

We have a problem here. Line unit commanders refuse to tell us what they need. Our surveys do not get answered. Our phone calls go unreturned. It is probably one of the few times when an entire population has refused the opportunity to do what legend has it soldiers love to do—complain. Without this input, trainers are flying blind and commanders are along for the ride.

The Department of Aviation Trades Training has a program called Field Link. We will call you if you will take the time to talk with us about our product and your needs. This is better than Ross Perot's town hall meetings because we can actually change things!

The second thing we can do is strive to increase the flexibility and knowledge retention of our AIT graduates. The most promising ideas involve an emphasis on basic theory, knowledge, and skills, and away from teaching isolated, discreet tasks. The hope is that with enough grounding in the basics, a soldier will be able to work on any item if given the manual and tools. The knowledge and skills should transfer.

The payoff for the unit is a soldier who progresses more quickly from apprentice to journeyman, who is more useful, and who does not forget tasks because they have not been practiced recently. For example, a powerplant repairer trained in the new way should be able to inspect the hot end of a CH–47 Chinook engine even if he has been working on nothing but OH–58 Kiowa engines in the 6 months since graduation from AIT. We believe this approach encourages development of diagnostic skills. With the Stock Funded Depot Level Repairable program in full swing, commanders should welcome this approach.

Trainers universally want to support the field. We would like to produce journeymen. But we have not found a way around the one hurdle that circumscribes everything we do: people only learn so fast. We can convey only so much information in a day before the human brain quits. While comprehension occasionally dawns like a flashbulb, it normally grows like a plant.

The technical skills schools teach require practice, practice, practice before the brain–hand–memory link is firm. Much of the knowledge that distinguishes a journeyman from an apprentice requires experience before it will be comprehensible. The AIT student is not ready for anything beyond the basics, at least not in the time we have. We could bring an AIT student much closer to being a journeyman if we kept them in school much longer. We could give them much more experience. But commanders probably would find their increased personnel shortages less desireable than an apprentice in hand.

The school cannot change how quickly people learn or improve near–term personnel fill, but we can, with your help, make sure we teach what you need. We are trying hard to give you a soldier with flexible skills tailored to your needs. To do this, we must have your thoughts and ideas. My mission is to train soldiers and to champion the needs of the field.

**U.S. Army Aviation Logistics School**

**Readers may address matters about aviation logistics to: Assistant Commandant, U.S. Army Aviation Logistics School, ATTN: ATSQ–LAC, Fort Eustis, VA 23604–5415**

# Army Air Traffic Services During Operations Desert Shield/Desert Storm

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The Army air traffic services (ATS) buildup in theater began on 8 August 1990 with the arrival of elements from the 1st Battalion (Bn), 58th Aviation (Avn) Regiment (Regt). The 29th Air Traffic Control (ATC) Group (Gp) deployed on 31 December 1990. The ATS in theater reached its peak on 15 January 1991, with the arrival of the 3d Bn, 58th Avn Regt, to support the 1st Infantry (Inf) Division (Div).

The ATS facilities and elements established critical operations throughout the theater. They set up ATC towers at Jubail Airport and King Fahd International Airport (KFIA), and airspace liaison elements to work with the proper airspace coordination elements. ATS elements also set up a flight operations center (FOC) at XVIII Airborne (ABN) Corps Main.

When all assets of the 1st Bn, 58th Avn Regt, arrived in theater, the battalion supported the 1st Cavalry (Cav) Div, 24th Inf Div, 82d ABN Div, 101st Air Assault Div, and XVIII ABN Corps. The 3d Bn, 58th Avn Regt, supported the 1st Armor Div, 1st Inf Div, 3d Armor Div, and VII Corps.

The 29th ATC Gp provided echelons above corps (EAC) staffing for airspace management, planning, and theater–level staff supervision of the assigned ATC battalions. ATS augmentation of U.S. Army Central Command (USARCENCOM) main G3 aviation section began after the arrival of the Group liaison personnel. This section was augmented to coordinate Army airspace command and control ($A^2C^2$) and other ATS matters. Shortly before the ground offensive (G–Day), the 29th ATC Gp provided one ATS representative to augment each shift of the $A^2C^2$ cell in the battlefield coordination element (BCE) of the tactical air control center (TACC).

When rotary–wing operations increased dramatically near King Khalid Military City (KKMC), five personnel from the Group augmented the G3 aviation cell at KKMC to handle aviation, ATS, and airspace matters. The Commander, U.S. Central Command Air Force (COMUSCENCOMAF), was the airspace control authority (ACA) within the USARCENCOM area of operation (AO). The ACA integrated and coordinated airspace usage within the joint AO.

Subject to the authority of the Commander, USARCENCOM,

COMUSCENCOMAF established broad policies and procedures for airspace control operations and for coordination, as required, among units operating in the AO. In January 1991, these policies and procedures were published as the COMUSCENCOMAF Air Defense and Airspace Control Procedures for Operation Desert Shield. Changes were published as needed.

The basic document of airspace control procedures was supplemented by the air tasking order (ATO), which included the special instructions (SPINs) and airspace coordination order (ACO). Published weekly, the SPINs made up the last section of the ATO. The ACO was chapter 10 of the SPINs. The ATO contained mission numbers and assigned mode two and mode three transponder codes to ensure proper aircraft identification for air defense purposes. The SPINs contained mode one transponder codes; radio frequencies for the Airborne Warning and Control System, airborne battlefield command and control center, and other air traffic and airspace controlling agencies; and authentication codes. Army airspace users and planners did not have timely access to those documents because of the distribution system for the ATO, SPINs, and ACO.

The U.S. Central Command Air Force (USCENCOMAF) used the computer–assisted force management system (CAFMS) as its primary means of distributing the ATO, SPINs, and ACO. The U.S. Air Force (USAF) units had access to those documents through their CAFMS terminals, which they also used to report flight mission information back to the TACC. In that manner, CAFMS served as a two–way communications system for missions and airspace. Although all airspace users required timely access to the documents maintained in CAFMS, they did not have it.

Army airspace planners encountered problems with elements that did not have ready access to CAFMS terminals. These elements were forward–deployed, fixed–wing and helicopter units and EAC units operating from fixed–based locations. The corps airspace cells had access to CAFMS terminals through their supporting air support operation center, but they were often far removed from their aviation units. Except for the 2d Military Intelligence Bn at Al Qaysumah, no Army Aviation unit had its own CAFMS terminal.

Vital mission data were obtained through secondary sources; for example, mode one and two transponder codes, time on target/station times, special electronic mission aircraft tracks, and air transit route approval. Army aircrews went to USAF units, if they were collocated, to gain access to CAFMS. In some cases, they were denied access because priority of use belonged to the USAF.

From debarkation day forward, the daily ATO with the SPINs and ACO totaled more than 800 pages. The mass of material made existing alternative distribution systems an impractical source for necessary information. For instance, distribution by courier was tedious and slow. Often Army Aviation units used any means possible to obtain either hard copies or computer disk copies of the ATO, SPINs, and ACO. Because of out–of–cycle changes, some pertinent mission information was not obtained until after mission windows had been missed. Noncompliance with changes placed aircrews and aircraft in danger; not reporting through the system resulted in some airspace requests being rejected. The $A^2C^2$ information distribution system did not always work for Army airspace planners and coordinators.

The USARCENCOM policy initially was set up for airspace control measures. It required the corps to submit requests for these measures to USARCENCOM G3 Aviation for approval and coordination with the USAF. G3 Aviation reviewed all requests for accuracy. It used the USAF combat airspace deconfliction system (CADS) software to determine if a particular request conflicted with other planned airspace measures. Any problems detected were resolved with corps before requests were forwarded to the BCE $A^2C^2$ cell for coordination with the USAF. A CADS disk containing the most recent airspace control measures was obtained daily from the USAF.

After a trial period of about 2 weeks, the USAF determined that producing a copy of the CADS disk was too time consuming and the practice was stopped. Corps airspace requests were checked simply to ensure that they were complete and then were forwarded to the BCE for coordination. The BCE checked the requests against existing and planned airspace control measures using the CADS. The BCE then approved or disapproved them based on that evaluation. The BCE notified USARCENCOM G3 Aviation when the requests were approved or disapproved.

G3 Aviation then relayed the decision to the corps, giving an explanation when a certain request was denied. This approval cycle or procedure was workable, but it added time to the process and slowed the flow of information, mission response time, and coordination. G3 Aviation recognized the problem and authorized the corps to coordinate directly with the BCE. Direct coordination substantially improved the information flow and mission response time.

It was anticipated that EAC airfield requirements would exist at Thumamah, KKMC, and KFIA. The one doctrinal communications zone (COMMZ) company in the force structure was not organized to provide en route facilities. To support

USARCENCOM EAC requirements, three ATC platoons (forward) and an ATC company (forward) headquarters were requested through the U.S. Army Forces Command. By the time those assets arrived in theater on 3 and 4 February 1991, requirements had changed.

As the corps closed on their assembly areas along Tapline Road, all organic ATC assets closed with them. The XVIII ABN Corps established flight coordination centers (FCCs) at Rafha Airfield, Logbase Charlie, and after some delay, assembly area Whiskey.

The VII Corps initially established a FOC at Logbase Echo and an FCC at Al Qaysumah. Up to that point, corps ATC assets had provided limited communications coverage between Dhahran and Rafha.

To fill communication voids, EAC assets were deployed with three ATC platoons. The 416th ATC Platoon (Arizona Army National Guard ARNG)) covered West Heliport in Dhahran, the port at Dammam, and forward operating base Bastogne. The 150th ATC Platoon (Vermont ARNG)) set up at Iraqi Pumping Station (IPS) 3 and Riyadh South. The 49th ATC Platoon (Texas ARNG) operated Hell On Wheels Airfield at KKMC. Some overlap of operations by units was achieved.

To minimize operational changes, assigned radio frequencies for the FOC and FCC facilities remained with the geographic location, not with the units. The corps assets were then used to cover corps rear areas and to stand by for contingency missions.

After offensive operations were halted, XVIII ABN Corps moved back into AO Dragon, northwest of KKMC along Tapline Road. The VII Corps assumed responsibility for the XVIII ABN Corps area, and the 3d Bn, 58th ATC Bn, was committed heavily in support of the II Corps. To meet its commitments, the 3d Bn, 58th Avn Regt, requested that EAC ATS assets assume responsibility for the FCC at Al Qaysumah when the platoon operating there moved out with the 1st Cav Div. Because of a lack of traffic at IPS 3, the FCC van from IPS 3 was moved to Al Qaysumah.

In Operation Desert Storm before G–Day began, the circumstance that created airspace problems was a vast majority of the sorties that were allocated to battlefield air interdiction (BAI) or air interdiction (AI). Minimal close air support (CAS) sorties were allocated to the corps. To open up the largest number of targets to AI and BAI sorties, the fire support coordination line (FSCL) was set at the Saudi Arabia–Iraq border. The USCENCOMAF aircraft could then freely engage planned target areas.

A conflict arose when 1st Cav Div planned to conduct an artillery raid. Because of the difficulties encountered in executing the raid, the planned block time for the raid was missed. Airspace control measures had to be extended, causing the cancellation of BAI missions. When a second request was made to extend the block time for the artillery raid, the request was denied. It was then that attention was focused on counterbattery operations. The VII Corps wanted to ensure that it could conduct immediate counterbattery operations without restriction. Would the operations endanger the USCENCOMAF aircraft?

Guidance established in these doctrinal publications was not specific enough about fire support operations: Field Manual (FM) 100–28, ***Doctrine and Procedures for Airspace Control in the Combat Zone***; FM 100–42, ***USAF and U.S. Army Airspace Management in an Area of Operations***; and FM 100–103, ***$A^2C^2$ in a Combat Zone***. The manuals address fire support operations in general terms. These statements sum up their treatment of the subject—

• The highest probability of conflict between aircraft and surface–to–surface indirect weapons fire occurs at relatively low altitudes in the immediate vicinity of firing battery (platoon) locations and target impact areas.

• The close interface between the fire support element and the $A^2C^2$ element ensures that planned artillery fires are routinely coordinated with air operations and planned air activities are coordinated with ground operations.

The first statement is essentially the big–sky, little–bullet theory. The second applies mostly to CAS and where AI and BAI sorties are restricted to a few corridors while transcending corps areas. Neither statement anticipated the intensity of the AI or BAI campaigns during Operation Desert Storm. Because of the sheer number of aircraft sorties, corridors were not used in Operation Desert Storm.

After careful consideration, procedures to avoid conflict were developed. In its final form, the proposal identified a block of airspace to be reserved for artillery fire. This airspace extended from the corps rear boundary to the FSCL and from the surface to 20,000 feet. Any preplanned fires exceeding the ceiling of 20,000 feet required coordination. However, counterbattery fires by multiple launch rocket systems would be fired immediately without coordination. The CAS sorties would avoid conflict from corps artillery by the air support operations center (ASOC) working with the corps fire support coordination center (FSCC). The AI sorties would climb to a minimum altitude of 20,000 feet before the corps rear boundary until past the FSCL. The same flight profile would be maintained on the return trip.

Before the proposed procedure was implemented, the ground attack was launched. The requirement for the procedure was overtaken by events. The FSCL was moved out to the normal distance from the forward line of own troops (FLOT). With the start of the

ground campaign, the focus of the air campaign became CAS. Close coordination with the FSCC for CAS aircraft movement through the corps was effected by the ASOCs. The impact of artillery on AI and BAI was minimized.

The deep attack presented a similar problem for airspace management. The corps conducted aerial reconnaissances and attacks that went as far as 100 nautical miles beyond the FLOT. Airspace control measures were requested to protect the aircraft during the conduct of those attacks. For lack of a more appropriate title, the control measures were called restricted fire areas. The control measures encompassed the entire flight route and engagement area, if required, from the surface up to as high as 2,000 feet above ground level.

Initially, these deep attacks went well beyond the FSCL and the requested airspace control measures conflicted with the USCENCOMAF BAI and AI sorties. This was particularly true when deep attack missions were delayed or rescheduled. Differences in planning cycles came into play. The USCENCOMAF uses a 72–hour planning cycle, whereas the corps normally uses a 12– to 24–hour cycle but occasionally plans 36 hours out. The USCENCOMAF approved the requested airspace control measures but canceled or reallocated the sorties.

After much discussion, the airspace management personnel suggested that the deep attack be coordinated completely by the corps deep attack cell. The deep operation representative aboard the airborne battlefield TAAC would ensure the resolution of conflicts between Army rotary–wing deep attack operations and AI and BAI sorties. Once the necessary coordination was done, airspace control measures were not required.

Another issue that surfaced during Operation Desert Storm was the ATS command relationship. Doctrinal theater ATS structure would be an ATS group at theater level with an ATS battalion in direct support of each corps in theater. A communications zone (COMMZ) ATS company would be assigned to the group in general support of EAC units. In the draft ATS doctrinal manual, the theater ATS signal support company also would be assigned to the group.

The normal higher headquarters during peacetime for the 1st Bn, 58th Avn Regt, is the 18th Avn Brigade (Bde). That command relationship was maintained during the deployment of the 1st Bn, 58th Avn Regt. In Europe, the 3d Bn, 58th Avn Regt, supports V Corps and VII Corps. Therefore, it is assigned to Headquarters, U.S. Army, Europe. For deployment to Saudi Arabia, the 3d Battalion, 58th Avn Regt, was attached to the 11th Avn Bde.

After consulting with the USARCENCOM G3 Aviation, the Department of the Army (DA) survey team recommended that corps commanders retain direct command and control of ATC battalions. It also recommended that direct EAC command supervision be considered if the complexity of theater airspace increased to a point that command of the ATS battalions at corps level did not meet theater ATS requirements. As a result of these recommendations, the command relationships of the battalions to the corps remained unchanged when the 29th ATC Gp arrived in theater. Initially the 29th ATC Group was to be assigned to the 2d Avn Bde or the Theater Avn Bde. However, it was decided that the Group was to be attached to Headquarters, USARCENCOM.

The alignment of the ATC battalions under the corps made them unresponsive to EAC ATS requirements. Initially, there were no EAC ATS units in theater and the corps ATC battalions had to be tasked to fill the void. The battalions' first priority was to support the corps, and other tasking took second place. The responses to tasking were not timely, as in the case of the establishment of an FCC at Logbase Whiskey by the 1st Battalion, 58th Avn Regt. A theater ATS system proved difficult to establish, but the ATS battalions did meet corps requirements.

The EAC ATS requirements, previously mentioned, were met with one ATC company headquarters and three corps/division support platoons. The company headquarters was attached to the 29th ATC Gp, and the platoons were attached to the company. For those units, the Group performed the function of a battalion headquarters.

The Group headquarters was located in Eskan Village, southeast of Riyadh. The majority of the ATS assets in country were set within 30 miles of the Saudi Arabia–Iraq border, essentially along Tapline Road. For the best access to tactical ATS equipment, the 256th Signal Support Company established operations at KKMC, where it would have access to Class IX accounts. The 256th was attached to the 2d Avn Bde for command and control and logistical support.

The doctrine governing the employment and command and control of Army ATS must be closely scrutinized. The scope of the ATS group mission should be clearly delineated. Does it command and control all Army ATS assets in theater, or does it command and control EAC assets only and just monitor corps ATS elements? Is the method of employment area support or unit support? These questions need to be evaluated closely in conjunction with the newly developed ATS mission statement.

In conclusion, Operations Desert Shield/Desert Storm were the Army's first opportunity to employ $A^2C^2$ doctrinal principles in a multicorps theater of operations. The lessons learned were numerous; some

situations could have been anticipated while others were either unforeseen or unique to Southwest Asia. The extraordinary distances, climate, terrain, and communication connectivity were all key factors in the employment and effectiveness of ATS assets. Other problems were the lack of real–time access to the ATO, SPINs, and ACO and the inability to efficiently support combat changes. These situations underscored the need for the development of a unified data distribution system accessible by all airland battle components. Future joint doctrine must be very explicit about fire support operations. The doctrine must ensure that the corps commander has control of enough airspace to rapidly bring to bear all weapon systems at his disposal.

Finally, state–of–the–art equipment for secure and nonsecure communication and data transmission is a must if ATS is to assist in facilitating the maximum unimpeded use of airspace. This equipment is needed to provide highly mobile, forward support that meets the needs of commanders across the scope of operations.

**U.S. Army Air Traffic Control Activity**

Readers may address matters concerning air traffic control to: Commander, USAAVNC, ATTN: ATZQ–ATC–MO, Fort Rucker, AL 36362-5265.

## U.S. Army Class A Aviation Flight Mishaps

| Fiscal Year | Number | Flying Hours | Rate | Military Fatalities | Total Cost (in millions) |
|---|---|---|---|---|---|
| FY 92 (through 30 April) | 14 | 731,928 | 1.91 | 6 | $57.6 |
| FY 93 (through 30 April) | 22 | 733,996 (estimated) | 3.00 | 21 | $85.7 |

Major General Dave Robinson
and
Command Sergeant Major Fredy Finch Jr

# Stripes on the Flight Line—Revisited

Technical/Leadership Tracking and the Stripes on the Flight Line initiatives are two extremely important, but inseparable, issues within the enlisted Aviation community. Daily, we are increasing our use of technology, as evidenced in our expanding fleet of modernized aircraft. To keep pace with technology while maintaining our readiness, it is imperative we keep qualified and experienced technicians on the flight line.

Historically, this created a paradox when leadership positions were the foundations for promotion opportunity. Technical/leadership tracking is a change in personnel management philosophy that will support both a technical track and a leadership track.

Stripes on the Flight Line supports implementation of the technical track by retaining our most experienced soldiers in aircraft maintenance roles. While it is simple to explain our intent, the process to implement it is complex. This is largely due to Department of the Army (DA) Standards of Grade (SGA) requirements, which are designed to ensure full promotion opportunity. It is also due to the current processes used by DA centralized selection boards for promotion.

Army Regulation 611–1 and the Guide for Preparation of Changes to the Military Occupation Classification Structure (MOCS) describe SGA requirements. These SGA requirements are symbolized through a personnel management pyramid. The pyramid depicts a balance of requirements within a MOCS to support competition and opportunity for promotion at a rate consistent with other MOCSs within the Army. It ensures we don't have more sergeant first class (SFC) requirements than we have staff sergeants (SSGs), and we don't have so few SFC requirements that promotion is too difficult.

There are other considerations for authorizations, like doctrinal and operational requirements, but the SGA is the primary personnel consideration. Realistically, it is too difficult to match any MOCS exactly to the pyramid, but we use it as a guide to monitor or merge existing MOCSs, or to create a new MOCS.

DA is reluctant to approve MOCS authorizations that deviate significantly from the ideal pyramid, as they affect promotion opportunity. All soldiers should have a fair chance for promotion. In any MOCS, there may be too many personnel in a given grade competing for too few positions in the next higher grade. If so, soldiers will not be promoted at the same rate as in other Army MOCSs. It is important to ensure there is a logical methodology to match the needs of the Army with promotion opportunities.

Another problem develops as we phase craft out of the inventory. OV–1 Mohawk–, UH–1 Iroquois–, and AH–1 Cobra–related MOCSs have experienced this. Reductions to the fleet, as we modernize these systems, reduce the number of authorizations for related MOCSs and, thus, reduce the promotion opportunity for those soldiers. We are reducing the Mohawk, Iroquois, OH–58 Kiowa, and AH–1 Cobra vintage aircraft and are introducing the family of modernized aircraft, specifically the UH–60 Black Hawk, AH–64 Apache, RAH–66 Comanche, OH–58D Kiowa Warrior, and the D model CH–47 Chinook. As we do so, great care must be placed on developing a personnel plan designed to transition these soldiers into other compatible MOCSs that will continue to offer promotion opportunities in the future. This plan must be initiated well in advance of aircraft introduction to allow proper personnel management integration.

As Army Aviation transitions from numerous airframes to a few modernized aircraft, we must develop a vision for aircraft maintenance. These visionary efforts must apply not only to our modernized aircraft, but also be flexible enough to ensure maintenance personnel focused on the nonmodernized aircraft can transition their invaluable skills to meet the future needs of Army Aviation.

Now back to Stripes on the Flight Line. We have to be careful in this process as well. If we simply authorize SSG crewchiefs, instead of specialists or sergeants, we may not solve the problem. We will create a demand for SSGs, and sergeants will get promoted, but it will only increase the rank on the aircraft, not the experience. This move could also create a flood of SSG authorizations, making promotion to SFC difficult. This dramatic change in the SGA will not benefit the soldier or the Army in the long term.

Our Aviation Branch must develop a technical track to allow our senior aircraft maintenance soldiers to remain in aircraft maintenance, while simultaneously remaining competitive for promotion. To remain competitive, competition must be against other technicians. The leadership tracked soldiers must likewise be compared only against other leadership tracked soldiers. Our current single tracked system would not be fair to technical tracked soldiers. Current doctrine allows 85 percent of the 67Z master/first sergeant to work in the leadership arena, and 100 percent of our 67Z sergeants major to work in staff areas of responsibilities. This must either be reversed or, at least, equalled, to keep highly trained and experienced aircraft maintenance soldiers working in aircraft maintenance.

I hope you can now see why the Stripes on the Flight Line initiative cannot stand alone but is intertwined with the Leadership/Technical Tracking initiative. Both will benefit the using unit and the Aviation Branch, but they require simultaneous implementation. Neither of these worthy initiatives can stand alone. They are linked to the reduction in the Aviation MOCS career progression of our enlisted soldiers and focused on maintaining our modernized aircraft, with safety and efficiency in mind.

# Portraits of the

# Warrant Officer Candidates

## What is a Warrant Officer?

A warrant officer is an officer appointed by the Secretary of the Army. The warrant officer is the highly specialized expert and trainer who, by gaining progressive levels of expertise and leadership, operates, maintains, and manages the Army's equipment, support activities, and technical systems for an entire career.

## What is the Mission?

The mission of the 1st Warrant Officer Company is to conduct active Army's only Warrant Officer Candidate School. The 6-week course is designed to transition the warrant officer candidate enlisted status to the rank of warrant officer. However, candidates can progress to the rank of master warrant officer at the Center.

*Major General Dave Robinson, Commander, U.S. Army Aviation Center, addresses the Warrant Officer Candidate Class. More than 500 candidates were appointed to the grade of Warrant Officer One.*

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**Front Cover**

Top: *Major General (MG) Dave Robinson, Commander, U. S. Army Aviation Center, right, and MG (then Brigadier General) Robert A. Goodbary, Deputy Commanding General, promote David Helton to grade of Chief Warrant Officer Five.*

Center: *MG Goodbary, left, and CW5 Helton cut the ribbon to officially open the The Total Warrant Officer Career Center.*

Bottom: *MG Goodbary, left, and CW5 Helton dedicate the plaque to honor the center's new name.*