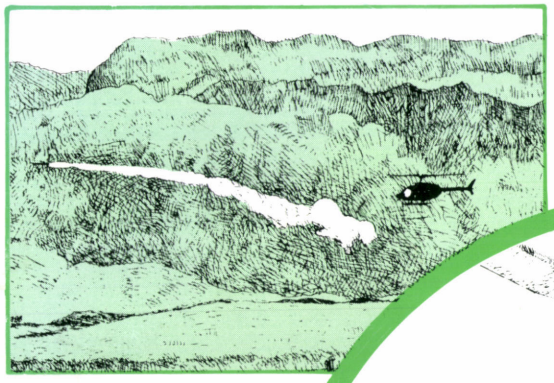
UNITED STATES ARMY

DECEMBER 1988

AVIATION DIGEST



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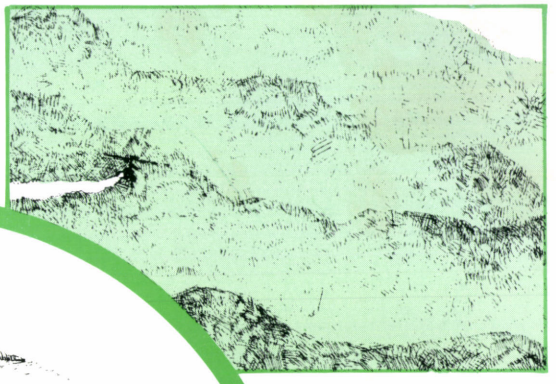
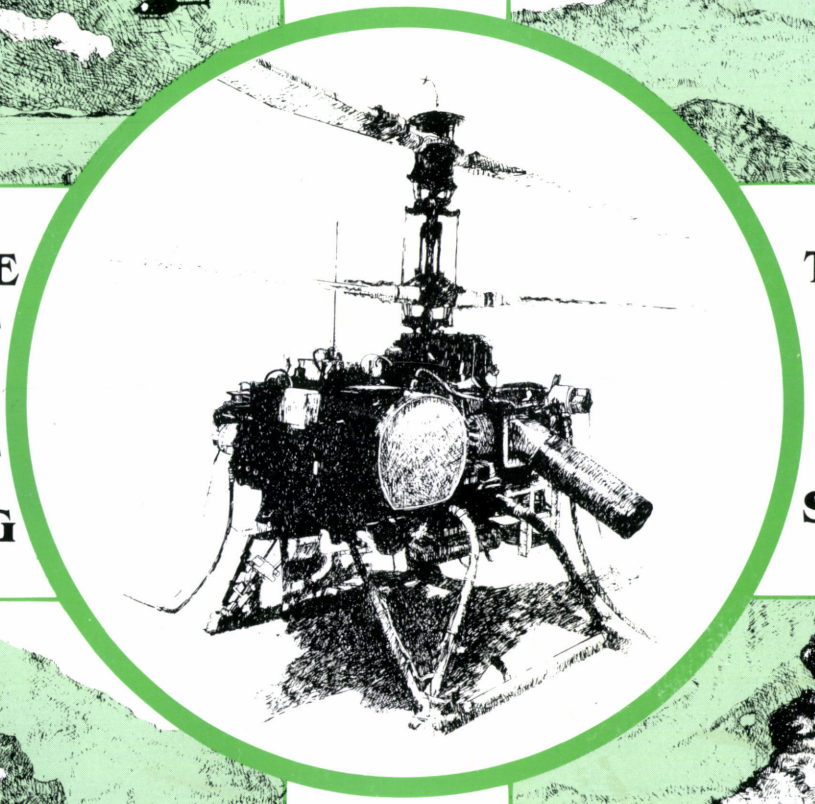


THE SILENT SIDE OF TESTING



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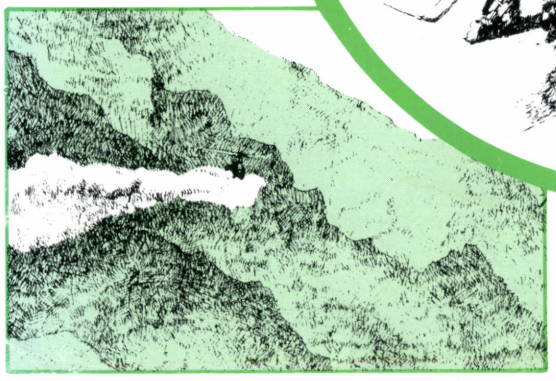

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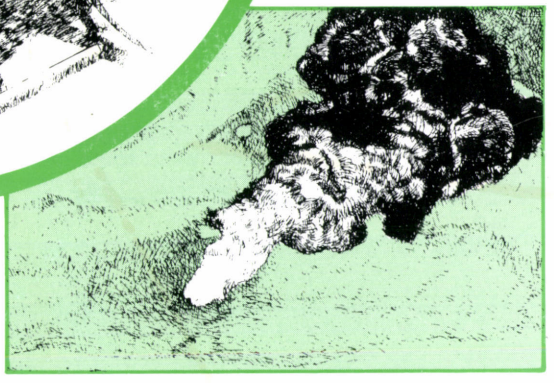

Professional Bulletin 1-88-12

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PROFESSIONAL BULLETIN

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Cover: **Conducting operational testing of a product for reliability, availability, maintainability and durability is the purpose of the U.S. Army Training and Doctrine Command (TRADOC) Test and Experimentation Command (TEXCOM) Aviation Board, Ft. Rucker, AL. This month's lead article, "The Silent Side of Testing," points out the other side of testing—safety—and begins on page 2. Cover sequence is an air-to-air Stinger fired from an OH-58 hitting a drone. Illustration by Jeff Babine. This issue also completes the Army theme for the year with the article, "Army Theme for 1988—Training," and others.**

Major General Ellis D. Parker
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U.S. Army Aviation Center

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The mission of the *U.S. Army Aviation Digest* professional bulletin (USPS 415-350) is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, air traffic control, training and doctrine, maintenance, operations, research and development, aviation medicine and other related data. Information contained in this bulletin does not change or supersede any information presented in other official Army publications.

The *Digest* is an official Department of the Army professional bulletin published monthly under the supervision of the commander, U.S. Army Aviation Center. Views expressed herein are not necessarily those of the Department of the Army nor the U.S. Army Aviation Center. Photos are U.S. Army unless otherwise specified. Use of the masculine pronoun is intended to include both genders unless otherwise stated. Material may be reprinted provided credit is given to the *Aviation Digest* and to the author unless otherwise indicated.

Articles, photos and items of interest on Army Aviation are invited. Direct communication is authorized by writing Editor, *U.S. Army Aviation Digest,* P.O. Box 699, Fort Rucker, AL 36362-5042, or by calling either AUTOVON 558-3178 or Commercial 205-255-3178. Manuscripts returned only upon request.

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Major General Ellis D. Parker
Chief, Army Aviation Branch

Be Careful

AT ONE TIME or another, we have all spoken or heard the words "be careful." Throughout our lives, we are given a long list of "dos" and "don'ts," and most of the don'ts deal either directly or indirectly with safety.

The U.S. Army expends a lot of time, money and manpower to prevent accidents. This is especially true in Army Aviation. Every effort will be made to identify, evaluate and remove or control hazards that can result in death or injury to personnel and damage to equipment.

As the Army Aviation Branch chief, I consider promoting safety as one of my most important functions. Virtually every activity at Ft. Rucker, AL, is involved in some aspect of aviation safety. Take, for example, the user testing and evaluation conducted by the U.S. Army Training and Doctrine Command (TRADOC) Test and Experimentation Command (TEXCOM) Aviation Board.

The primary mission of the TRADOC TEXCOM Aviation Board is user testing of aviation-related equipment, concepts and training programs to ensure they meet the needs of the aviation organization in the field. Safety is an important aspect of user testing. Evaluation of the safety and health characteristics of each item and system is conducted throughout the life cycle of a test. User testing provides assessments of personnel hazards. It also provides conclusions on equipment maintenance hazards or any associated operational hazards inherent in the system.

Data from all tests provide a basis for evaluating safety and health characteristics. Specific safety tests performed on critical devices or components determine the nature and extent of hazards presented by the materiel. In addition, the adequacy of hazard warning labels on equipment is evaluated, as well as the need for warnings, precautions and control procedures to be stipulated in equipment publications.

Provisions are included for an independent assessment of hazards in test directives and test design plans for all user tests. The results of these safety evaluations are published in the final test reports. However, evaluating the safety of the test items is only a part of the responsibility of the Aviation Board. Every precaution must be taken to protect personnel and equipment during the tests.

The TRADOC safety officer provides safety releases that are required for all user tests. After receiving the safety release, TRADOC will begin training test personnel for test execution, maintenance or any activity that is performed by TRADOC personnel.

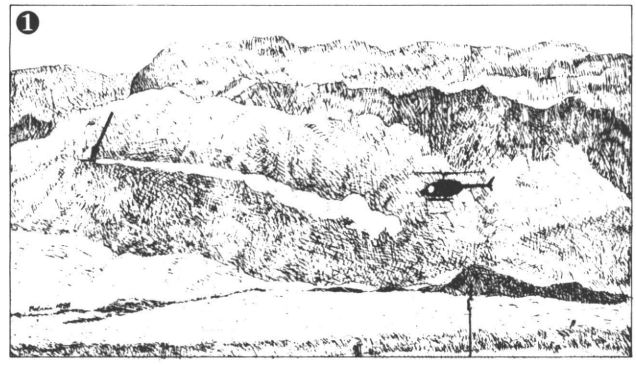
Some of the user tests involve the testing of prototype aircraft or aircraft with modifications. Other tests may require the use of test support aircraft. In any case, an airworthiness release is required before the test begins. Once the requirements for test and test support aircraft are determined, the Aviation Board submits the requirement and the request for the airworthiness release to Headquarters, U.S. Army Aviation Systems Command, St. Louis, MO.

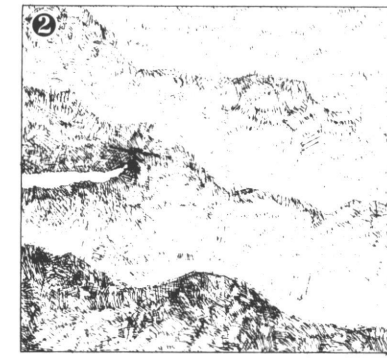
The responsibility for safety and documentation during Aviation Board user testing rests solely with the Board, and it is not taken lightly.

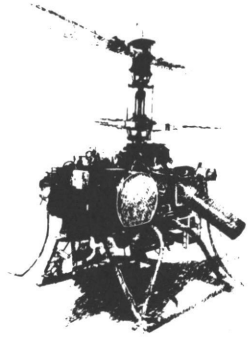
Although organizations such as the Aviation Board are making it easier for us to be safe, we must all take an active role in supporting and promoting the safety programs throughout the Army.

Colonel Gilbert H. Fredrick (Retired)
Former Commander/President
TRADOC TEXCOM Aviation Board
Fort Rucker, AL

RIGHT: Sequence of an air-to-air Stinger fired from an ON-58 hitting a drone.
BELOW: Drone used in testing.





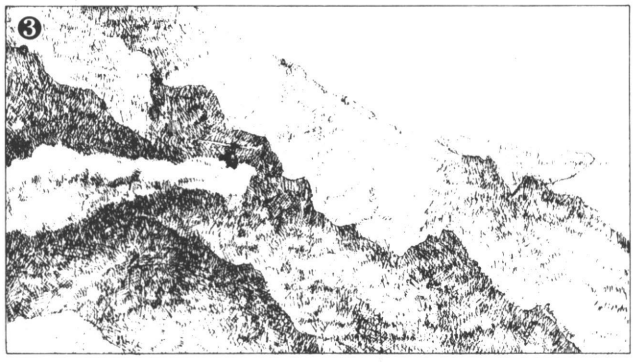


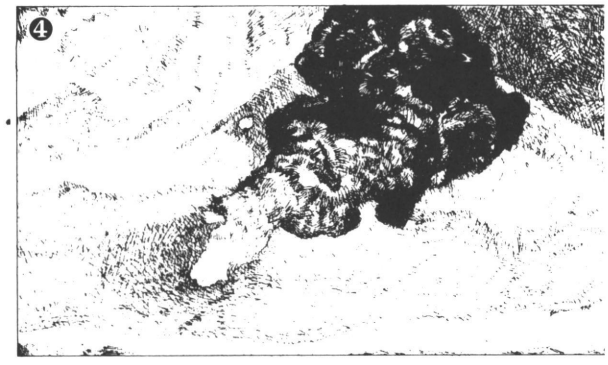
the Silent Side of Testing

Test activities are naturally concerned with such characteristics as the performance; reliability, availability, maintainability and durability (RAM-D) of the product being tested; but what is their attitude toward an intangible product of major importance: safety—your safety?

WHEN NEWS OF an Army helicopter destroying a drone aircraft in midair with an air-to-air missile during an operational test (OT) was published in the newspapers, public interest was significantly aroused. And the reason is simple. This type of news article readily appeals to persons in all walks of life because of its very nature and visual impact. But it's a good bet that few of the readers noted—or cared—that the U.S. Army Training and Doctrine Command (TRADOC) Test and Experimentation Command (TEXCOM) Aviation Board at Ft. Rucker, AL, was the operational test activity that conducted this test. And that, too, is as it should be.

When it comes to testing and test activities, most of us are generally inclined to picture a group of methodologists, engineers and other researchers, along with a host of support personnel, diligently performing a variety of tasks to obtain findings. The findings, in turn, are slated to be published as part of a thick report bearing some peculiarly worded title.





Although somewhat stereotyped, the above description does embody a good bit of truth. Certainly, if it is to fulfill its purpose, any test activity must be appropriately and adequately staffed with qualified personnel for the types of testing it is to perform. And, certainly, the findings will be published in the form of an official report. However, this report may or may not be a "thick" one. Some reports are hundreds of pages in length, while others may consist of but relatively few pages.

As for report titles, they vary. Many are quite simple and self-explanatory: CH-47D Flight Simulator, New Aircraft Tool System, Portable Engine Test Stand.... Others, such as Voice Interactive Avionics Technology, Aircrew Uniform Integrated Battlefield and UH-60A Hover Infrared Suppressor Subsystem, tend to obscure the purpose of the tests they identify. Nevertheless, all tests have one thing in common. Each is performed for a specific purpose, and that purpose determines which type of test activity will conduct a particular test.

Currently, the TRADOC TEXCOM Aviation Board, located at Ft. Rucker, is one of nine separate operational test activities operating under the auspices of TRADOC. The Aviation Board participates in development tests and performs other types of evaluations; however, its primary task is to conduct, or to participate actively in, a variety of operational and other user tests of aviation materiel. During such tests, the Aviation Board's interest is directed primarily to those areas associated with the RAM-D of the product being tested. This, of course, represents the obvious purpose of operational testing. However, in most instances, another vital ingredient can be found entwined within that purpose. We call that ingredient *safety*.

Consider, for a moment, a comparison of two radically different types of hardware such as combat boots and air-to-air missiles. What if, during an OT, the data collected should indicate that the reliability of an air-to-air missile is questionable? In combat, failure of the missile to function properly or to strike and destroy the intended target aircraft can provide the crew of the hostile aircraft an opportunity to destroy the launch aircraft.

Similarly, failure of boots under arduous combat conditions could severely impair the efficiency and health of the soldiers wearing them and, thereby, adversely affect the soldiers' performance—and their *safety*.

However, the element of safety intricately woven within an OT reflects only one side of the safety picture. There is another side. This side is present even when the reliability factor of a given product is not in question.

For example, even if a missile being tested should prove to be totally dependable, safety of a different nature must still be considered. Can the missile be launched accidentally during flight or when the aircraft is on the ground? Does the missile pose any danger to the launch aircraft when it is fired? What special safety precautions must be taken when the missile is stored, handled or transported?

Similar types of questions can be asked in referring to the combat boots.

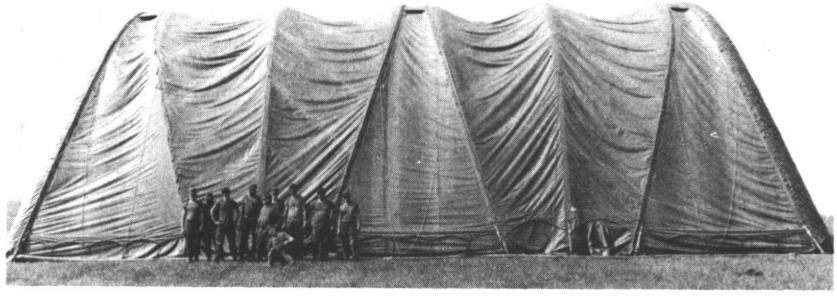


FIGURE 1: During operational testing of the air-inflatable, transportable maintenance shelter, an important prerequisite was its ability to provide adequate ventilation, effectively discharge fumes and permit rapid evacuation of personnel in case of fire.

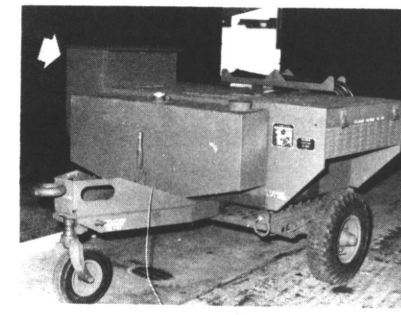


FIGURE 2: The exhaust section (arrow) becomes extremely hot during operation of the gas turbine engine that drives the enclosed 10-kw generator, and anyone coming in contact with this section will sustain severe burns. The danger is especially present immediately following engine shutdown when the exhaust section is extremely hot, and no exhaust gases are being discharged to warn personnel of the existing hazard.

While the boots may prove to be of sturdy construction and reliable, do they tend to retain excessive moisture, which can promote the growth of fungi in tropical climates? Are they sufficiently pliable to prevent undue strain on the wearer's feet? Do they rub against heels or toes and cause blisters or calluses that can result in infections or painful discomfort, degrading the soldier's efficiency?

The Aviation Board has not been involved in the testing of combat boots; however, a portion of one OT was performed to ascertain the ability of a helicopter to fire armor-piercing ballistic ammunition from various flight attitudes without compromising the integrity of the aircraft and the safety of its crew.

During an OT of a transportable maintenance shelter, data collected included those associated with—

- The provisions available for adequate ventilation.
- The effective discharge of toxic fumes.
- The ability of personnel to rapidly evacuate the shelter in case of fire (figure 1).

More recently, during testing of a 10-kilowatt (kw), portable generator, it was noted that the vertical, box-shaped "chimney," through which exhaust gases emitted by the gas turbine engine are discharged, became so hot that anyone coming in contact with this section would sustain serious burns (figure 2). As a result, this part of the generator was singled out for corrective action. Part of the corrective action included prominently displayed markings warning against leaning on, or otherwise contacting, the surface of that particular part of the generator.

It becomes obvious that testing is necessary to ensure the RAM-D of the equipment being tested. Testing is also necessary to enhance the safety of the personnel who will be operating and maintaining the equipment. After all, the best equipment in the world becomes utterly useless without the human element to operate it. So, while continued research and development of sophisticated hardware is essential to our security as a nation, the most important element is the individual who must be available and capable of using and maintaining the equipment. And you are that individual—important to yourself, your family and to your country.

Within the Army, there are those organizations—inconspicuous as they may be—that place a high priority on your welfare. Their prime purpose is to continue to ensure that you not only have the best equipment and training available but also the best protection. The TRADOC TEXCOM Aviation Board is one of these organizations that place a high priority on your welfare.

RSI Report

Mr. Rush Wicker

EVALUATION OF INTEROPERABILITY

THE ELEMENTS of brigade tactical operations centers from America, Britain, Canada and Australia (ABCA) assembled at Ft. Ord, CA, in November of 1987, to form the first ABCA exercise division. This organization took part in command post exercise (CPX) CALTROP TYRO. This training exercise demonstrated that a combined force of four nations can operate together effectively.

Most of the equipment belonged to the United States; however, the operational procedures employed by each nation were interoperable. This achievement did not just happen. As members of the ABCA program, each nation has taken part in developing agreements known as Quadripartite Standardization Agreements (QSTAGs). When ratified by a nation, QSTAGs direct that the operational procedures and technical design of each nation's equipment comply with the terms of the applicable agreement. The program attains a more effective combat force through standardization between nations.

CALTROP FORCE will take place in March of 1989 at Ft. Hunter Liggett, CA. It will overshadow the success of CALTROP TYRO. This operation is a 12-day, brigade-size field training exercise (FTX). Each nation will field a battalion-size force. Unlike the CPX, nations will operate with their organic equipment. This will allow for a more effective evaluation of interoperability between nations.

The exercise allows the forces to be evaluated during mid- and low-intensity conflict. Forces will be deployed into the operational area by air and sea. U.S. Air Force C-141 Starlifter aircraft will air-drop the British battalion into the lodgement area. Australians will be airlifted from ships at sea to the beaches of the Big Sur. U.S. Marines, flying CH-46 Sea Knight helicopters, will conduct this air operation after an amphibious attack against enemy positions overlooking the beaches. U.S. Army UH-60 Black Hawks, CH-47 Chinooks and U.S. Air Force C-130s will airlift Canadian and U.S. forces into position. Attack helicopters will provide the primary antiarmor deterrent to threat forces. Threat helicopters flown by Marine aircrews will challenge friendly aircrews in simulated air-to-air combat.

Evaluators will observe the forces to determine if the procedures are employed according to the STANAGS being evaluated. Interoperability of equipment between nations will be a primary objective of the evaluation. When a lack of interoperability is observed, proposals will be made to develop new agreements or make changes to existing ones. A total of 106 QSTAGs have been nominated for evaluation.

Upon completion of the FTX, the forces of each nation will assemble on the division parade field for a final ceremony. The presence of four nations, united as an effective military force, symbolizes the purpose of the ABCA program. Participants will remember CALTROP FORCE as a training exercise that will "show the way" for improving relations between the ABCA nations and increasing the effectiveness of combat forces through standardization.

If this article has generated any questions or requirements please contact Mr. Rush Wicker by writing: Commander, U.S. Army Aviation Center, ATTN: ATZQ-CDC-C, Ft. Rucker, AL 36362-5191.

AMERICAN, BRITISH, CANADIAN AND AUSTRALIAN ARMIES

THEME FOR 1988

TRAINING WAS proclaimed as the Army theme for 1988 in the December 1987 message from Secretary of the Army, John O. Marsh, and Chief of Staff, U.S. Army, General Carl E. Vuono. Training is a major concern to the Department of the Army (DA) and the U.S. Army Training and Doctrine Command (TRADOC). Superior training is essential for the Army to fulfill its mission. Combat readiness is achieved by carefully designed and effectively presented training to all Active Army, National Guard, Reserve Component and civilian personnel.

With DA and TRADOC guidance, the Department of Enlisted Training (DOET), U.S. Army Aviation Center, Ft. Rucker, AL, accepted this challenge. The Air Operations Training Division (AOTD) of DOET trains advanced individual training (AIT) students in three military occupational specialties (MOSs) within career management field 93: 93B Aeroscout Observer, 93C Air Traffic Control Operator and 93P Aviation Operations Specialist.

First is the MOS 93B, Aeroscout Observer Course. DOET is the proponent for this program of instruction with many other departments and units on Ft. Rucker contributing to its success. The Department of Combined Arms Tactics teaches 28 hours of instruction in threat and aerial adjustment of artillery. The Department of Gunnery and Flight Systems teaches 43 hours of instruction in nontactical navigation and OH-58 A/C Kiowa aircraft systems. The U.S. Army School of Aviation Medicine teaches 21 hours of instruction in aviation medicine and life support. The 1-14th Aviation Regiment teaches 293.5 hours of aeroscout observer flight-related training, including 67 actual flight hours. AOTD is responsible for 119 hours of instruction, taking the student through six phases of training as follows:

Phase I - Course orientation
- Aircrew training manual requirements

Phase II - Mapreading
- Symbols and graphics

ING

Sergeant First Class Keith D. Wilbur
Department of Enlisted Training
Air Operations Training Division
Fort Rucker, AL

- Terrain analysis

Phase III - Nuclear, biological and chemical

Phase IV - Introduction to radar-directed weapons and countermeasures
- Communications-electronics operating instructions (CEOI)
- Identification friend or foe and secure voice
- Joint interoperability of tactical command and control systems (JINTACCS)
- Introduction to infrared guided weapons and countermeasures
- Dynamics of aircrew communication and coordination

Phase V - Survival medicine
- Travel, personal protection and camouflage
- Evasion
- Introduction to resistance
- Aircrew survival and rescue equipment
- Land navigation, fire making and shelters
- Procurement of food and water
- Prisoner of war organization
- Prisoner exploitation

Phase VI - Field training exercise (FTX)

Coordination is underway for AOTD to take greater responsibility for the course.

The second MOS, 93C Air Traffic Control (ATC) Operator, is a combination of the 93H ATC Tower Operator and 93J ATC Radar Operator. Feedback from field commanders indicated that having two separate entities restricted the placement of newly assigned personnel in the ATC field. Now, with the new MOS 93C, commanders can place a newly assigned soldier or a noncommissioned officer at either a radar or a tower facility. Combining the two MOSs also required that the course length be expanded from 11 weeks, 3 days for MOS 93H and 13 weeks, 2 days for the MOS 93J to 14 weeks, 4 days. This makes it the longest course instructed by AOTD. More than 600 (FY 1988) AIT students entering the 93C ATC Operator Course progress through eight phases of training as follows:

Phase I - Course orientation
- Total fitness
- Control tower operator instruction

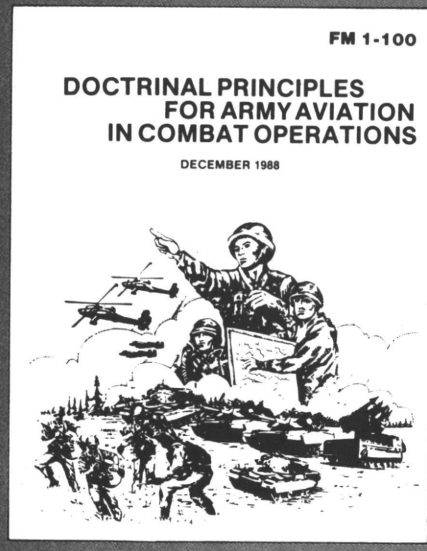
Phase II - Flight information publications (FLIPs)
- Weather reports and pilot reports
- Radio/telephone procedures
- General operating procedures

- Aircraft designations
Phase III - Nonradar academics
Phase IV - Nonradar instrument flight rules operations
Phase V - Fundamental control tower operations
- Visual flight rules tower operations
Phase VI - Operate AN/TPN-18 radar
- Fundamental radar procedures
- Ground controlled approach operations
Phase VII - Flight following
- JINTACCS
hase VIII - Tactical ATC equipment
- FTX

Last, but not least, is the 93P Aviation Operations Specialist Course. Seven weeks in length, it is the shortest AIT course instructed by AOTD. More than 600 AIT students take part in a seven-phase program of instruction as follows:

Phase I - Course orientation
- Aircraft designations
- Aviation weather reports
- FLIPs
- Aeronautical charts
- Notice to Airmen
- Typing
Phase II - Flight plans
- Interphone procedures and flight movement messages
Phase III - Overdue aircraft procedures
- Airfield operations
Phase IV - Filing documents and correspondence
- Flight records
Phase V - Staff organization
- Operate tactical crash alarm system
- Land navigation
- CEOI
- Situation map
- Radio net
- Radio interference and antijamming procedures
Phase VI - JINTACCS
- Total fitness
Phase VII - Tactical equipment training
- Operate radio set AN/VRC-46 and AN/PRC-25/77
- FTX

Training AIT students to be functional at skill level one is the primary mission of the AOTD. With a professional and highly competent staff of both military and civilian personnel, AOTD is dedicated to the Army Theme of 1988—Training.



Doctrinal Literature Update

FIELD MANUAL (FM) 1-100, "Combat Aviation Operations," has been revised as part of the Armywide Doctrinal and Training Literature Review Program. Retitled "Doctrinal Principles for Army Aviation in Combat Operations," the manual will be fielded in March 1989. The new FM will serve as the foundation for aviation unit manuals. Principles manuals, by TRADOC directives, deal primarily with doctrinal principles and not so much with tactics, techniques and procedures (as did the Sep 84 FM 1-100).

The new FM 1-100 describes the doctrinal principles by which Army Aviation performs maneuver, combat support and combat service support operations across the spectrum of conflict and during deep, close and rear operations. It supports AirLand Battle doctrine and focuses on the critical nature of combined arms, joint and combined, and special operations. The point of contact is Captain Robert Jones, ATZQ-CAT-DD, Ft. Rucker, AL, AUTOVON 558-3947/4882 and Commercial 205-255-3947/4882.

Captain James M. Reed
Captain Reed was attending the Aviation Officer Advanced Course, Fort Rucker, AL, when he wrote this article.

PICTURE YOURSELF in a time not so long ago, in a land of innocents called Officer Basic Course. Your best friend walks into your quarters and proclaims to you that he has cheated on the English exam. You tell him that you do not want to hear about it, but he insists on justifying his cheating and how it is the American way. You toss and turn all night, unable to sleep with this massive guilt on your conscience. On one hand you have the trust of a friend and, on the other, the integrity of the officer corps. This is not the same as they explained it back in college. You are not ready to handle a real-life integrity problem. Where do you find the answer?

Armed with the few books that you have, you go forth in your quest to resolve this dilemma.

Having been an average college student, the first book you have been trained to pick up when you are confused about the meaning of a word is the dictionary. You quickly look up the definition of integrity only to discover that Webster does not give the answer to the problem. The definition adds confusion by adding the word "honesty." You already know that your friend has been dishonest, but how do the two words relate?

To gain information on how these two words relate, you turn to that book with the funny name (Thesaurus) you bought for the English composition class. You flip to the word "integrity," and you see the beginning of the circle again. Webster has a catch 22 when he does not want to define a word. Integrity tells you "See honesty" and honesty tells you "See integrity." Fearful now that you are caught in this trap, you go back to the word "honesty" and hope that you can escape the trap. The end might be in sight. The list of synonyms includes loyalty, courage, trustworthiness, soundness, candor, morality, character and conscientiousness.

To gain word clarity, you write these words down as if they were parts of a math equation.

INTEGRITY = HONESTY = TRUSTWORTHINESS = SOUNDNESS = CANDOR = MORALITY = LOYALTY = COURAGE = CHARACTER = CONSCIENTIOUSNESS

The threads of your problem are slowly being woven together. Their interrelation is becoming clearer, but the answer to your quest has not been satisfied. What do you do? Where do you turn? The answer has to be somewhere, but you cannot find it.

Then you spot it. The book the colonel gave you at your commissioning—*The Army Officer's Guide*. You kick yourself for not thinking of it sooner. The answer has to be in the Officer's Guide—it probably has a whole chapter on integrity.

You smile to yourself as you turn to the table of contents. There it is, "Chapter 1: The Code of the Army Officer." It is not quite a whole chapter, but the answer has to be there. You eagerly thumb through the section, stopping on page 9 under the heading, "Integrity, The Essential Ingredient."

Thrilled that you are close to a resolution of the problem, you anxiously read the section. You learn that an officer is an official of the government who is sworn to obey lawful orders and make decisions on matters of life or death. Yours is the job of national security and the execution of policy. Then you read the magic words that tie up the loose ends. "The United States could not entrust its security to officers about whose integrity there is the slightest doubt."

Next, you read about the basic code of the United States Corps of Cadets. You relate to the fact that West Point produces officers, so this code must be the code of the Army officer. It is a simple code of duty, honor and country. Duty and country help you define your job, but the word that catches your eye is honor. If integrity equals honesty (honor), then integrity is part of the basic code.

So you dive into this section, hoping to find the final answer to your problem. It tells you that honor is the cornerstone of officer-like conduct and "the outgrowth of character." The country expects officers to lead an ethical life. Then it hits you. The ultimate definition of integrity (and honor) is written on the next line. Simply put, "An officer does not lie, cheat, steal or violate moral codes."

The answer is clear; you know what you must do. But you wonder why they do not teach this book. The answer to ethical problems would be much clearer if everybody would read *The Army Officer's Guide*. How basic can you get—one book with all the answers.

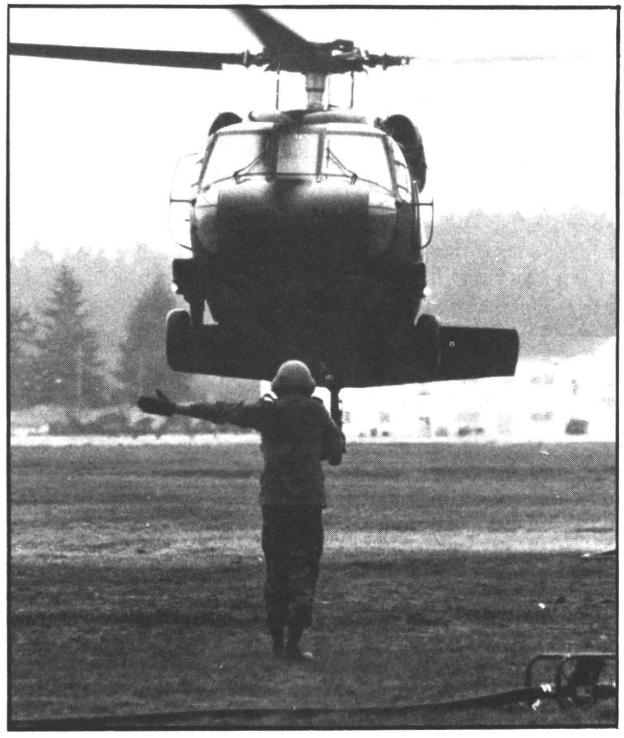
MONTHLY WRITING AWARD

Lessons From

Operation Urgent Fury

Captain Duke A. Dywan
Captain Dywan was attending the Aviation Officer Advanced Course, Fort Rucker, AL, when he wrote this article. He is presently assigned to the Directorate of Combat Developments, Threat Division, Fort Rucker.

A UH-60 being guided into the hot refueling point.



SO YOU'RE AN Army Aviation officer and you have just received your wings. That is great! Be proud of yourself; you have accomplished a lot. However, let's be serious and talk about a few things I experienced as a member of the 1-17 Air Cavalry during Operation Urgent Fury. How about combat, and preparing for it? Are you ready physically and mentally to go to war? Think about it for a moment. In this article I will focus on a few subjects that you may want to consider as you approach your new assignment.

First, expect to see combat and approach your training with that fact in mind. Develop a sense of urgency within yourself and your people to prepare for war right now. One can watch the evening news to realize the possibility of our facing war in many parts of the world. When the next conflict erupts, you may have little time for training or preparations. Your ability to survive depends on what you do today. As for Grenada, I never knew such an island existed, and the alert totally surprised me. From Granada I learned the importance of the motto "Be Prepared."

Second, you'll face stress—not only your stress, but also that of your men. The realization of going to a combat zone produces a high level of stress, which causes different reactions in you and in your men. You must learn to handle your own fears and emotions, and at the same time lead your men. As the leader, you'll see some of your troops become loud and excited, while others become quiet and dazzled. The high-stress level also will cause tempers to flare quickly, so don't overreact to the sharp words of a superior or to the grumblings of your men. Know and try to understand these various reactions so that you can prepare yourself to provide a calming force in the situation. Maintain control of your men and establish a chain of command within your section or platoon. Keep your troops busy and informed to help reduce the stress.

Next, realize the importance of aircraft and equipment maintenance. In a war-type situation, maintenance may tend to take second priority to missions, but you should insist on proper maintenance procedures. Require that your platoon sergeant keep you informed of aircraft status. Track the following items for each aircraft—total aircraft hours, flight hours available until the next major inspection and all major deficiencies.

Flying in a combat situation is another item to consider. Do you know your aircraft completely? Can you read a

map and navigate with proficiency? What would you do in the event of the death or injury of your copilot? Develop a list of those minimum items needed to start the aircraft in case of an emergency situation; however, do not violate the dash 10 procedures. Know your limitations as a pilot and those of your crew during night vision goggles and instrument meteorological conditions. Closely monitor crew rest and insist on good hygiene. Deployment usually results in the changing of time zones, eating habits and sleeping habits, and causes changes in the body. These changes usually manifest themselves in fatigue and intestinal problems.

Try to keep your crew and the aircraft together as much as possible. This closeness will facilitate cockpit communication, confidence and knowledge of aircraft deficiencies.

Now let's discuss weapons training and maintenance. How proficient are you with a .38 caliber, M-16 rifle or M-60 machinegun? Can you operate these weapons? Schedule training for your pilots on live fire ranges to familiarize them with the M-16, M-203, M-60, Claymore mine, hand grenade and light antitank weapon. This training will increase the chance of survival if you become a downed pilot. It will also increase the strength of the perimeter defense plan. Do you have a door gunnery standing operating procedure? Will scout crewchiefs carry M-60s in the back seat of their OH-58 Kiowa? Decide on these issues and train your men accordingly. Be creative. Conduct weapons classes for "hip pocket" training on weather days. Maintain and clean weapons daily in the field.

Finally, do you know nuclear, biological and chemical warfare? How many times have you flown in mission-oriented, protection posture (MOPP-4) gear? How often do your crewchiefs pull maintenance in MOPP-4? Heat and humidity would have dramatically affected operations and the use of chemical weapons in Grenada. How would it affect operations in the Middle East? Iran and Iraq use chemical weapons and so do the Soviets. You need to train for the possibility of chemical warfare.

Don't underestimate the importance of training troops for war during peacetime. Hopefully, these suggestions and questions will enable you to produce a platoon of troops ready to fight in the safest and most efficient manner. One never wishes for war and does not like dwelling on the idea but, as an officer of the United States Army, I believe that preparing men for war provides the biggest deterrent to war.

LEFT: Being properly prepared to fight a war includes performing required aircraft checks to ensure that the dispensing of fuel is clean.

BELOW: Paratroopers from the 82d Airborne, Ft. Bragg, NC, move inland from a landing zone in Grenada.

photo by SP4 Jon E. Long

U.S. Marine CH-46 Sea Knight helicopter.

A Thorough Briefing:

IT CAN SAVE YOUR LIFE

Captain Donald L. Wagner
Captain Wagner was attending the Aviation Officer Advanced Course 87-1, U.S. Army Aviation Center, Fort Rucker, AL, when he wrote this article.

What goes through an aviator's mind in that instant when an emergency progresses to the point that it will result in a crash? As the pilot in command in this situation, do you know exactly what your copilot's reactions are going to be? Take that one step farther. You have lost "commo" and cannot talk with your copilot. Do you know what his reactions are going to be? Take these questions into consideration and perspective as you read this account of an actual crash.

IT WAS A BEAUTIFUL September morning in the Clan Alpine Mountains of the Sierra Nevadas. The sky was pure turquoise blue with scattered white wisps of clouds. A soft 7-knot mountain breeze blew gently from the north over the arid terrain. Two CH-46 Sea Knight Marine helicopters in tactical cruise formation cleared the ridge line to the south and passed low over the jutting pinnacle.

The flight lead and his wingman checked the landing zone for winds and obstacles. A quick computation of the altitude and weight on the "whiz wheel" revealed to the helicopter aircraft commander (HAC) in Dash 2 that sufficient power was available to land on the pinnacle.

The flight broke hard left and commenced the downwind leg. The HAC in Dash 2 went through the landing checklist, cross-checked the lights and gauges, set the parking brake and selected "auto" on the speed trim. Both aircraft reacted simultaneously as their programmable rotor heads adjusted for the landing. At the 180 degrees position, the HAC in Dash 2 gave his copilot the thumbs up.

As the flight rolled wings level, Dash 2 swung into the right cruise position. On short final the aircraft was at 60 knots airspeed and 600 feet per minute rate of descent. The HAC in Dash 2 checked the alignment for landing when he felt a sinking sensation and loss of power. He was on the controls instantly as the generator dropped off

the line; "commo," "stability augmentation system" and "automatic stabilization equipment" were gone.

The HAC immediately initiated a right turn to effect a waveoff and lowered collective to maintain turns. His mind went into high gear, everything appeared in slow motion and there seemed to be an eternity to go over the options he had for this emergency. "Should he try to set it down on the steep slope and risk a certain rollover? Could he clear the boulders to his right and downslope if he milked the collective? Was it possible to make it to the flat area at the bottom of the mountain?"

While these thoughts were racing through his mind, the HAC was continuing the right turn and mashing down on the beep trim switches trying to get maximum power out of his engines. He remembered that this particular aircraft was the only one in the squadron not equipped with emergency throttle and there was no need to grope for the "button."

The Sea Knight began its downhill flight with a large boulder blocking its path. The HAC milked the collective to leap-frog the enormous rock. The aircraft reacted with a forward lunge. The nose cleared, but the left main mount and stub wing were crushed on impact with the immovable object. The nose wheel struck the ground and was sheared under the chin of the aircraft. The HAC struggled to maintain the helicopter upright, but the momentum of two consecutive impacts sent the Sea Knight in a hard left roll. The giant rotor blades began crashing into the mountainside and exploding into chunks of flying metal. Out of the corner of his left eye, the HAC could see the copilot securing the engines as briefed.

The aircraft bucked and began a nauseating hard left roll that jerked the copilot's hand from the engine condition levers, but not before he had got the number 1 engine to stop and the number 2 engine to crank. The sounds of metal against rock, metal against metal, and exploding rotor blades were a cacophony. Dust and rocks were flying through the cockpit and one piece of rotor blade came crashing into the windscreen between the HAC and his copilot. A flying shard of metal impacted the HAC's helmet and cracked the visor in front of his nose.

For what seemed an eternity to the HAC, the Sea Knight continued in its death throes as it twisted and rolled down the incline. Then something almost paralyzing happened to the pilot. He smelled JP-4 fuel; that meant there could be a fire or an explosion. The HAC thought at that moment: "Of his childhood on the ranch back in the Rockies of Colorado; of his wife and home in southern California; and he thought to ask God not to let him burn. It wasn't that he minded dying—that seemed inevitable—he just didn't want to get trapped and roasted."

Finally the wrenching sounds and the horrible rolling slowed. The old Sea Knight gave one last convulsive heave and came to rest in an almost inverted position. To the HAC the silence was almost deafening. He immediately reached up to secure the boost pumps and looked down to see if his copilot was still alive. The copilot began moving so the HAC called back to the cabin and got a response from his crewchief and first mechanic. Everyone was still alive.

The HAC jettisoned his escape hatch, unplugged his helmet cord and unstrapped. He helped his copilot up and then climbed out the escape hatch. He assisted the crewchief and first mechanic out the crew door and then jumped to the ground. The HAC gathered his crew, and they ran up the mountain away from the wrecked Sea Knight that could catch fire or explode at any moment. As he was getting out his survival radio to call "Lead," the HAC noticed that all crewmen were wet with JP-4 and could easily have become "Roman candles" if there had been a fire. The HAC informed Lead everyone was OK and would meet him on top of the pinnacle.

Once safely aboard Lead and on their way back to the airfield, the HAC thought over how things had clicked in the cockpit and how the copilot did just as he was briefed—"put out those two fires" (secure the engines in the event we crash). He remembered Lead clearing the zone as his "wing" crashed, thus avoiding damage to his aircraft—just as briefed. And the HAC remembered that from the start of the "emergency" until the end of the "crash" not one word was spoken. Even with the wind whistling through the cabin of the Sea Knight as they returned to base, the HAC could still smell the JP-4.

There is a reason those four crewmen returned alive and unburned. Stated simply, they were professionals. They took their flying seriously, and they took their briefing seriously. They reacted with correct crew coordination and did not have to take the time to "get the checklist out and talk things over." These crewmen knew ahead of time what they were to do and when to do it. They had briefed properly and thoroughly. I know, I was the HAC.

Upgrading the OH-58 Kiowa Instructor Pilot Course

Captain Christopher C. Sullivan
Captain Sullivan was attending the Aviation Officer Advanced Course, Fort Rucker, AL, when he wrote this article.

SINCE ITS INCEPTION, the OH-58 Instructor Pilot (IP) Course has trained qualified OH-58 pilots to perform duties as IPs in field units throughout the Army. The course has always produced highly qualified and competent IPs, but, until recently, the program of instruction (POI) excluded from the training a critical part of the duties of an IP.

Beginning in October 1987, OH-58 IP students began receiving an upgraded, more comprehensive POI—a POI that includes *tactics instruction.* The result of this change has produced an IP who is more tactically proficient and who is more valuable to the commander in the field.

The former OH-58 IP course POI concentrated on the pilot's performance of "contact" or "transition" type maneuvers (i.e., takeoffs, approaches, autorotations, etc.) and the ability to instruct other pilots in these maneuvers. The intensive program produced OH-58 IPs competent in teaching only those contact base tasks required to qualify pilots in the OH-58. Under this POI, students received no instruction in *tactical mission planning, terrain flight* or *tactical procedures* of any type. Thus, this POI qualified IPs to give in-unit transitions. The 1983 moratorium on touchdown emergency procedures significantly reduced the need for IPs to be "touchdown current." Only a few IPs are now authorized to perform touchdown emergency procedures. Furthermore, the program did not assist the IP in providing standardized tactical instruction and evaluation in his unit.

Basically, we were then teaching IPs tasks that they might not ever instruct or evaluate, and not teaching them the tasks that they perform during virtually every mission they fly.

This training has changed under the new POI. This 31-day training program incorporates 5 days of refresher, 15 days of contact and 11 days of combat skills training. The first 20 days of instruction generally parallel the former POI in content and form. Students receive 23.5 hours of contact flight instruction; they must demonstrate their ability to instruct contact skills during the 2-hour flight evaluation given on training day 20. This portion of the training guarantees that IPs in the field still possess the ability to give in-unit transitions if they are required to do so.

The final 11 days of the program are designed to provide students with both classroom and flight-line instruction on those tactical tasks required to be performed by the aeroscout pilot. Students learn how to instruct all tactical base tasks (e.g., terrain flight mission planning, out-of-ground effect hover check and nap-of-the-earth) as well as selected special tasks (e.g., evasive maneuvers, security missions, reconnaissance missions, etc.) from the aircrew training manual (Field Circular 1-215). The students are each allotted 13 flight hours for this instruction and receive a 2-hour combat skills flight evaluation at the end of the program.

This phase of the course accomplishes several things. First, it guarantees that OH-58 IPs in the field possess the necessary tactical expertise to advise commanders on tactical situations. Thus, it provides a more valuable asset to the field commanders. Furthermore, it gives credence to an IP's ability to train and evaluate the tactical procedures within a unit. Finally, it helps improve the standardization of intra-unit tactical procedures employed by the aeroscout.

Hence, the incorporation of combat skills training in the OH-58 IP course POI has significantly improved the ability of the OH-58 IP in the field to perform his mission. This program will be improved upon in the near future. Beginning in October 1988, another upgraded POI was instituted —this time incorporating night vision goggles (NVG) instruction. The program will result in the student being qualified as an OH-58 NVG IP.

So, since October 1988 we are finally sending fully mission-qualified OH-58 IPs out to field units. Commanders are receiving an IP who can not only qualify new OH-58 pilots, but who is also tactically proficient and able to give NVG flight instruction as well. This new instruction should have a major positive impact on training and standardization within field units and should greatly increase our readiness as an Army. It's been a long time in coming.

Students attending the OH-58 IP course learn to instruct nap-of-the-earth flying.

Flight Following in Remote Areas

Sergeant First Class John W. Conyers
U.S. Army Air Traffic Control Activity
Development Office
Fort Rucker, AL

Flight following in remote areas has long been a problem because of ineffective and inefficient communications systems for beyond line-of-sight (LOS) ranges. In many cases, alternate procedures are designed for flight following in the use of single ship routes, deployment of multiple aircraft for single ship missions or simply accepting the risks as necessary. However, these solutions to the problem tend to become problems themselves by masking the real need of enhanced communications capability. In addition, aviation operations in undeveloped areas magnify the limitations of the LOS communications, thereby placing greater emphasis on the need for the capability of enhanced communications.

Through the development of the nap-of-the-earth (NOE) communications program, a comprehensive solution to these problems will be provided; however, in the interim, a more immediate solution is required.

Presently, Honduras is the site for testing an interim solution that provides remote flight following services from a central facility to communications problems with aircraft flying NOE altitudes. This interim solution is designed to fill the NOE communications void until a more comprehensive NOE communications program can be fully implemented.

This system—

- Requires no modification or new installation of equipment on any aircraft.
- Uses standard very high frequency (VHF) frequencies.
- Is expected to provide 75 to 80 percent coverage throughout the country at altitudes of more than 1,000 feet above ground level.

How do we accomplish coverage in extremely mountainous terrain with strictly LOS communications? First, let us go back and familiarize ourselves with the requirement.

In August 1985, a required operational capability (ROC) was developed for air traffic control (ATC) support (particularly flight following) in Honduras. This ROC called for the use of remote communications facilities linked to a central flight following

facility by microwave repeaters. However, because of the enormous costs associated with the installation of microwave repeaters and the fiscal constraints, the program made little headway.

Emphasis on flight following in remote areas that occurred in late 1987 and early 1988 raised the priority for a flight following facility in Honduras. In January and April 1988, joint working groups (JWG) convened at the U.S. Army Aviation Center, Ft. Rucker, AL. The U.S. Army Air Traffic Control Activity took the lead in finding a solution for urgent requirements for flight following in remote areas.

The problems associated with flight following in remote areas lie basically in the organic communications capabilities of the aircraft. ATC, because it is normally a ground-based facility, has no real limitations on size and weight of equipment within its facilities; unfortunately, Army aircraft do. Also, there are many more aircraft than ATC facilities, which make any solution requiring new equipment on the aircraft cost-prohibitive, not to mention the tradeoff required for the hardware weight versus beans and bullets. These limitations required a look for alternatives having minimum impact on current or future aircraft communications capabilities.

With that in mind, the JWG started developing solutions considering everything from satellite to high frequency communication systems. Systems included airborne (aircraft, remote piloted vehicles and tethered balloons) radios, high frequency radios, tactical satellite and repeaters (both microwave and others).

The JWG concluded that the development of the NOE communications program would adequately resolve the problems associated with communication ranges. However, because this program is still in the developmental stage, an interim solution should be pursued. The problems encountered in finding the interim solution revolved mainly around particular mission requirements and terrain features. Because of these problems, the JWG decided that each remote area and mission would require a study to determine the best-suited solution.

In the JWG meeting held in April 1988 current urgent requirements were identified. The U.S. Army South (USARSO), Ft. Clayton, Panama, responded with the immediate need in Honduras and contingency missions in other countries. The JWG decided to use portable, unmanned repeaters as the solution, giving USARSO flexibility in siting and allowing for temporary missions requiring deployment of aviation assets outside of Honduras.

Each repeater is composed of four major components (radio repeater set, antenna, batteries and solar panels) with a total weight of under 150 pounds. The repeaters are battery powered with solar panels for recharging. The link between repeaters is on a pair of frequencies to allow simultaneous transmitting and receiving. The air-to-ground link is a VHF/amplitude modulated transceiver installed on the repeater, capable of up to six aviation frequencies.

The major advantages of the repeaters are that they are easy to install, lightweight, small in size, do not require any external power source and are low in cost (less than $8,000 each).

The disadvantages stem from the repeaters' susceptibility to theft or tampering because of their remote installation sites. The threat can be countered somewhat through camouflage, inaccessible locations, or installation within physically secure compounds; however, the risks must be justified through an assessment of the need for the communication capability.

By installing the repeaters on ridges or mountaintops, effective range of up to 90 miles is possible between repeaters. On the average, using about 12 repeaters, linked in threes, extending from the center of a hub, like spokes on a wheel, could effectively cover more than 70,000 square miles, an area the size of Oklahoma.

Someday, when you are flying low through the most remote regions of Central and South America, secure with the knowledge that if, by some slim chance, the instruments suddenly indicate an upcoming event featuring Newton's Law, ATC will have a fix on your whereabouts.

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

The MEDEVAC Story

Specialist Robyn Gregory
National Guard Public Affairs Office
Boise, ID

ON A SWELTERING hot day, one of the thousand soldiers training on ranges at Gowen Field, ID, collapses, writhing with the pain of a heart attack. Range medics give first aid, fighting to keep the patient alive in the barren, remote desert.

The approaching UH-1 Huey helicopter looks like any other cargo-hauling bird at first glance. Today, however, the cargo is unusually precious, the task is especially critical and the mission is to save lives.

According to Major (MAJ) Perry E. Barth, Idaho Army National Guard (IDARNG), Headquarters, State Area Command, the aeromedical evacuation (MEDEVAC) mission is not new to the Army nor to Gowen Field. However, eight IDARNG soldiers have pioneered the first full-time Army National Guard training site MEDEVAC mission in the United States.

In support of increased training at Gowen Field, the Army National Guard established the first full-time MEDEVAC mission in January 1988. This training draws armor battalions from throughout the country, thus increasing the need for MEDEVAC support.

The MEDEVAC mission, once an intermittent mission using either range medics or a "summoned medic," now boasts two full-time crews consisting of two pilots, a crewchief and a paramedic.

"Although the MEDEVAC mission actually began 2 years ago, we had no paramedics on the crews. If we received a MEDEVAC request, we'd either have to spend critical response time finding a medic, or take a medic off the training range, resulting in a loss of training time," MAJ Barth said.

The addition of two IDARNG men, Sergeant (SGT) John Morgan and Staff Sergeant (SSG) Dennis Neibaur, both of Headquarters, State Area Command, as full-time paramedics has improved the quality of medical care available to soldiers.

The two paramedics have more than 10 years of National Guard service. They acquired 3,500 hours of prehospital medical certification and back-country medical rescue experience before leaving civilian paramedic careers as state certified medical technicians.

Pilots for the MEDEVAC mission attended the Essential Medicine for Army Medical Department Aviators Course at Ft. Sam Houston, TX.

"That course taught us information that enables us to aid the paramedics if necessary and communicate effectively with them. We also became aware of when to alter our flight patterns as needed (higher, lower, etc.)

photos by LTC Kent Jewell

ABOVE: Idaho Army National Guard paramedic, SGT John Morgan, and an emergency room technician offload an injured soldier from the MEDEVAC helicopter.

RIGHT: SGT Daryl Love (left), crewchief and SGT John Morgan (right), paramedic, rush an injured soldier to the MEDEVAC helicopter for transport to St. Alphonsus Regional Medical Center, Boise, ID.

Idaho Army National Guard paramedics and field medical technicians from the Montana Army National Guard prep an injured soldier for aeromedical evacuation in the desert training area south of Gowen Field, Boise, ID.

to help the condition of the patient,'' said Captain James Skene, pilot in command, MEDEVAC unit.

''It is a good feeling to upgrade the level of medical support for the soldier in the field. A citizen soldier should be able to expect the same level of medical care while training, as he does in civilian situations,'' said SSG Neibaur.

A MEDEVAC unit has the capability of physician-level care in a prehospital setting. The MEDEVAC unit is further equipped for communication with physicians at St. Alphonsus Regional Medical Center, Boise, ID. The MEDEVAC paramedics operate under the standing orders of the National Guard State Surgeon, and may take any action thought necessary to preserve life.

The IDARNG MEDEVAC support program now provides 24-hour standby services whenever someone is operating in the training or maneuvering area, according to MAJ Barth. The MEDEVAC mission includes out-of-state units that make a request for support through the IDARNG annual training site coordinator.

''In the Idaho Guard we have the finest equipment, schools and terrain for excellent training. Why shouldn't we also provide the finest medical treatment,'' SSG Neibaur said.

Beginning next year, with the addition of the M1 Abrams tank to the Idaho training schools, the MEDEVAC mission will become a 24-hour continuous operation.

When not on MEDEVAC call, the crews accomplish various other missions while remaining immediately accessible. Crewchiefs work in hangars; paramedics augment base medical facilities; and pilots conduct aviation training necessary for state and Federal MEDEVAC missions.

Though the full-time MEDEVAC mission is carefully restricted to the transport of sick, injured and wounded members of the Armed Forces, emergency lifesaving aeromedical transportation is extended to civilians under certain conditions.

The MEDEVAC support is available to civilians to transport any person who the medical authority diagnoses as suffering possible loss of life, limb or sight to the nearest medical facility where immediate treatment is available when commercial transportation is not available, feasible or adequate.

The IDARNG MEDEVAC unit was recently called upon to transport an Oregon woman suffering from traumatic injuries sustained in a tractor accident. The IDARNG MEDEVAC unit transported her to the St. Alphonsus Regional Trauma Center, when the commercial ''Life Flight'' service was not available.

''If we weren't truly interested in helping people, we wouldn't be doing this. Working 24-hour shifts is not fun, and there is nothing glamorous about waking to the sound of a horn and the sight of a traumatic scene,'' SSG Neibaur said.

Upon receiving a MEDEVAC call the crew jumps into action.

''You go from a dead sleep to full speed in a matter of seconds. Weather permitting, we can be anywhere in the Gowen Field/Orchard training areas within 11 minutes,'' said SGT Morgan.

According to SSG Neibaur, the frequency of MEDEVAC missions has been moderate. ''Even though it is our mission to answer requests for MEDEVAC support, we'd rather not get those calls because that means that someone, somewhere, is hurting,'' he said.

Using the call sign ''Guardian,'' for urgent clearance, the IDARNG MEDEVAC unit is on its way to provide help. Its cargo: pioneers of the first full-time Army Guard training site MEDEVAC mission.

The Aviation Medicine Report is a monthly report from the Aviation Medicine Consultant of TSG. Please forward subject matter of current aeromedical importance for editorial consideration to U.S. Army Aeromedical Center, ATTN: HSXY-ADJ, Ft. Rucker, AL 36362-5333.

PEARL'S

Personal Equipment And Rescue/survival Lowdown

About $350,000 worth of equipment is presently on hand to sustain ALSE MTT course requirements.

Joint CONUSA ALSE MTT Course

Mr. Danny L. Rode Sr.
Headquarters, Fourth U.S. Army
Fort Sheridan, IL

IN JANUARY 1985 I was hired at Headquarters, Fourth U.S. Army, Aviation Division, Ft. Sheridan, IL. One of my many "additional duties" was the Fourth U.S. Army aviation life support equipment (ALSE) project officer. "ALSE? What's that?" I had spent 20 years in the U.S. Air Force both as an engine mechanic and a safety specialist, but I had never been exposed to the ALSE field. My boss decided that I should receive some training in this field if I were to be the Fourth Army ALSE project officer. So, in August 1985 I ventured forth to receive some training in ALSE.

At the time, quotas at both the ALSE Supervisor and Specialist courses at the U.S. Army Aviation Logistics School (USAALS), U.S. Army Training and Doctrine Command (TRADOC), Ft. Eustis, VA, were full. It appeared that I could not enter until mid-1986. Then I read about the Sixth U.S. Army Western Region ALSE Survival School (AWRASS). When I inquired about a quota, I was told that the course was a formal TRADOC mobile training team (MTT) course, producing an additional skill identifier (ASI). The course was specifically designed for the Reserve Components (RCs) because it has its own program of instruction (PIOI). I persuaded my boss to let me attend one of the 3-week AWRASS courses at Camp Relia, OR.

As the course progressed, I realized that it was a valuable learning experience. When I tried to obtain some quotas from Sixth Army for RC personnel in our Fourth Army area, I was told that the course I was attending was one of the first, and definitely the last, MTT course that USAALS would conduct. The course has been a tremendous burden on the USAALS instructors who were overloaded with students and classes, and on Sixth Army personnel, who had to put together a complete classroom instruction, including ALSE equipment and publications the instructors would need. CW4 Art Miskimons, then the ALSE Branch chief at USAALS, stated he simply could not support another MTT course, with a dwindling supply of instructors; conduct numerous 6-week courses at Ft. Eustis; and supply the vast majority of equipment and publications for an MTT course at the same time. Major Pat Kelly, then the Sixth Army ALSE project officer, and I decided to pool our resources and convince CW4 Miskimons to try one more course.

We tried for several weeks to convince TRADOC how it is nearly impossible for RC personnel to spend 6 weeks away from their full-time jobs, not to mention their military jobs to attend the course at USAALS. CW4 Miskimons agreed that he would try one more MTT course. Coordination began with CW4 Marion Krauss, the current ALSE Branch chief and chief ALSE instructor at USAALS. Without his support for an MTT, we would not have had any hope of setting up the course.

Major Kelly and I discussed the large task laid before us. I met with Mr. John Little, my counterpart at Fifth U.S. Army. His expertise in ALSE and his personal desire to ensure only quality training was afforded ALSE personnel were assets we could not have done without. We were very fortunate in convincing him to join our crusade. In addition, I met Mr. Jim Angelos, ALSE specialist (aircraft), at Aviation Systems Com-

The 3-week long MTT course is by no means an easy one.

Instructors ensure students attending the ALSE MTT course receive one-on-one training.

mand (AVSCOM), St. Louis, MO. Mr. Angelos joined us and contributed his knowledge of ALSE procedures and equipment. Together we set out to form the first, and presently the only, formal ALSE MTT course at Ft. McCoy, WI.

We formed the nucleus of the joint CONUSA (the numbered armies in the continental United States) ALSE MTT course with some borrowed buildings from the Fourth U.S. Army Area Training Center at Ft. McCoy and all the ALSE that we could beg, borrow or, ahem, borrow. After several meetings with USAALS and numerous trips to Ft. McCoy, we were ready to run our first course scheduled for December 1986. As predicted by USAALS, we encountered problems; however, we did graduate more than 45 formally trained, ASI-qualified students in that first course.

We were succeeding in convincing TRADOC that an MTT ALSE course was viable! CW4 Krauss agreed that, with a little more planning and effort on our part, the MTT concept could work.

Immediately after the December 1986 course, we requested USAALS to support another course for 1987. (Our adrenaline was really pumping now.) We set the date for September 1987.

In the meantime, the Fourth, Fifth and Sixth Armies continued to try to convince TRADOC that this training concept would work. We lobbied at the Headquarters, Department of the Army (HQDA) Safety Workshop held in Washington, DC, in March 1987, for an ALSE military occupational specialty (MOS), ALSE training and establishment of a HQDA ALSE representative. The workshop set these items as the top high priority goals for Safe Army 1990. We continued to try to convince TRADOC of the importance of an MTT ALSE course for the RC. We convinced Colonel Vassey, the deputy commander and the director of training and development, at USAALS that we were

The MTT course offers ALSE training to meet the needs of the Reserve Components.

earnest in our quest for a formal, established RC MTT ALSE course.

In 1987 Fourth Army transferred $100,000 to the ALSE MTT course for equipment, bench stock items, prescribed load list (PLL) items and general supplies. This transfer required a significant amount of paperwork as justification because approval from U.S. Army Forces Command (FORSCOM) was needed to order and receipt for table of distribution and allowance equipment.

The 1987 course, our second course, was exceptionally smooth running, and graduated 18 students. This class was significantly reduced in size from the first course because of the ratio of RC POI instructors to students. Our current maximum student quota of 30 per class ensures that all students are given the necessary time and one-on-one instruction needed for experience comprehension difficulties. The overall course average was 87.2 percentile—the highest class average ever for an ALSE MTT course. (Our honor graduate had an overall course average of 98.5.) However, do not be misled; this MTT course is not easy. Fast-paced and in-depth training is required if you want to teach a 6-week course in 3.

We conducted our third course in August 1988 and set several milestones. We enrolled 25 students and all 25 graduated. We, the formal 6-week school at Ft. Eustis, normally have a few students drop out; this was a first for us as an MTT course and the first time the complete starting class graduated from an ASI ALSE course. Our honor student this year graduated with a grade of 98.33. She has the highest overall course average of any student to attend an ASI ALSE course.

As we progress into the year 1989, we are considering branching out. We now have our own dedicated ALSE shop and classroom in one dedicated facility. We are thinking about changing our name to the Joint CONUSA ALSE Survival and Safety School. We want to use the equipment and facilities more than 3 weeks out of the year. We want to conduct the DA-required survival, evasion, resistance and escape training. We also want to start teaching the Safety Noncommissioned Officer ASI course here. In addition, we want to start teaching hot, basic and cold weather survival training.

We now have about 170 regulations in a quantity of 35 each for student workbooks. We have almost 400 line items of equipment, including our own bench stock; PLL; numerous pieces of ALSE presently in development states (donated by Natick Research and Development Laboratories); and several training aids. Our onhand equipment includes items such as an integrated helmet and display sight subsystem; climactic cooling vest; survival aircrew recovery vest including pockets; survival kits; flight clothing; aircrew uniform integrated battlefield suits; life rafts; sewing machine; carbon dioxide recharging machine; our own microfiche readers; first aid kits; and more. We now have our own hand receipt for about $350,000 worth of equipment.

HQDA approved the ALSE Manpower Requirements Criteria Study in February 1988; therefore, an ALSE MOS may not be that far off. Training in ALSE will be elevated to an even higher priority. There are many ALSE people in the field who are genuinely committing themselves to promoting ALSE. We three CONUSAs feel that we have played an important part in convincing higher headquarters of the need for this MTT training. Our formal ALSE MTT course at Ft. McCoy is living proof of our commitment. TRADOC, USAALS, AVSCOM and the individual CONUSAs have a unique bond in ensuring that RC personnel are afforded the same training as their active component counterparts. This MTT course is our way of meeting the ALSE training needs of the RC. As for ALSE, the RC will be ready for mobilization.

As a joint CONUSA venture, we have proven to FORSCOM that we, the RC, can and will meet the challenge. We will be prepared to train, fight and survive on the modern battlefield. Each CONUSA, the AVSCOM, Natick Research and Development Laboratories and USAALS have contributed to this course. We are now "the place" to receive ALSE training outside of USAALS. Keep a lookout for our next ALSE and future safety courses.

If you have a question about personal equipment or rescue/survival gear, write PEARL'S, AMC Product Management Office, ATTN: AMCPM-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-3573 or Commercial 314-263-3573.

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VIEWS FROM READERS

Editor:

In early winter 1988, the Directorate of Training and Doctrine, Officer Training Branch, Ft. Rucker, AL, will field an Aviation Officer Occupational Survey to validate critical tasks for aviation company grade officers. This initiative began in 1988, and represents a comprehensive analysis of tasks required of company grade officers. Every commander and supervisor of aviation officers should ensure adequate time and attention are given to this effort. The survey will result in selection and refinement of critical aviation tasks, and in decisions on whether these tasks should be trained in the basic or advanced course, or in the unit environment. This is an opportunity to directly influence the future of Army Aviation.

COL Floyd E. Edwards
Director of Training and Doctrine
Ft. Rucker, AL 36362-5163

Editor:

In your October issue, the article "The Commissioned Officer, Pilot or Tactician" is truly applicable to some of our commissioned officers—lieutenant and above! I applaud CPT MacDonald's efforts. However, there are some tactical terminology discrepancies noted in his article. These errors in terminology may seem a little minuscule in importance, but understanding basic terminology helps to lay the foundation for employment of a force. First of all, FASCAM is the Army acronym for "FAMILY of SCATTERABLE MINES." Scatterable mines may be delivered using many methods other than field artillery. In addition, there is not a place called "AirLand Battlefield." AirLand Battle describes the Army's method of generating and employing combat power at the operational and tactical levels. Normally, the battlefield is referred to as the "modern or future" battlefield. Again, I sincerely appreciate the intent of the article and hope to contribute one of this nature in the near future. It's essential that our leaders, staff and soldiers do their homework first—that is, read the manual and understand how to employ what they learn based on the factors of mission, enemy, troops, terrain and time (available); unit location; area of operations; etc. This also means fighting not only as one branch, but as part of the combined arms team.

CPT Allen T. Storey
Doctrine Division,
Department of Combined Arms Tactics
Ft. Rucker, AL

Editor:

Because of the interest your readers have in aviation safety, I believe they would like to know about the Fifth International Symposium on Aviation Psychology to be held 17 to 20 April 1989, at the Hyatt Regency in Columbus, OH, hosted by the Ohio State University's Department of Aviation. This symposium series has been recognized as the cornerstone in the scientific aviation community for the dissemination of aviation research relating to human performance and the presentation of new problems that need to be addressed.

Richard S. Jensen, Ph.D.
Director, Aviation Psychology Lab
Ohio State University

Readers can obtain copies of material printed in any issue by writing to:
Editor, U.S. Army Aviation Digest, *P.O. Box 699, Ft. Rucker, AL 36362-5042.*

U.S. Army Class A Aviation Flight Mishaps

	Number	Flying Hours	Rate	Army Fatalities	Total Cost (in Millions)
FY87 (through 30 September)	38	1,711,894	2.22	42	$104.4
FY88 (through 30 September)	31	1,741,997	1.84	39	$58.3

UH-60A Black Hawk External Stores Support System Self-Deployment System, A Reality

CW4 Eugene B. Kopp
Directorate of Evaluation and Standardization
U. S. Army Aviation Center
Fort Rucker, AL

SELF-DEPLOYMENT of the UH-60A Black Hawk has become a reality. The United States Army Aviation Development Test Activity (USAADTA), Cairns Army Airfield (AAF), Ft. Rucker, AL, is currently testing the UH-60A Black Hawk Self-Deployment System.

A test profile was flown by CW3 Terry Jones, USAADTA, project officer, External Stores Support System (ESSS) Self-Deployment System; CW4 Eugene Kopp, standardization instructor pilot, Directorate of Evaluation and Standardization; and Staff Sergeant Ray Wheelock, project noncommissioned officer, USAADTA. The purpose of the test profile was to fly nonstop 1,250 nautical miles (nm) as well as validate derived data for performance charts and performance tables.

On 26 August 1988, at Minot AFB, ND, a UH-60A with the ESSS consisting of the self-deployment kit awaits takeoff for a nonstop flight to Cairns AAF. The UH-60A is configured with two 230-gallon fuel tanks mounted on the outboard racks and two 450-gallon fuel tanks mounted on the inboard racks. All tanks are topped off with JP-4 fuel to maximum capacity, including the main tanks of the aircraft. The gross weight of the UH-60A is calculated to be 24,500 pounds at takeoff.

The UH-60A taxis for takeoff. A hover power check is performed. The main rotor blades of the aircraft are coning with both engines whining. The performance planning card's predicted hover torques are checked against the indicated torques, indicating that the calculated power figures are correct and that the takeoff gross weight is going to be 24,500 pounds. The aircraft is cleared for the runway and taxis into position. After the aircraft is cleared for takeoff, power is applied and a rolling takeoff commences. The aircraft rolls down the runway. As the tailwheel leaves the ground first, the nose of the aircraft rotates forward and downward. At this point the wire strike protection system on the main landing gear is only an inch or so from striking the ground. At about 40 knots (kt) indicated airspeed, the stabilator begins to program up, while the pilot simultaneously applies a little aft cyclic and increases the collective to his preplanned climb power. The main landing gear of the aircraft leaves the ground and lifts into the air. The long journey has begun.

The nonstop flight to Cairns AAF is an estimated 12 hours. The first leg of flight is at 4,000 feet, which will

SSG Raymond Wheelock (left), crewchief; CW4 Eugene (Buddy) Kopp (center), copilot; and CW3 (P) Terry L. Jones (right), pilot in command, await the nonstop test flight to Cairns AAF, AL, from Minot AFB, ND.

The UH-60A Black Hawk with ESSS at 4,000 feet on the final approach to Cairnes AAF, after the 11-hour, 52-minute nonstop test flight of more than 1,365 nm.

give the best specific range and the best fuel flow at the present gross weight and power available. The flight continues and the gross weight changes because of fuel burn. Different altitudes and power criteria are derived from the specific range charts calculated by USAADTA. The last planned altitude is 10,000 feet for the flight. After passing through numerous air traffic control center areas of responsibilities, the UH-60A is handed off by Montgomery, AL, Approach to Cairns Approach.

An update on the fuel remaining and the fuel flow indicates that flight past Cairns AAF is possible at the present altitude of 10,000 feet. The flight plan is amended for further flight to Marianna, FL, and back to Cairns. Upon returning to Cairns an instrument approach is initiated. The UH-60A finally breaks out at 4,000 feet on final for runway 6 at Cairns. The aircraft crosses the landing threshold after 11 hours and 52 minutes in flight with 930 pounds of fuel left in the main fuel tanks. The UH-60A Black Hawk ESSS Self-Deployment System has completed a nonstop flight of more than 1,438 nm—a flight much longer than the projected profile of 1,250 nm. Yes, self-deployment capability for the UH-60A is a reality.

The extended range fuel system (ERFS) can be configured in the three different variations as follows:

- Two 230-gallon fuel tanks mounted on the outboard stores, and two BRU-22/A ejector racks with all attaching hardware. This leaves the two inboard support stores for other mission components, if needed, and extends the UH-60's range from 310 nm to more than 600 nm, depending on type of mission and mission gross weight.
- Two 230-gallon fuel tanks on the outboard stores and two 230-gallon fuel tanks on the inboard stores.
- Two 230-gallon fuel tanks on the outboard stores and two 450-gallon fuel tanks mounted inboard on the MAU-40/A ejector racks that comprise the UH-60A Black Hawk Self-Deployment System. This configuration will give a range capability of about 1,150 nm against a 10 kt headwind.

With the long-range capability that the ERFS configurations give, mission planning becomes the most important aspect of a successful mission accomplishment.

Various environmental conditions can be encountered on such a flight; therefore, flight and aircraft performance planning will have to be calculated accurately to determine the varying mission capabilities and limitations, such as different maximum torques available for the different environmental conditions that can be encountered on a long-range flight. What about the numerous types of weather phenomenon that affect the flight? Where are the weather facilities to get updated weather? Sometimes there won't be any. Then, by what means will the forecast be derived and from what source? These are only a few questions with which the aviator will have to contend.

Mission planning criteria become more critical. The mission will have to be executed in a professional manner to be successful.

Crew endurance, physical fitness, mental attitude, crew comforts, nutrition, individual abilities and limitations have to be considered and planned for. Food, comfort bags and water are a must for these flights. Cockpit crew communication and coordination are essential for a safe and successful mission.

Self-deployment for the UH-60A is a reality. The USAADTA testing continues, but is nearing completion. The specific range charts are being validated by flying mission profiles as part of the test. Training formats are under development by Directorate of Training and Doctrine, Ft. Rucker, with plans for training to begin in fiscal year 1989. UH-60A self-deployment is definitely a viable option that can be used.

Clarification:

Articles appearing in the September and October 1988 "DES Report to the Field" have caused numerous questions regarding altitude over airspeed versus airspeed over altitude takeoffs in fixed wing aircraft. The articles provided excellent professional information but were not intended as a change to current Army procedures. Army regulations, operator's manuals and appropriate aircrew training manuals continue to provide policy, procedures and standardization for operating Army aircraft.

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362-5208; or call us at AUTOVON 558-3504 or Commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or Commercial 205-255-6487 and leave a message.

AVIATION PERSONNEL NOTES

Noncommissioned Officer Education Update

A recent change to Department of the Army (DA) promotion policy makes successful Basic Noncommissioned Officer Course (BNCOC) completion mandatory for promotion consideration to sergeant first class (SFC) effective 1 October 1990.

If you expect to be promoted or even considered for promotion by the centralized board, you must have successfully completed BNCOC, even though you may be in the zone of consideration by virtue of date of rank.

Check your records. If you have completed BNCOC, then section II, item 13, of your DA Form 2A had better look like this:

13. MIL EDUC/Code: BNCOC Grad W

If it doesn't, you have a big problem. You must immediately see your personnel staff noncommissioned officer or military personnel office representative with proof of completion to have it corrected.

You control your own destiny. Make sure your records are correct. Failure to pay attention to this important requirement will delay your career progression.

There is no need for error. Check it out; if it's wrong, get it corrected; if the entry is right, make sure it doesn't change. *DO NOT,* repeat, *DO NOT* sit back thinking that it will all sort itself out in the end and in your favor. It may be too late and you're the one who will suffer the aggravation and disappointment.

If you have not attended BNCOC, you need to push hard in that direction. Excuses or reasons for nonattendance will not change your promotion eligibility to SFC/E7. Only the above code will do so.

Point of contact for further information is Sergeant Major Cole, AUTOVON 221-8324/8325.

Linguist Shortage for Military Occupational Specialty (MOS) 93C, Air Traffic Control Operator

There is a shortage of soldiers in MOS 93C (H and J) with the requisite language skills to fill critical positions in this MOS. The readiness of aviation units is jeopardized and mission accomplishment is made more difficult if we cannot provide sufficient 93C (H and J) soldiers who are proficient in Spanish.

Commanders can help by screening all personnel in this MOS and identifying those soldiers who speak Spanish or who demonstrate an aptitude or desire for language training. Any soldier who speaks Spanish should be encouraged to take the Defense Language Proficiency Test (DLPT). This test can be administered by any post test control officer. The DLPT will determine their precise degree of proficiency. If test results are favorable and an acceptable skill level is demonstrated, the local personnel service company (PSC) should update the enlisted master file (EMF) accordingly. The U.S. Total Army Personnel Agency (USTAPA), Aviation/Transportation Branch, DPAC-EHL-TD, should also be notified of favorable test results by message or written form for soldiers in grades E4 and above.

Soldiers who have a skill-technical score of 100 or better and whom the commander feels has the necessary motivation and desire to complete language training should take the Defense Language Aptitude Battery (DLAB) test. Results are to be posted to the EMF and DA Form 2 by local PSC personnel. Those who obtain a DLAB score of 89 or better are encouraged to apply for language training. Soldiers selected for training will receive a permanent change of station to Presidio of Monterey, CA, for up to 52 weeks of training. Upon completion of training, soldiers will be awarded a language identification code and be given a utilization assignment appropriate to their grade and MOS. Currently, there are school seats for language training that will not be filled for this fiscal year because of a lack of qualified applicants. These empty seats translate into unfilled personnel requisitions and personnel voids in both table of organization and equipment and table of distribution and allowance units. Identifying, testing and schooling 93C (H and J) soldiers with requisite language abilities are essential if we are to meet aviation unit requirements for Spanish linguists.

Point of contact at USTAPA for further information is SFC Prescott, AUTOVON 221-8322.

Elimination of Forced Entry Branching of Reserve Officers' Training Corps (ROTC) Rangers

A memorandum issued by the Deputy Chief of Staff for Personnel, HQDA, dated 16 September 1988, eliminated the policy of forced Infantry branching of Ranger-qualified ROTC cadets. Cadet Rangers now have the option to request any branch, including aviation, during the selection and branching process.

TRAINING:
The Ultimate Noncommissioned Officer Responsibility

Sergeant First Class William H. Feeney
Headquarters and Headquarters Company,
1/58th Aviation Regiment (ATC)
Fort Bragg, NC

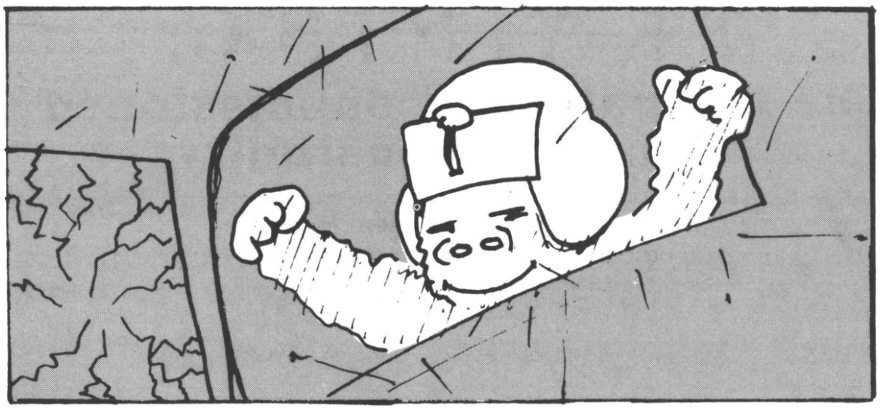
WHETHER THE United States passes or fails its next combat test will depend on whether or not its soldiers are properly trained. The next conflict will probably pit U.S. forces against Warsaw Pact forces. The modern AirLand Battlefield will be a high-tech environment that is unforgiving and will not be the place for poorly trained soldiers. Because of this, it is essential that every soldier be a master of both common and military occupational specialty (MOS)-specific tasks.

As noncommissioned officers, leaders and trainers, we hold our soldiers' lives in our hands. It is our responsibility to ensure that our soldiers are properly trained. Compromises in training will cost lives on the battlefield. We cannot allow valuable training time to be wasted—if we do, we may pay the ultimate price. It is our responsibility as noncommissioned officers to ensure that any available time is devoted to training.

Common task training gets to the very core of what being a soldier is all about. These basic soldier skills that are all too often neglected provide soldiers with the knowledge that they need to shoot, communicate and survive. Soldiers must know how to properly care for and use their individual equipment before they become controllers, food service personnel or medical corpsmen. They must be trained, and that responsibility lies with the noncommissioned officers.

Only after our soldiers have mastered the stay-alive skills can we concern ourselves with teaching them the technicalities peculiar to their MOS. We cannot and must not expect a soldier fresh from advanced individual training to have anything but the most basic understanding of specific job skills. We must train them once they arrive at their permanent duty stations. We will need to start at the beginning and ultimately mold them into a contributing team player in the squad, platoon and unit.

All aspects of training are up to us as leaders and trainers. We are responsible for planning, organizing and implementing training. Training must start with the individual soldier and culminate with the unit Army Training and Evaluation Program. Remember, as noncommissioned officers we are responsible for everything that our soldiers accomplish or fail to accomplish. Effective and realistic training will enable us to emerge victorious on the modern AirLand Battlefield.



The human, as opposed to the gorilla, has the ability to think and to reason. He needs the tools at hand in order to respond correctly. That's what emergency procedures are.

EMERGENCY PROCEDURES

Captain George Meleleu Jr.

EMERGENCY PROCEDURES—the bane of any student pilot's existence. What military student pilot, or rated aviator for that matter, hasn't felt a cold chill go down his spine at those awesome words, "Let's go through some emergency procedures"?

How many times have you sat down at the briefing table and hoped you would not be called upon to recite an emergency procedure? When you did study, did you only study the most commonly asked emergency procedure? Did you leave that unnoticeable emergency procedure in its obscurity, still lost in the vast realms of the dash 10?

After all, with the reliability of today's equipment, why bother wasting time committing that garbage to memory? That's what it is isn't it—garbage?

I'm sure that all of us have shared similar thoughts during our training. I spent much of my time studying my student handouts, flight publications and preparing for the next day's flights. As a result, I didn't always allow time to study my emergency procedures properly. Oh yes, I knew them and could recite them in proper order in the briefing room or in a simulated emergency. However, most of that studying was last minute cramming on the bus riding out to the stagefield. I think that we all know the level of quality of that type of learning.

As a Reserve Officers' Training Corps flight student in college, I had earned my private, single-engine, land pilot's certificate. I developed an attitude during that instruction that the civilian instructors, although safe and competent, tend to deemphasize knowledge of, and preparation for, emergency procedures with the exception of the forced landing. That attitude plagued me as a military flight student.

I still see the same attitude prevalent today in the civilian flight community. The civilian community, because of its dependence on funding from the private sector, emphasizes safety and reliability. If this weren't the case, how many people would be disposed to cheat death and defy gravity to fly? Emergency procedures are reviewed but, in my ex-

perience, not stressed the same as they are in the military or the commercial world.

Attitudes about emergency procedures are formed by misconceptions, lack of understanding and lack of a sense of urgency. Thus formed, so are our study habits regarding them.

I have already discussed the cramming as a method of studying. Other methods are routine and random. The routine method dictates that a specific time period is allocated. The individual continually reviews emergency procedures at his designated time period without fail. The random method, which I later found was best for me, suggests that you always carry a dash 10 or, more practically, emergency procedures rewritten on index cards. You can review them whenever you have a spare minute (waiting in a mess line, at sick call, in a cashier's line, etc.).

Regardless of how you study, until there is some impetus to cause you to accept the true, inherent, lifesaving value of emergency procedures, they are nothing more than another obstacle to flying.

I managed to graduate from flight school without any problems and "blackbirded" at Flat Iron while awaiting my AH-1G Cobra transition. When I started the transition I discovered that the instructor pilots (IPs) were more intense regarding the student's complete knowledge of systems and his ability to immediately and accurately regurgitate emergency procedures. I adjusted my study habits and proceeded with the course. Even though there was a difference in attitude of the instructors, I still didn't reexamine my own attitude toward emergency procedures; I merely met the course requirements.

As the course drew to a close, I faced two checkrides: aircraft and systems, and armament. After finishing the aircraft ride, I actually looked forward to my armament ride.

The appointed day arrived and I set off to show the IP just what a "hot shot" I was. My engagements went well, and I thought that I was flying the aircraft very well that day.

I was making my last engagement of the day, a low-level, high-speed strafing run, firing my M18A1 wing gun pod capable of firing bursts of 2,000 and 4,000 rounds per minute. The M18A1 is an old system that consists of a self-contained 7.62 mm minigun with its own electrical system. Although we had these weapons in our arms rooms in my future units, I never saw one again.

As I crossed the firing line, I immediately depressed the cyclic trigger to the second detente and felt the rumbling of the airframe as the minigun answered my call. With rounds on targets and engagement complete, I released the trigger. To my surprise the weapon was still firing albeit at the low rate of fire. Thinking that the trigger might be stuck, I recycled it, but to no avail—it was still firing and I was running out of range area!

I attempted to reduce the airspeed and keep the nose down in order to keep the weapon oriented downrange and not allow it to fire outside the range fan. As I was doing that, I simultaneously reached for the master arm switch and announced to the IP that I had a runaway gun. I asked the IP to verify that the gunner's override pilot switch was off. He indicated that it was, and I turned the wing store armament switch off and the weapon ceased firing. Continuing with the emergency procedure, I located the appropriate circuit breaker and pulled it out.

With the weapon silent, I began to turn uprange and return to the rearming pad. All of that action took place in a matter of seconds and no rounds went out of the range fan.

Time in the cockpit seemed to stand still. Yet, the most amazing thing to me was that I acted appropriately and executed the emergency procedure in the correct order without ever having to stop to think about what to do. All my actions were completely automatic.

For the first time, I fully realized the value of studying emergency procedures, constantly reviewing them and knowing them by the book from memory. In an emergency, you need to be able to react to the situation, not sit there thinking about what to do. Reaction comes from training and experience. The best method to receive training is by repetitive and routine study. The best way for us, as aviators, to gain experience (and stay safe) is in the synthetic flight training system.

My primary flight instructor said that he could teach a gorilla to fly, given the correct stimuli. Am I advocating flying and responding to emergencies merely by a rote mechanism? No, certainly not. The human, as opposed to the gorilla, has the ability to think and reason. However, he surely needs the tools at hand to be able to respond correctly. That's what emergency procedures are. They provide the means to safely terminate the emergency after you, the pilot, have determined what system has failed and what procedure to apply.

Oh, did I pass the checkride? Yes. More importantly, I learned something that will stay with me for the rest of my aviation career—the value of emergency procedures.

ALERT PROCEDURES

Captain (P) William D. Miller II
First Sergeant Jeffrey L. Kirk
Headquarters, 4th Squadron
2d Armored Cavalry Regiment
APO New York

ALERT PROCEDURES are critical to your success. This is true whether you are serving a tour of duty along the 38th parallel in the Republic of Korea, border duty with the 2d or 11th Armored Cavalry Regiment (ACR) in Europe or any table of organization and equipment (TOE) unit with a mission of rapid deployment from a garrison environment. R Troop, 4th Squadron, 2d ACR, Federal Republic of Germany, uses this method to achieve that mission. As will become evident, the method is nothing more than thorough planning to achieve an objective.

The first step in constructing an effective alert procedure is to apply standards to what has to be done. Then convert the procedure to a standard five-paragraph operations order (OPORD) format. There isn't a better way.

(Classification)
Copy No.____or copies
Issuing headquarters
Location
Date time group

OPORD No. (Alert Procedures)
Reference(s): All pertinent OPORDs, letters of instruction, standing operating procedures (SOPs), maps, etc.
Time zone used throughout the Order: Initial activities will be based on the N-hour sequence, that being the time that the squadron received notification (N-hour) of an alert. Thereafter Zulu or local as directed.

Task Organization:

Look at available resources in terms of operational aircraft, vehicles and personnel. This listing has to be constantly updated at troop level and forwarded to the squadron to give an accurate assessment of combat strength. An ideal method of doing this is an alert board that is updated anytime a change dictates because of aircraft availability, personnel leaves, temporary duties and rotations.

Apply available crews to aircraft in both terms of alert deployment and succeeding operational missions. (The first priority is to get the aircraft off the airfield.) This sometimes necessitates crewing more experienced aviators with crewchiefs to deploy operational aircraft to the local dispersal area (LDA), and then recrewing for tactical missions. Evaluate the abilities of assigned aviators. Consider the use of limited pilots in command (PCs) for deployment. Talk it over with the platoon leaders, instructor pilots and the safety officer. If an aviator is capable, designate him as a limited PC for deployment to the LDA.

Organic ground vehicle transportation will be the primary mover for troops in air cavalry and attack helicopter units. If utility aircraft are available, then consider using them for troop movement to the LDA. Air transporting troops to the LDA, task organized into quartering, security and nuclear, biological and chemical (NBC) monitoring teams, will reduce occupation time once the main body arrives. Ensure updated manifests are on file with the lift element.

Before deployment, assemble troops for an operational briefing. Included should be the means of transport, route, speeds and procedures, in case of breakdown or attack, and the priority of work on arrival at the LDA. Ensure troops are aware of the chain of

command, in case of disruption, and the challenge and password. Evaluate follow-on missions upon arrival at the LDA and the time constraints imposed. After security and communications have been established, precombat inspections are conducted to prepare for the movement to the forward assembly area.

1. SITUATION:

a. Enemy forces. An effective threat program within the unit is the backbone of this portion of alert preparation. Every member of the troop should be familiar with the potential adversary, to include doctrine, equipment and likely courses of action. Succeeding intelligence updates should build on previous briefings so that all aircrews and troops are familiar with the current situation and threat.

b. Friendly forces. All key leaders should understand the mission at least two levels higher and all troops should understand the mission one level higher. This will put unit activities and missions into perspective and result in success in the absence of orders. While it is acknowledged that each unit does things differently, standardization within the squadron in carrying out like-units mission essential task list will enable the cross-assigning of missions. Added to this is the need for a thorough understanding of the mission of ground maneuver forces with which the squadron will be operating.

c. Attachments and detachments. What additional missions does the unit have responsibility for other than alert and deployment? Does the unit pick up a maintenance contact team from the aviation unit maintenance (AVUM) troop for the deployment, or a radiological survey team for a survey of the LDA? Are there any staff aviators attached for alerts? Plan for the unexpected and have contingency plans to cover it.

d. Weather.

(1) Assign an aircrewmember, by TOE position, to obtain a weather briefing for the troop. Too much time is lost when individual crews attempt to obtain weather. The weather detachment should provide multiple copies of their forecast to facilitate a speedy process.

(2) Publish weather minimums for operations. What is the minimum weather to depart the airfield and reach the LDA?

2. MISSION

Your unit alerts and deploys to its LDA, departing the airfield within a specified time (2 hours for the purpose of this article), prepared to conduct tactical operations.

3. EXECUTION

a. Concept of operation. The unit commander's intent is to deploy the troop to the unit LDA, within a specified time, prepared to conduct tactical operations upon arrival.

b. Subunit instructions. Contained here is a list of all missions and activities that have to be accomplished from notification of alert, to arrival for occupation at the LDA. Compile a list of all required missions and put them in priority sequence. Then delegate those not accomplished by the headquarters element to subordinate platoons. Using alert cards, platoons are able to assign individual responsibilities to accomplish tasks.

c. Coordinating instructions. List the alert and deployment instructions and details of coordination that apply to the unit, not covered elsewhere in the order. Included are uniform, loads, reports, briefings, etc.

4. SERVICE SUPPORT.

a. Supply.

(1) Class I.

(2) Configuration of Class III and V resupply rates. The place to draw, and method of distribution for, initial upload of ammunition for personal weapons are included.

(3) Location of forward arming and refueling points and the squadron rotational order for initial upload of attack helicopters.

(4) Other classes of supplies.

b. Services and Transportation.

(1) Location of AVUM contact teams for assistance on the airfield and succeeding location in the LDA.

(2) Procedures and responsibilities for transferring control of nonoperational aircraft to AVUM.

(3) Procedures and responsibilities for deicing aircraft and starts requiring auxiliary power units.

(4) Downed aircraft and vehicle recovery procedures for deployment.

(5) Road march and convoy procedures.

5. COMMAND AND SIGNAL

a. Command.

(1) Chain of command.

(2) PC designation.

(3) Location and time of deployment briefing.

b. Signal.

(1) Procedures and recipients for distribution of Communications-Electronics Operation Instructions (CEOIs).

(2) Secure radio codes (per SOP).

(3) Nonverbal communications signals (per SOP).

(4) Lost communications procedures (if other than SOP).

(5) Frequencies other than contained in CEOIs.

Through the use of the OPORD, you have identified and directed the accomplishment of those critical collective and individual responsibilities necessary for a successful operation. The principal aim of our alert procedures was to put faces to places during the procedure. Initially, a by-name listing of duties was thought to be the best method for this, but it proved to be flawed in that leaves, duty, illness, etc., could result in critical missions not being accomplished. We came up with a by- position listing of duties during the alert.

During an alert, after signing in, officers and troops draw an alert card. Each card contains the duties, times and responsibilities to be accomplished. These cards were cross-referenced against all troop duties and responsibilities for completeness. Duties were then incorporated for the performance of critical duties, for example, perform duties of a position such as troop commander, as directed.

During inprocessing, alert cards are issued to new officers and troops. Their duties are explained, and a "walk through" conducted to ensure a thorough understanding. Periodically, the entire troop is walked through to see if any improvements can be made.

Key leaders in the troop are issued an "alert book" (see below) that expands on the OPORD.

Success in alerts begins with identifying all missions and duties to be accomplished, application of a standard to those conditions and hard work on the part of every officer and troop in the unit to achieve those standards.

1. OPORD
2. Alert SOP (containing the following annexes and enclosures)
   a. Alert roster
   b. Alert manifest
   c. N-hour sequence
   d. Packing list
   e. Marshalling/movement instructions
   f. Load plans
   g. Strip maps to the LDA
   h. Tactical march orders
   i. Unit convoy briefing format
   j. NBC recon/security/reaction teams SOP/composition
   k. Reports
3. Alert checklist
4. Sensitive items checklist
5. Precombat inspection checklist
6. Evacuation/destruction instructions
7. Squadron alert SOP

Major (P) Frank T. Taddonio
Task Force-Hawk
Fort Kobbe, Panama

Marines boarding TM Shadow UH-60

7th Infantry Division (Light) Supports JTF-Panama

THE COMBAT Aviation Brigade, 7th Infantry Division (Light), has fulfilled an extremely demanding mission for more than 5 months. The brigade has provided an aviation task force (TF-Hawk) to Joint Task Force (JTF)-Panama to support U.S. national policy. This article provides an overview of this mission and how it is being executed.

The initial mission requirement was placed on the 7th Infantry Division (Light) in response to a crisis situation that developed in the Republic of Panama during March 1988. The aviation task force was formed around Headquarters, 7th Aviation Battalion. The task force included one of its assault companies, D Company, 123d Aviation Regiment, a composite scout and gun element formed around B Troop, 2d Squadron, 9th Cavalry (Recon). The task force included assets of A Company, 1-123d Aviation Regiment, a composite maintenance company formed around D Company, 7th Aviation Battalion. It also included elements of 2-9 Recon Squadron, 1-123 Aviation, and E Company, 123 Aviation. The headquarters company was rounded out with elements of Headquarters and Headquarters Company, Combat Aviation Brigade and a tactical satellite operator from Company B, 127th Signal. In addition, an infantry platoon from Company B, 1-9 Infantry Regiment, was assigned to provide doorgunners for each of the 15 UH-60 Black Hawk helicopters and additional security for the task force.

The task force mission was, and continues to be, to deploy to the Republic of Panama to augment in-place security forces to protect U.S. facilities and installations. The planned duration for the mission was 60 days, but circumstances have caused the mission to continue indefinitely. TF-Hawk has provided mission support to JTF-Panama for 160 days as of 10 September 1988. We developed a system for rotating personnel from Ft. Ord, CA, to Panama and back since we learned that this would be a long-term commitment. On 21 May 1988, we rotated 30 personnel and 3 aircraft. A major rotation was carried out on 3 July 1988 when we received 120 personnel, and a commensurate num-

ber of soldiers was returned to Ft. Ord. Another rotation was completed on 25 August 1988. As the mission continues, we will attempt to rotate people out at about the 90-day point in their commitment. However, a number of soldiers in key positions within the task force will remain in Panama until the mission is completed.

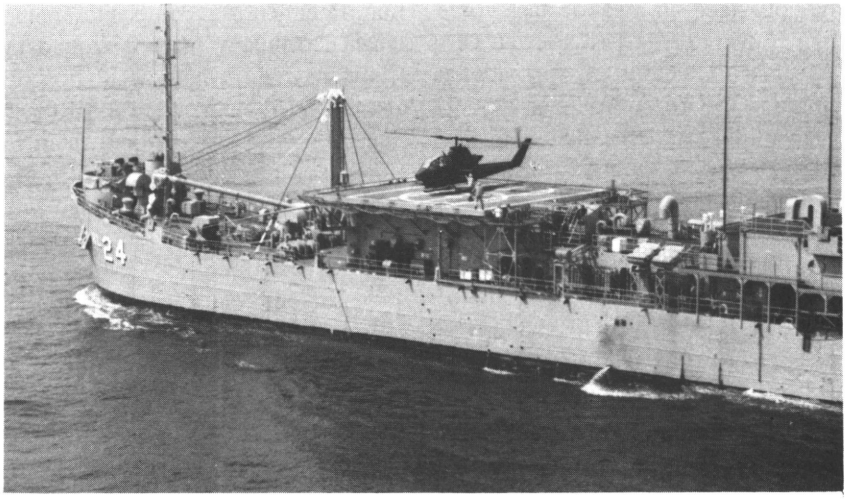
The task force is assigned to a joint task force. Many unique opportunities to train and operate with all the other Services have occurred. We have revitalized a concept used during Vietnam that provides for the mutual employment of an Air Force C-130 Hercules and AH-1 Cobra helicopters to engage hostile targets, sequentially or simultaneously. We have conducted this live fire training exercise routinely and have learned a great deal about the capabilities and limitations of this U.S. Air Force platform. We have also worked with U.S. Air Force A-7 Corsair IIs and Cessna OA-37s on a number of exercises, including the conduct of dry and live fire joint air attack team training and search and rescue operations.

Our search and rescue operations have improved procedures for recovering downed aircrews in a hostile environment. We have integrated all of our assets including infantrymen with a medical evacuation UH-60, A-7s and OA-37s. The task force also has conducted escort missions with submarines that transit the canal and require protection along critical areas. Our attack helicopter pilots seized the opportunity to train when the U.S.S. *Sphinx* departed for Honduras. They received deck landing qualification training by landing on the ship's deck while it was underway some 30 miles offshore. Besides these missions, we have routinely trained with, and supported, the U.S. Marines, U.S. Navy, U.S. Air Force and the 193d Infantry Brigade.

Our infantry platoon also has taken advantage of this deployment to hone their skills. The highlight of their training has been the conduct of actual operations side-by-side with the U.S. Marines on the Arraijan tank farm. The infantrymen have conducted day and night patrols in the jungle around the tank farm to ensure protection of that facility. Also, the Manchu soldiers have been integrated into the flight crews of the UH-60s as doorgunners. Each soldier was assigned to an aircraft and performed duties along with the crewchief. We have fired the doorguns at least once a month to increase their level of proficiency with this weapon system.

All of the members of the task force have represented the division in an extraordinary manner. While all soldiers have worked extremely hard, our maintenance personnel have habitually put in 18-hour days. The results of their efforts have been near 100-percent operational readiness of all aircraft assigned to the task force. One superlative example of their great work is the completion of a UH-60 500-hour phased maintenance in 8 days. At Ft. Ord this same maintenance procedure is normally completed in 30 days. The actual goal set by Sikorsky is 14 days. In addition, our AH-1 maintenance personnel have completed five Cobra 150-hour phases. This is the same number of phases

AH-1 Cobra crewmembers receiving deck landing qualification training by landing on the deck of the U.S.S. *Sphinx*.



TM Shadow extracts members of 193d Infantry Brigade.

UH-60A Black Hawks from TM Shadow at Rodman Naval Station to pick up Marine fast team.

OH-58 Kiowa from TM Viper scouting along the Chagres River.

performed over an average year in the Recon Squadron. Two OH-58 Kiowa 350-hour phases also have been completed during this same period. The accomplishments merely typify how the entire task force has performed during the entire deployment.

All of this training is great and unique to this deployment; however, we have always kept our mission in focus. The task force always has some elements on a 1- or 2-hour standby, 24 hours a day, 7 days a week. We all realize that we may be involved in combat operations on short notice. All of the task force soldiers recognize the importance of the mission. It is not uncommon for them to work until 2000 or 2100 hours. This work invariably carries over to Saturday or Sunday. We have gained great benefits in aircraft maintenance by establishing night crews who report for duty at 2000 hours and work until 0800 the next morning.

As the duration of the commitment to this mission extended, we realized that we must perform all the normal functions accomplished at Ft. Ord. Therefore, we also emphasize physical fitness training 5 days a week, individual and crew served weapons proficiency, common task training and skill qualification testing. Through the task force command sergeant major, we have sent our lightfighters to leadership schools here. The first two soldiers we sent to the Primary Leadership Development Course achieved honors by making the commandant's list. We currently have three individuals enrolled in the Basic Noncommissioned Officers Course. We've also sent one of our aviators to jungle survival training. In addition, we conduct promotion boards and process personnel actions like any other unit.

This article has demonstrated how aviation is currently being employed in an actual contingency. You may have gained an appreciation for the type of activities we are involved in as a member of JTF-Panama.

Last, I wanted to convey to the aviation community how great today's soldiers are and how well they are representing the 7th Infantry Division (Light) and the U.S. Army. Soldier power is alive and well, as exemplified by all the members of TF-Hawk when they execute their mission to support JTF-Panama.

THREAT

Donald E. Neese, Ph.D.
Directorate of Combat Developments
Threat Division
Fort Rucker, AL

Soviet Obscurant Capabilities and Effectiveness

DURING THE 1980s, if one thread has run through the military force modernization in the United States, it has been the preoccupation with "smart" weapons and systems employing high technology to offset threat superiority in numbers of personnel and equipment.

We, and our North Atlantic Treaty Organization (NATO) allies, intend to destroy enemy targets through visual means or by use of low-light level television, laser designators, beam-riding missiles and electro-optical fire control systems, among others. Our potential adversary, the Soviet Union, has not been standing still and passively observing these Western developments. On the contrary, the Soviets went back to a low-technology solution that had proved successful in the past.

During World War II, the Soviets used obscurants in hundreds of operations, at division and army levels, to degrade enemy target acquisition and thus reduce the effects of enemy fire.[1] The results demonstrated that infantry weapon fire alone is reduced 10 to 15 times by obscurants blinding gun crews and 4 to 5 times when laying fire on targets screened by obscurants.[2]

With the introduction of electro-optical surveillance and guidance systems following World War II, interest in obscurants declined because obscurants seemed to be of little use against these modern systems. During the 1960s, however, interest in the military applications of obscurants was renewed in the Warsaw Pact. Moreover, the use of obscurants during the Yom Kippur War in 1973 reestablished the advantages of obscurants in both offensive and defensive operations.

For example, during that conflict, Soviet-made AT-3 SAGGER antitank guided missiles (ATGM) destroyed more than 130 Israeli tanks in 2 hours. However, once the Israelis began to employ infantry and obscurants as supporting elements, they began to overcome the Egyptian ATGMs.[3] Since this period the Soviets alone have published at least 25 important articles in their military magazines on the use of obscurants in combat.[4]

Traditionally, smoke was defined as those substances that obscured the visible spectrum and aerosols as those that attenuated the infrared spectrum. For this article, obscurants will be used to denote those substances, whether gaseous, liquid or solid, either manmade or natural, that are suspended in the atmosphere and attenuate (degrade) a portion of the electromagnetic spectrum.

Generally, analysts divide obscurants into three groups or generations depending on how they affect the electromagnetic spectrum (figure 1). The first group or generation denotes those obscurants that screen the visible band, specifically white phosphorous, naphthalene, anthracene, "fog oil," titanium tetrachloride and S-4 (composed of sulfur trioxide, chlorosulfic acid and concentrated sulfuric acid). These obscurants are all based on World War I and World War II technology. Although these obscurants as a group are only able to screen the visible spectrum, laser designator wavelengths of 1.06 micro-

meters (near infrared) also are screened effectively (figures 2 and 3, page 42).

Lately, a second group or generation of obscurants has been the subject of extensive research and development. These obscurants that use metallic particles are capable of screening both the visible and infrared bands of the electromagnetic spectrum. In addition, recent studies have shown that even ordinary white phosphorus (WP), in large concentrations, will have the same effect. Even artillery-produced dust, under all but the wettest soil conditions, will screen visual, laser designator and thermal viewer systems. If the preparatory artillery barrage continues for a few minutes, large areas of the battlefield will be screened for tens of minutes or more.[5] Incidentally, Soviet artillery preparation fires could last up to 50 minutes or longer, or they could be repeated against well-fortified, deeply echeloned defenses.[6]

Analysts define the third group or third generation of obscurants as multispectral—those agents that obscure the visible, infrared and millimeter wave (radio waves) of the electromagnetic spectrum. Given the pace of research and development in this area, these obscurants may be part of the military inventory today.[7]

What does all of this mean to the Army aviator? The essential thing to remember is that obscuration will be present in significant quantities on the future battlefield. Detection of enemy vehicles will be difficult and identification will be close to impossible at significant distances. Why is this so? First, there are many meteorological conditions in which, even without obscuration, your thermal imager will be degraded. Some of those conditions exist at dawn and dusk, during the presence of low, thick clouds, with optical turbulence (the uneven heating of ambient air), and during falling rain and snow (figure 4). In each case, target and background temperatures are closer together reducing thermal contrast and the effectiveness of your imager.[8] Hopefully, the enemy vehicle engines are hot, thus creating a large contrast with their background.

Consequently, we can expect a considerable amount of fratricide as friendly vehicles, positions and helicopters are engaged by friendly artillery, air defense systems and helicopters on the nonlinear battlefield. Before the above statements are discounted, several clarifying remarks must be made. Because some obscurants are toxic or chemical agents may be intermixed with them, chemical protective

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[1] ITAC, Use of Smoke in Soviet Tactics, ATC-CR-1100-078-78, 1978, p. 1-1.

[2] USACAC, FM 100-2-1, The Soviet Army, 1984, p. 13-1.

[3] Holst, Dr. Gerald, Tactical Smoke Increases Survivability, *Armor*, May-June 1984, p. 21.

[4] Author's research.

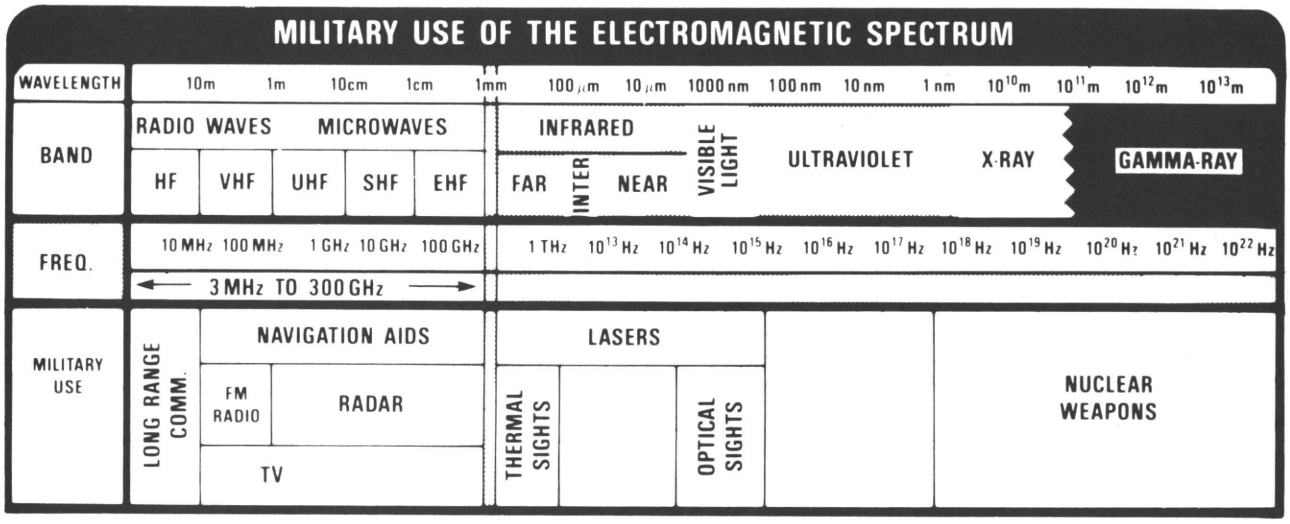
[5] Smoke and Natural Aerosols Parameters (SNAP) Manual, April 1985, p. 5-4.

[6] The Soviet Army, op. cit., p. 8-2.

[7] Third Generation Soviet Obscurants (unclassified title), AMC Message of DTG 201210Z November 1987.

[8] Seagraves, Dr. Mary Ann, How Weather Influences Thermal Imager Performance, *Military Intelligence*, June 1987, pp. 22 and 49.

FIGURE 1: The electromagnetic spectrum.



gear will be the order of the day. Operating in protective clothing produces among other things, depressive psychological effects. These effects were confirmed in the recent phase 1 of the Combined Arms in a Nuclear/Chemical Environment test program. In this 72-hour exercise, leaders experienced disorientation, confusion, frustration and irritability. More importantly, 20-percent of the friendly rounds fired were directed at friendly personnel.[9]

Your next question is probably whether the Soviets can screen the battlefield effectively for an extended period of time. To answer that question, we must consider—

- The quantity of obscurant dispensers.
- The amount of obscurant needed to screen a given area for a certain period of time.
- The percentage of a unit of fire (basic load or two or three times basic load depending on weapon) allocated for obscurant rounds.
- The resupply capability of logistical elements.

First, the Soviets are well supplied with obscuration delivery systems, including smoke pots and barrels; mortar-, artillery- and rocket-delivered obscurant rounds; vehicle-mounted screening systems; helicopter-mounted screening systems; and grenades. The fact is that there are more than 300 delivery systems in the average motorized rifle or tank division.[10] For example, all modern Soviet tanks and infantry fighting vehicles have vehicle engine exhaust systems (VEESS) as well as obscurant grenade launcher systems.

Second, to screen 1 kilometer of the battlefield with pasquill stability (moderately stable); 83-percent relative humidity; wind speed of 2.5 m/seconds and directed 45 degrees with respect to front, placing the smoke between the observer and target does not require an extraordinary expenditure of obscuration rounds. For example, to screen the visible band for 1 minute requires only 36 81 mm rounds of red phosphorus (RP), 8 4.2-inch rounds of WP, 10 105 mm rounds of hexachlorethane (HC), 14 105 mm rounds of WP, 2 155 mm rounds of HC or 6 155 mm rounds of WP. To screen both the visible and infrared bands for 1 minute requires 132 81 mm rounds of RP, 20 4.2-inch rounds of WP, 48 105 mm rounds of WP and 15 155 mm rounds of WP.[11]

One must also remember that other sensor defeat mechanisms such as dust and various forms of precipitation are not accounted for in these calculations. These are not many rounds when you consider that a Soviet regimen-

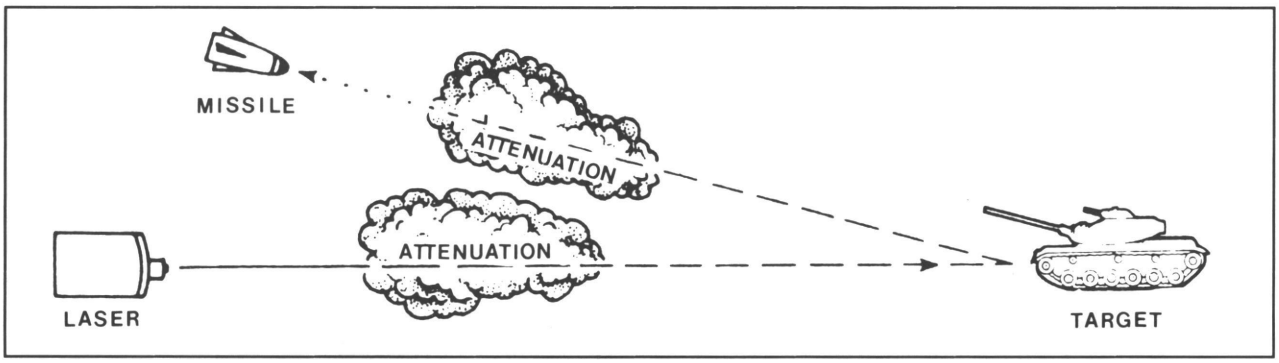


FIGURE 2: Laser-guided seeker and laser rangefinder obscurant effects.

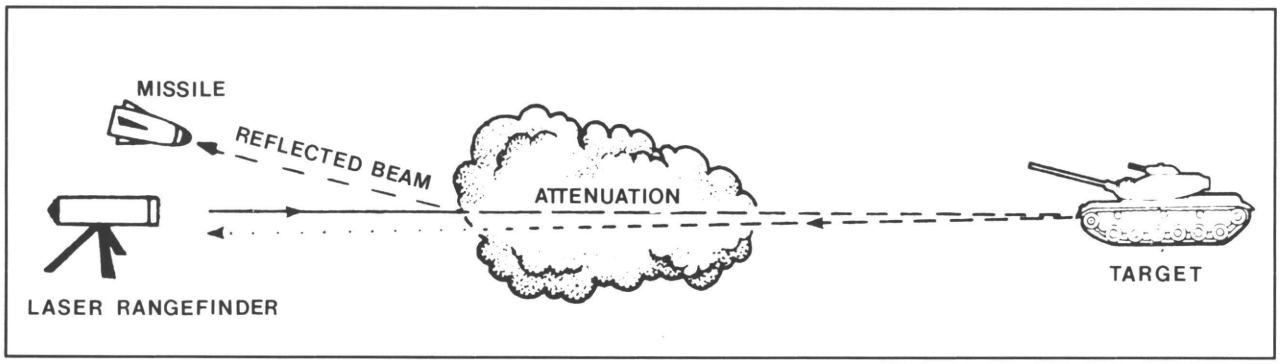


FIGURE 3: Laser rangefinder obscurant effects.

tal artillery battalion alone would have well over 2,000 rounds available to support an attack. Remember, these figures do not include VEESS assets, large area smoke generators, smoke pots or additional support from division or Army.

Thus, the bottom line is that the Soviets cannot perpetuate a smoke screen over the whole battlefield; however, they are able to obscure necessary sections of the battlefield for significant time periods.

To summarize, as a helicopter pilot, you will probably not see enemy vehicles emerging from the obscuration until they are 1,000 meters or less from the forward line of own troops. And then your position and other friendly positions may be in danger of being silhouetted by obscuration rounds falling on rear area targets.[12] In addition, obscurants will surely be incorporated into maskirovka (cover, concealment and deception) planning to mislead you as to the direction and nature of the axis of advance, river crossings and airmobile insertions.

Finally, what obscurants do the Soviets possess? We do know that they have in their inventory both first and second generation obscurants.[13] These are capable of blotting out those bands of the electromagnetic spectrum in which most of our sensors operate. There is also speculation that they may have third generation obscurants.[14]

In this area of expensive and smart weapons like TOW, HELLFIRE and fiber-optic guided missile, cheap countermeasures like obscurants can effectively preclude the effectiveness of these systems. The Soviets are well aware of these facts and well equipped to employ obscurants as a multiplier of combat power on the battlefield. From their writings on obscurants, they would have us believe that obscurants are at least as effective as suppressive fires in limiting the adverse effects of NATO's high technology weaponry. Although this is not good news, at least you are aware of the facts. As the old saying goes, "To be forewarned is to be forearmed."

[9] U.S. Army Chemical School, Winning in a Nuclear/Chemical Environment, SH 3-800, July 1987, pp. 4-8.

[10] USACAC, FM 100-2-3, The Soviet Army, 1984, p. 4-36.

[11] SNAP, op. cit., p. 5-3.

[12] ABRAMTSEV, Major General B., Use of Smoke in the Offensive, *Voyennyy Vestnik*, December 1976, p. 119.

[13] AIA, Soviet Smoke (unclassified title), AST-2660Z-058-88, 27 January 1988, SECRET/NOFORN/WNINTEL, p. 1.

[14] Ibid, p. VII.

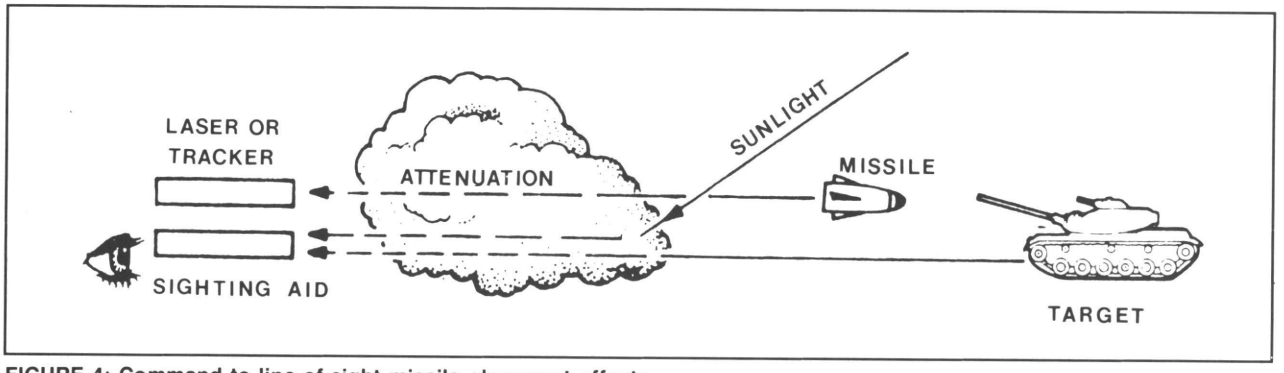


FIGURE 4: Command to line-of-sight missile obscurant effects.

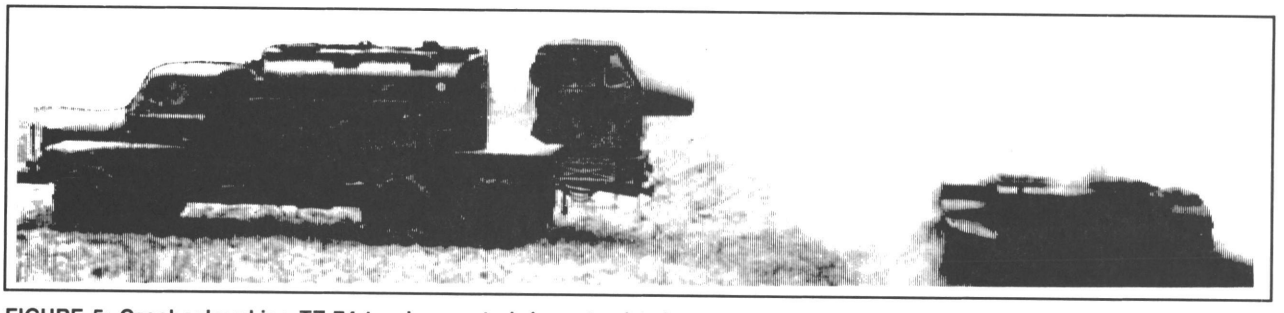


FIGURE 5: Czechoslovakian TZ-74 truck-mounted decontamination apparatus, which is similar to the Soviet TMS-65.

Mr. George Philips

Parts 1 through 13 of the AH-64, A Total System for Battle, series are available upon request. Requests should be addressed to Editor, *U.S. Army Aviation Digest*, P.O. Box 699, Ft. Rucker, AL 36362-5042.

AH-64

A TOTAL SYSTEM FOR BATTLE

This is the thirteenth and final article in a series on the AH-64A aircraft and weapons systems. "Apache Air-to-Air" addresses the AH-64A counterair development system currently under contract for the U.S. Army.

Apache Air-To-Air

McDONNELL DOUGLAS Helicopter Company (MDHC) has initiated a number of programs to enhance the capabilities of the AH-64A Apache attack helicopter. The Army has contracted with MDHC to integrate the Stinger missile system into the aircraft. The foundation of an Apache multistage improvement program (MSIP) is being laid through studies of the evolutionary path for the mission equipment package, which avoids duplication of research and development (R&D) efforts.

MDHC has been conducting internal research and development (IRAD) since 1985 to reduce the technology risks to aircraft improvements. These technologies will increase the mission effectiveness of the Apache and allow it to meet the threat more effectively into the next century. The most significant new mission area for the Apache is air-to-air.

The role of the combat helicopter has grown from the original combat support and medical evacuation mission of the Korean War to the highly sophisticated antiarmor weapon system associated with today's intensive battlefield. Continually expanding roles and emerging threats have driven helicopter fleet modification to counter evolving threats. The following paragraphs describe current Apache efforts to defeat threat air systems.

The air-to-air mission is called many names, to include air-to-air combat, counterair, cat fights and fur balls. Whatever the nomenclature, a need exists for Army aircrews to be able to conduct air-to-air operations, especially against threat helicopters, to protect themselves and other elements of the friendly forces. Many operational commanders, supported by analysis, have identified the inability to conduct effective counterair missions in Army helicopters as a high-priority mission deficiency. The urgent need to eliminate this deficiency resulted in a challenge to industry to identify enhancements to the helicopter fleet to impact positively Army counterair operations capability. The Army is concurrently developing a required operational capability for air combat enhancements that can be applied to all aircraft.

Many consider the AH-64A Apache the most effective and lethal attack helicopter in the world. It was designed primarily as an air-to-ground weapons system. Because of the Apache's tremendous maneuverability and performance capability, the Army and MDHC naturally cooperate to enhance the Apache for air-to-air

AH-64 *A TOTAL SYSTEM FOR BATTLE*

photographs courtesy of McDonnell Douglas

The AH-64 Apache firing a Sidewinder air-to-air missile.

Apache's maneuverability makes it highly suited for air combat operations.

operations. Such a capability becomes more significant when considering the potential role of the Apache as an element of the Forward Area Air Defense System. Various independent and contracted research and development programs have been started to move the Apache's sights to the sky.

With support and guidance from the Army, the AH-64 has been transformed into an effective air-to-air weapon system. Tests and demonstrations have been conducted in—

- Multiple missile integration.
- Field of view enhancements.
- Gun system improvements.
- Maneuverability, agility, performance and dynamic loads analysis.

The first step was to review the Apache's capability to destroy air threats with the present aircraft missile system. Users of the Apache's HELLFIRE system have gained an appreciation for its ability to destroy enemy armored forces. Rockwell International has completed a simulation which suggests that, in many cases, the HELLFIRE can be an effective counterair weapon. Despite HELLFIRE's air-to-air capability, a requirement for a dedicated air-to-air missile has been identified for the Apache and other Army aircraft.

The Army's current requirement is to provide an Air-to-Air Stinger (ATAS) capability. This system development on the AH-64 is currently under contract and is undergoing prototype qualification testing. This program, managed by the ATAS project office of the U.S. Army Aviation Systems Command, St. Louis, MO, will achieve integration of the Stinger on the Apache. Using the Government-furnished equipment (GFE) system manufactured by General Dynamics and found on the OH-58D Kiowa, the Apache will be outfitted with wing-tip stores capable of carrying two missiles on each side. This configuration enables the Apache to retain its full air-to-ground weapons capability. This system will be used during contractor and Army tests to define the safe firing envelope for the missile on the aircraft. The GFE ATAS system is not ideally suited to the Apache's integrated weapon system; therefore, a concurrent source selection process will be conducted to provide an Apache Stinger system with these attributes:

- One-hand, eyes out of the cockpit operation.
- Simplified operation with minimum training.
- Automatic or manual control.
- Growth potential for future weapons.
- Dynamic potential for future weapons.
- Dynamic off-axis seeker operation.
- High reliability.
- No cooling air required and minimum modifications to the Apache.
- Installation within existing space and weight restrictions.
- Continuous built-in test/95-percent fault detection/isolation to the line replaceable unit.
- Low initial and recurring cost.

Many of these attributes were evaluated and found to be feasible during independent research and analysis conducted by McDonnell Douglas. The system attributes will be incorporated into the Stinger engineering change proposal modification work order, providing the AH-64A a truly effective counterair capability. Beyond the Stinger option, the research identified tremendous flexibility and increased capability for the air-to-air mission by adopting a "multiple missile" integration approach.

Before the Stinger contract was started, MDHC Apache engineers set out to demonstrate near-term missile enhancements for the AH-64A. Flight testing has been completed on a system that gives the user the choice of loading Stinger, Sidewinder, Mistral or even Sidearm antiradiation air-to-ground missiles, on the Apache. Test firings or captive flight tests were conducted using existing wing store stations. All missiles were controlled through a system developed by Base 10 Defense, Inc. The data derived from these flight tests will yield valuable information to the Army on the use of these systems and their utility in combat under varying conditions.

One-on-one missile comparisons were not made during the trials. The objective was to determine if the Apache could control each missile with the same electronics equipment and use maximum missile off-axis capabilities. Test findings show that crewstation differences among missile types are virtually transparent to the pilot. The same symbology is used for each missile. This standardizes missile acquisition procedures and minimizes training requirements. The Apache weapons system corrects for different missile firing characteristics. Given the findings of the private research and the direction of the contracted effort, it is conceivable that this type of system could be commonplace on Apaches in the near future.

The multiple missile approach provides mission flexibility to Apache aircrews. Depending on the combat situation, certain missiles may be more available or better suited to particular missions and conditions. The multiple missile approach offers the flexibility to use any missile required or available.

In expanding the multiple missile concept, the Apache recently fired the AGM-122 Sidearm antiradiation missile. The Sidearm uses a broad band, passive seeker that can be employed against threat air defense system or C3I critical nodes. The testing of the Sidearm was an evolutionary progression from air-to-air tests since it was easily accommodated in the multiple missile fire control system. The Sidearm capability is not currently identified as an Army requirement; however, it could be an important combat capability for defeating the threat air defense umbrella. When coupled with other equipment, such as the AN/APR-39A, Radar Warning Receiver or Radio Frequency Interferometer, the Sidearm could provide a fire and forget Short Range Air Defense system with off-axis capability in the near term with low cost and low technical risk.

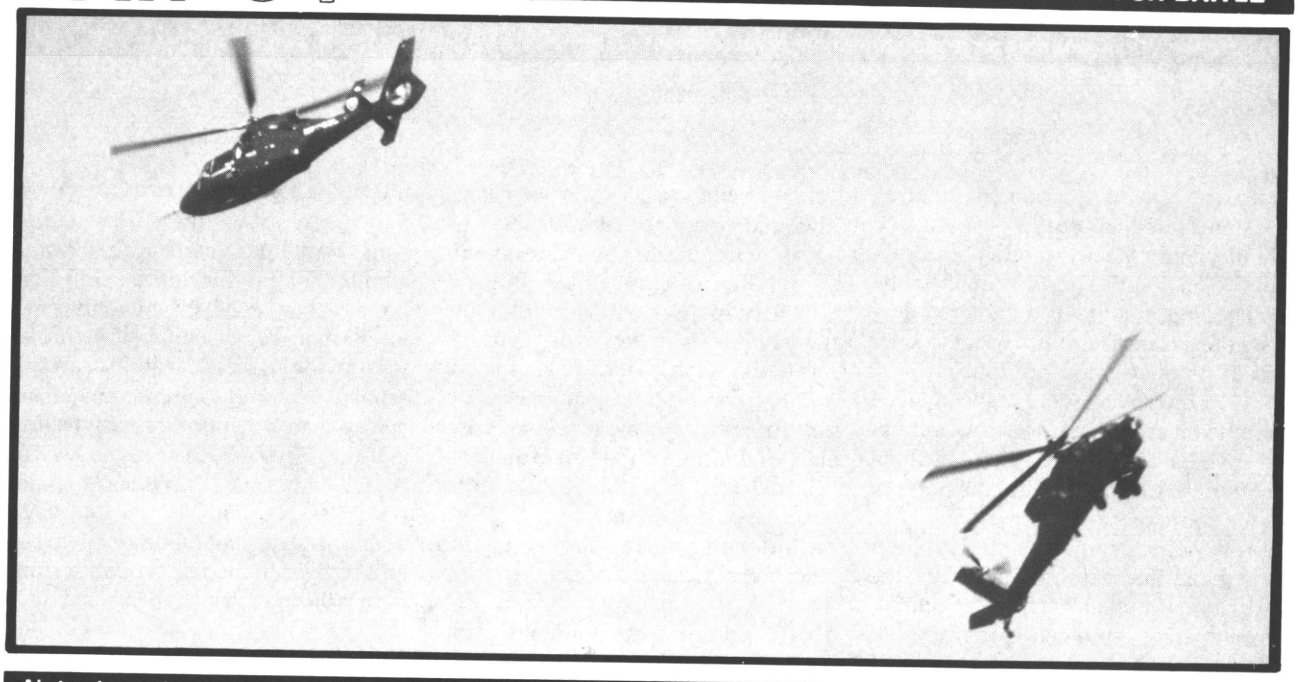
The need to improve the crewstation field of view (FOV) in the Apache has

become evident since fielding. Crewstation rollover structural requirements drove the present canopy design. During the air-to-air combat tests (AACTs) conducted at Patuxent River, MD, improved FOV was emphasized for the day contact environment. The ability of the pilot to acquire and maintain visual contact with an adversary aircraft will continue to be an important design challenge. In response to this challenge, a plan was developed to redesign the canopy to allow for better FOV. The plan explores the use of rear viewing devices, such as mirrors, video and other sensors, and the reduction of crewstation visual obstructions. As the feasibility of these approaches is demonstrated, product improvement proposals will be evaluated.

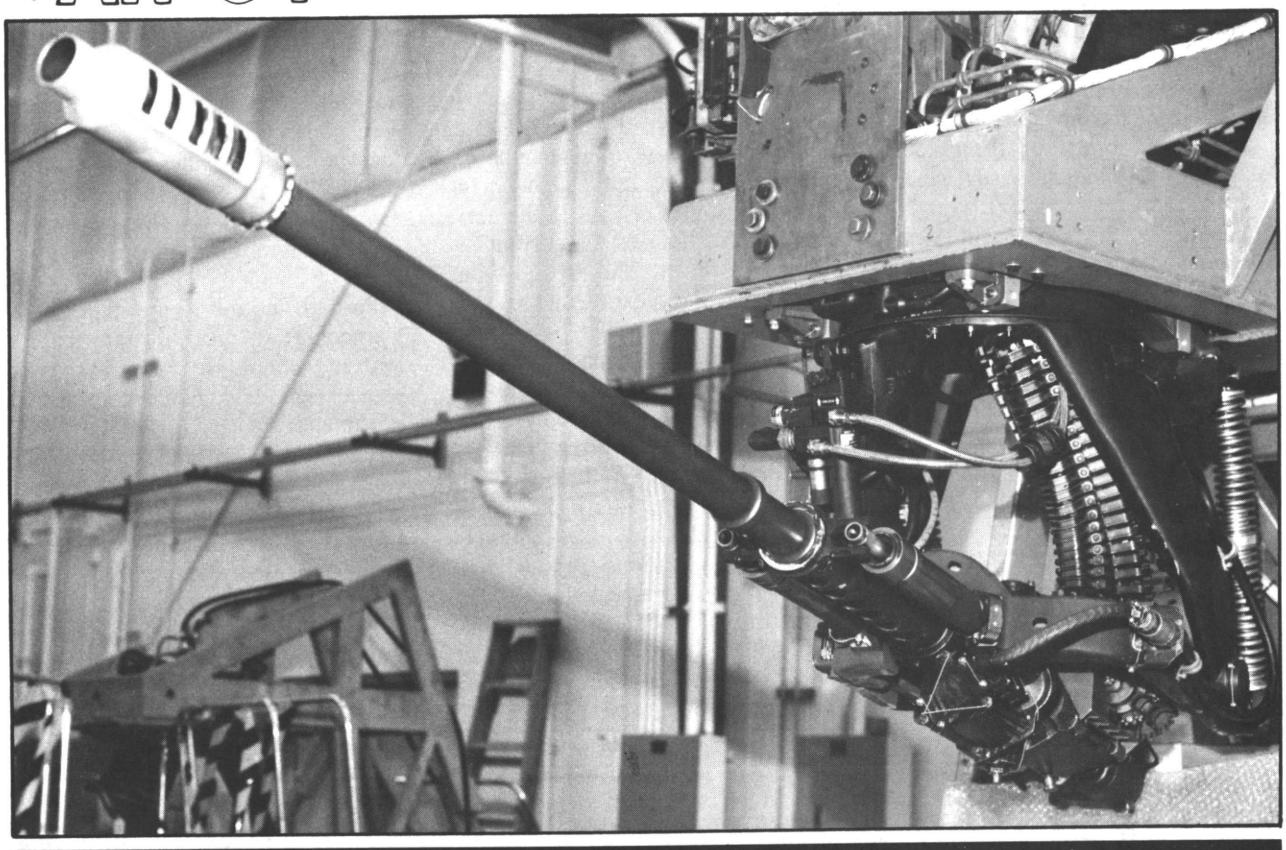
As an element of the requirement to conduct tactical training of pilots in air-to-air combat, the Army evaluated the design of helicopters to determine their capability to withstand the rigors of evasive and offensive aerial combat maneuvering. The AACT series of tests evaluated various helicopter capabilities in the worst segments of the aerial combat environment. The principal objective of the AACT series of flight tests is to determine the maneuverability, agility and performance attributes critical to the aerial combat effectiveness of current and future rotorcraft. The AH-64A participated in the most recent research looking at these design parameters. The tests focused primarily upon the contact fight. AACT-IV proved that Apache performance in the close air engagement is noteworthy.

In many instances, however, the Apache does not "talk back" to the operators with the typical helicopter high-load indications of increased vibration or airframe bucking. This factor raises the concern that it may be possible to over stress components without having an indication in the crewstation. MDHC and the Army will continue to investigate means to improve the pilot's ability to concentrate on the air-to-air tactical fight while maintaining the aircraft within the flight envelope. A solution may be some form of envelope cueing to be incorporated into the aircraft in the future. There is also a need to reexamine the aircraft flight envelope appropriate for air-to-air maneuvering requirements.

Perhaps the most important lesson learned during AACT-IV was that the aircrews should strive to avoid the contact fight, taking advantage instead of the aircraft sensors and maximum weapons ranges. Other AACT-IV conclusions will be used to form the basis for detailed designs and for simulation effectiveness analysis studies in air-to-air combat. These studies will shed light on loads and stresses experienced by the airframe and dynamic components, the effectiveness of the turreted gun, auto



Air-to-air combat tests (AACTs) IV.

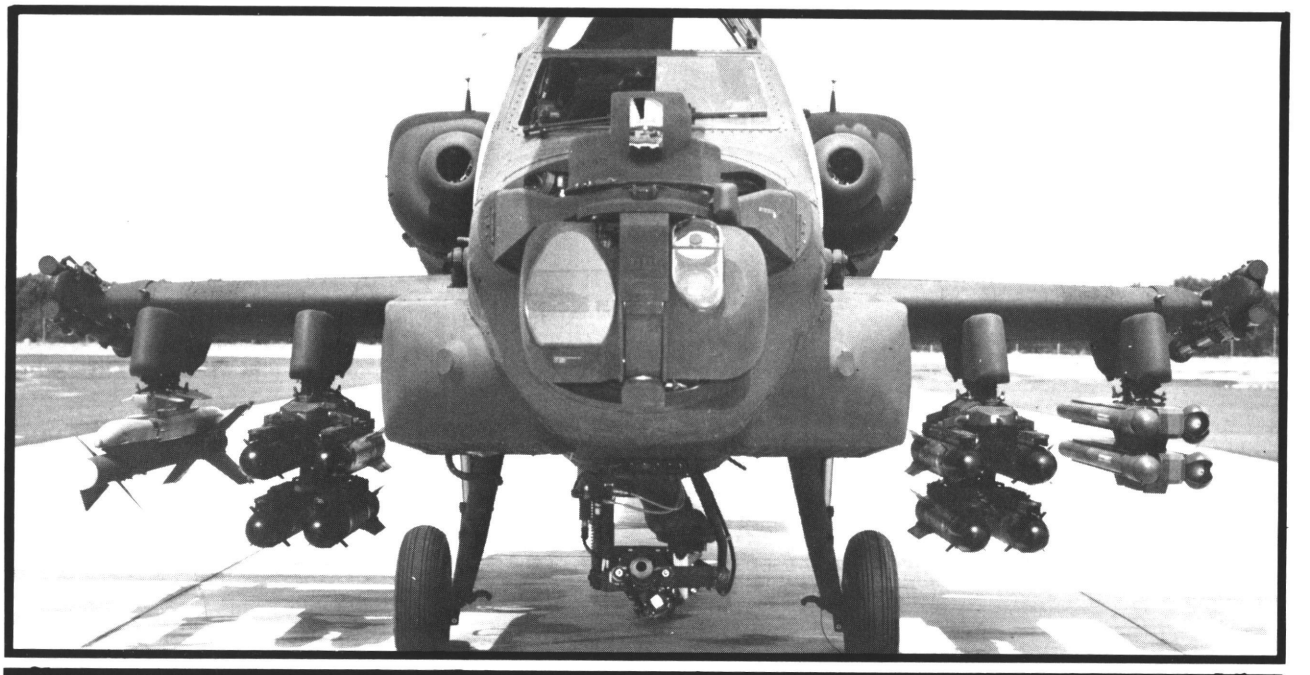


The 60-inch gun barrel and the M-23P 30 mm chain gun with the stiffened turret fork assembly on the McDonnell Douglas internal research and development test stand.

tracking, helmet mounted sighting systems and aircraft performance agility and maneuverability. Follow-on AACT series tests remain to be scheduled, but the data gathered during the past tests are sufficient to keep analysts busy for some time.

Gun improvements for the Apache are being considered. The overall objective is to adapt an area weapon system to the point target gun system required for air-to-air. The U.S. Army Armament Research, Development and Engineering Center and the Aviation Applied Technology Directorate have initiated programs to develop and demonstrate the effectiveness of a heliborn air-to-air weapon suite based upon integrated advanced weapons technologies. The AH-64 was selected as the test vehicle for this program. The program primarily focuses on the 30 mm gun and Hydra-70 rocket with flechette warheads. A trade study is in progress to determine the modifications necessary for an acceptable level of performance in the air-to-air environment.

Apache 30 mm gun IRAD efforts have been directed at improving turret fork stiffness and eliminating the mechanical free play of the turret. Industry support in experimenting with a turret control system and programmable firing patterns is also being accomplished. Besides development and testing of a 60-inch barrel for the 30 mm cannon, there have been significant work and interest in 30 mm ammunition improvements. Olin Corporation has been working to improve the 30 mm projectile time of flight and to provide tracer capability. Work scheduled on gun improvements is nearly complete. Preliminary testing and range firing will lead the way to Apache air-to-air firings against airborne targets. The AH-64 will have demonstrated a preliminary air-to-air ability by conducting ground testing during this month of December. Using the best of the Army laboratory evaluations and industry's experiments, the Apache community will benefit from



AH-64 Apache has great flexibility with possible armament (from left to right): 2 wingtip mounted Stingers, Sidearm, 4 HELLFIRE, 30 mm chain gun, 4 HELLFIRE, 4 Mistral, and 2 wingtip Stingers.

application of these enhancements.

The past year has been exciting as the Army and industry cooperated to meet the air-to-air challenge. Success has exceeded expectations with the integration of a multiple missile system, successful firings of the Sidewinder and Sidearm, and captive flight testing of the Stinger and Matra Mistral. The Stinger contract defines the limits of the ATAS on the Apache. A competitive selection of a missile control system suited to the Apache's requirements being implemented will be made. Users will see the benefits of these efforts in the near term. Combined with the success experienced in gun improvement programs, there is little doubt that the Apache will continue to be a powerful force multiplier against traditional ground threats and the emerging threats of the counterair environment.

At left, two Mistral air-to-air missiles.

Mr. George Philips, a retired Master Army Aviator, has been a Program Manager for Advanced Apache Programs at McDonnell Douglas Helicopter Company (MDHC) since joining the company in March 1986. He manages the internal air-to-air research and development programs, the Air-to-Air Stinger contract and those activities related to integration of the Airborne Target Handover System into the Apache.

ABOUT THE AUTHOR

USAASO SEZ

Military Airspace Management System for Special Use Airspace

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EACH MILITARY service has a requirement for special use airspace (SUA) within the National Airspace System (NAS) to contain activity that is considered hazardous to, or incompatible with, other users of the NAS. Until a few years ago, this presented little or no problem. There was sufficient airspace for all users. Within the last few years however, the luxury of abundant airspace has vanished. The skies are now crowded. The military services must compete with rapidly growing commercial and general aviation for access to the NAS. At best, this competition ends in a draw for the military.

Use of SUA by the military is being challenged more and more by special interest groups. General aviation is more vocal with its +300,000 membership. Commercial aviation is more visible with its millions of passengers. Other groups, including the environmental and naturalist groups, object to military SUA. They object because of noise pollution, air pollution, the adverse impact military operations have on wildlife, the ecology and for various other reasons. These groups have considerable political clout and are using it more and more frequently, as is evident by the recent increase of congressional involvement.

The Federal Aviation Administration (FAA), reacting to congressional and public pressure, has initiated several actions designed to provide more access to the NAS, primarily by commercial aviation, but also for general aviation. These actions include the en route capacity program, designed to reduce scheduled air carrier delays; the terminal capacity program, designed to provide increased safety in the terminal area; and the reorganization of FAA to create a Military Operations Division, designed to manage all SUA. All these initiatives have had, or have the potential for having, a negative impact upon the military.

What, if any, will be the effect of the above on the Army? Granted, it may not be as severe on Army Aviation as on other Army users of SUA. On Army Aviation it could have an adverse impact on night vision systems training, air-to-air operations, lasers and weapons firing and other aerial activity hazardous to, or not compatible with, other NAS users. On other Army users, because of the probability of the loss of priority SUA users now enjoy, it would in effect put FAA in the position of telling us when and where training, or any activity that requires SUA, could be conducted. This is completely unacceptable.

To ensure that the above does not occur, the managers of SUA for the three military departments initiated the development of the Military Airspace Management System (MAMS). This facility will manage SUA on a real-time basis, and will interface at various levels with the FAA. It will permit the military to maintain what priority of SUA we now enjoy, provide for more efficient use of the SUA by allowing access to the SUA areas by other Department of Defense (DOD) users, and more access by the general public through real-time activation and deactivation.

The requirement for MAMS has been validated and the decision has been made. *DOD must develop MAMS to manage our designated SUA on a real-time basis or have it managed for us by the FAA with specific congressional interest.* Accordingly, a test of the MAMS concept has been initiated in the southwestern part of the United States. The test is scheduled to last about 9 months. Upon completion of the test, implementation of MAMS on a national scale will commence.

For additional information on MAMS call Mr. Jesse Burch, AUTOVON 284-7796/6304 or Commercial 202-274-7796/6304.

USAASO invites your questions and comments and may be contacted at AUTOVON 284-7773.