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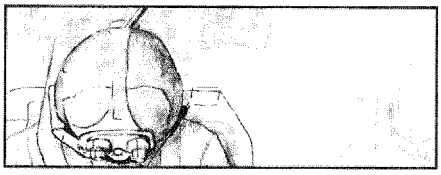

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Cover: A soldier uses the XE-3 Visioceilometer. This eye safe laser device can measure straight lines and slant visibility and cloud height . . . developed through the efforts of ERADCOM to help provide Army Aviation the critical combat edge. See the story on page 2.

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The mission of the *U.S. Army Aviation Digest* (USPS 415-350) is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, Aviation medicine and other related data.

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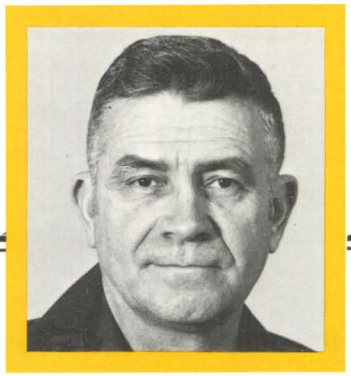
Major General Ellis D. Parker
Chief, Army Aviation Branch



The UH-60 Instructor Pilot Course

PRIOR TO October 1984, UH-60 Black Hawk aviators with the preferred experience level in the aircraft were not available for training in the numbers necessary to fill the Army's requirements for instructor pilots (IPs).

Aviators qualified as instructor pilot in other rotary wing aircraft were selected to attend the UH-60 Aviator Qualification Course and to be trained as instructor pilots. Unfortunately, the majority of their training was devoted to initial aircraft qualification, leaving inadequate time to develop the proficiency demanded of an instructor pilot. Only 3.5 flight hours and 4 days of the 21.5 hours and 24 days allocated to the course were used for IP training.

Because of the high experience level of the aviators who return from field assignments and the need to provide career progression for the young aviator, a complete revision of the UH-60 Instructor Pilot Course was initiated and implemented. Flight and academic training became solely devoted to developing the proficiency and indepth knowledge of systems and procedures required of newly qualified instructor pilots.

The new UH-60 Instructor Pilot Course consists of flight and academic instruction in theory of flight, instructor fundamentals, aircrew training, regulations, safety, aircraft systems, malfunction analysis, methods of instruction for contact maneuvers, dual and single engine operations, and emergency procedures.

During the 4 weeks and 4 days of the course, students receive 27.5 dual flight hours, of which 20.0 hours are in the UH-60 and 7.5 hours are in the UH-60 synthetic flight training system (SFTS). The first 2 days and 2.6 flight hours are dedicated to a diagnostic evaluation. The student IP must perform all required maneuvers from the right seat to the standards listed in the Flight Training Guide, which are identical to the standards listed in FC 1-212, "UH-60 Aircrew Training Manual." Upon successful completion of the diagnostic evaluation, the student IP devotes the next 17.4 aircraft hours and 7.5 SFTS hours to methods of instruction training from the left seat. The remaining 2.0 flight hours are used for the end-of-course flight evaluation.

In addition to the previously listed flight and academic subject areas, the daily briefings conducted at the flight line have dedicated about 6 hours to instrument procedures and 3 hours to tactics, emphasizing common pre-mission or in-flight errors and potential conflict areas.

The prerequisites for attendance at the UH-60 Instructor Pilot Course are:

- Active Army or Reserve Component commissioned or warrant officer rotary wing aviators with Specialty Code 15 or 71 (with additional skill identifier 1N) or military occupational specialty 100A; Department of the Army civilians must have a Federal Aviation Administration certified flight instructor rating.
- Assigned to a unit equipped with UH-60 aircraft.
- Recommended by the commander as having the potential to perform instructor pilot duties.
- Accrued a minimum of 500 hours in rotary wing as first pilot, of which 250 hours are in the UH-60.
- Possess a current Army rotary wing instrument qualification and flight physical, neither of which will expire during the course.
- Possess a SECRET security clearance.
- Have in possession personnel records, aircrew training records, Department of the Army Forms 2 and 759, and Standard Form 88.
- Successfully completed an Army physical readiness test within the previous 6 months. Must meet height and weight standards in accordance with AR 600-9.

Obligated service for active duty commissioned and warrant officers is 1 year upon successful completion of the course.

With the implementation of the new UH-60 Instructor Pilot Course, the field will gain fully qualified instructor pilots who are as equally well versed in tactics and instrument flight as they are in contact flight, requiring less resource time to become integrated into the unit's mission. This is just another example of our continuing effort to remain "Above the Best."

ERADCOM — *Providing the Critical Combat Edge*

It is indeed with a great deal of pleasure that I introduce a series to be published over the coming months dealing with Electronics Research and Development Command (ERADCOM) contributions to Army Aviation.

ERADCOM's laboratories and activities touch on every facet of modern Aviation operation. From weather effects determination, aerial surveillance, target acquisition and electronic warfare systems to weapons control radars, integrated helmet systems and night vision devices, ERADCOM is responsible for numerous electronic airborne systems that will allow the combat aviator to gain, and maintain, a critical edge in his operations on the battlefield. The proliferation of electronic technology across all spectrums of the battlefield demands that we succeed in providing you the most advanced, reliable and usable systems possible.

ERADCOM itself is only 7 years old this year. However, it descends from the Signal Corps Radio Laboratories which began operations on 23 February 1918 at present-day Ft. Monmouth, NJ. Concurrently, one of the older Army Aviation organizations existing today got its start with six Curtiss JN4-D Jennies. The first research, development, test and evaluation (RDTE) project flight flown concerned direction finding by radio. This Aviation organization is ERADCOM's Flight Test Activity (EFTA). EFTA continues to support the Army Aviation community as the primary Army Materiel Command Aviation RDTE organization responsible for airborne electronic system testing at the breadboard, or concept exploration, level of the RDTE cycle.

The underlying theme to the acquisition process, though, is the fact that systems are originated when you, the user, define a need and let the chain know about it. I encourage you to feel free to contact this organization at any time. The Aviation Office may be reached at AUTOVON 624-2116/2117. They are prepared to assist you in any way possible.

ERADCOM: Providing leaders the decisive edge.

JAMES C. CERCY
Brigadier General, USA
Commanding

Atmospheric Sciences Laboratory: Weather Intelligence Enhances Capabilities

Lieutenant Colonel Martin S. Kleiner
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TODAY'S COMBAT commander, whether on the ground or in the air, is intensely interested in any system which will provide him a critical, decisive edge in the conduct of his battle. For the Aviation commander, the introduction of the AH-64 Apache and OH-58D AHIP represent significant advances in his combat capabilities. The hearts of these new aircraft are the advanced electronic subsystems used for low/degraded visibility conditions and the target acquisition systems. These systems, plus numerous other airborne electronic systems now in use, are the result of research and development efforts which began within the U.S. Army's Electronics Research and Development Command.

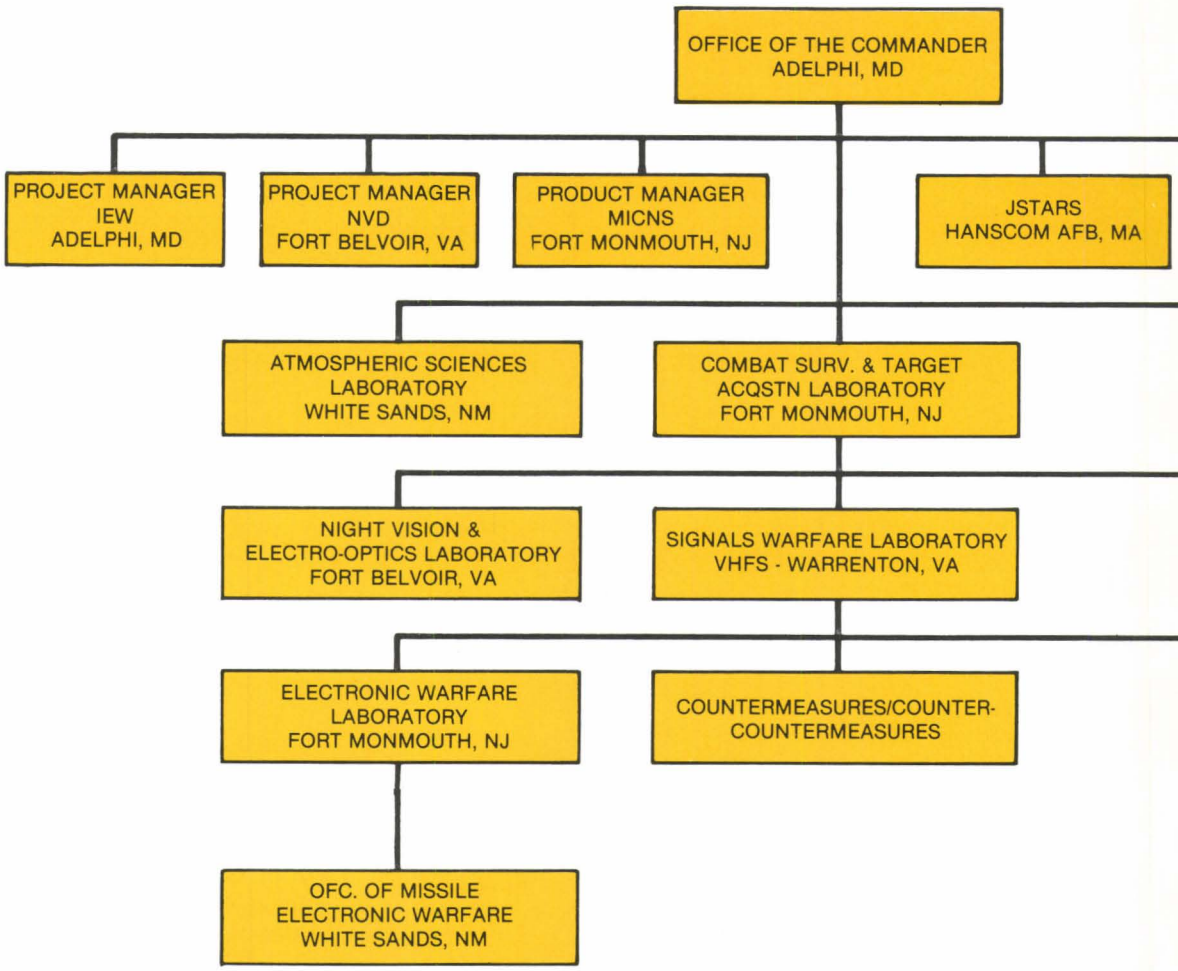


FIGURE 1

ERADCOM is a major subordinate command of Army Materiel Command. It consists of seven laboratories, a research facility, two activities, and three project/program managers spread over four states (figure 1). Research and development are conducted within a broad spectrum of technology areas—microelectronics, millimeter wave, electro-optics, radar, atmospheric obscuration, multisensors, jammers, lasers, fuzing, nuclear weapons effects, and electronic countermeasures/electronic counter-countermeasures/electronic warfare support measures.

In this first of a series of articles on ERADCOM and its contributions to the Army Aviation community, we will examine the Atmospheric Sciences Laboratory (ASL) which is headquartered at White Sands Missile Range, NM. ASL is the Army's only laboratory dedicated solely to conducting research on how atmospheric conditions and obscuration problems affect Army weapons design and operation. Some of these problems and conditions are smoke, haze, snow, dust, fog and other natural elements. Additionally, it provides the combat commander with the atmospheric sensors, systems, technology and weather intelligence required for combat operations. This added mission is where we will concentrate our discussion of ASL.

The largest and highest priority project which is underway is what ASL labeled "Tactical Weather Intelligence" (TWI). This is a computerized

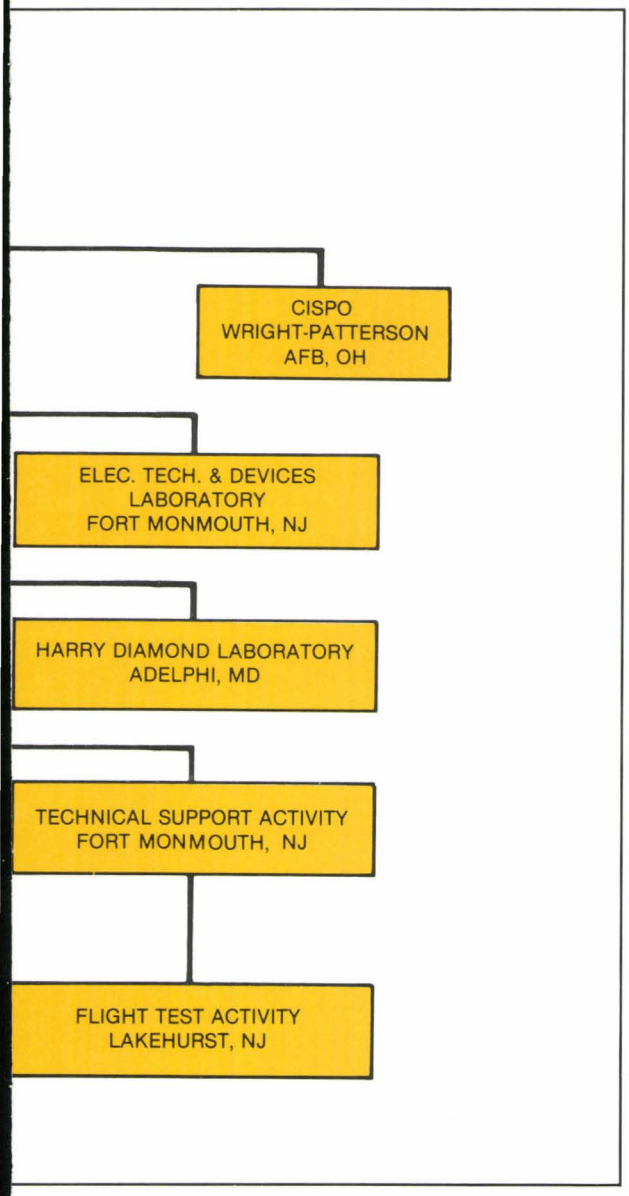


FIGURE 2. Surface meteorological parameters.

Measured, Observed or Forecast

Air Temperature
Dew Point Temperature
Daily Mean Temperature
Ground Temperature
Wind Direction
Wind Speed
Wind Direction Variability
Wind Gust Speed
Pressure
Visibility
Slant Range Visibility
Precipitation Type
Precipitation Intensity
Sky Cover
Ceiling Height
Cloud Top Height
Inversion Height
State of Ground
Snow Depth
Roughness Height
Electrical Storm
Illumination
Significant Weather

Calculated

Wind Chill Temperature
Relative Humidity
Absolute Humidity
Altimeter Setting
Pressure Altitude
Density Altitude

Pasquill Stability Category

FIGURE 3: TWI topics.

Nuclear and Chemical Programs
Smoke Programs
Mission Oriented Protective Posture (MOPP) Programs
Effects on Weapons and Tactics
Aviation Programs

system which will take raw weather data and forecasts and produce information usable by the commander and his staff. Selected examples are precipitation estimation, chemical hazard prediction and the effects weather would have on weapon systems and tactics.

TWI has as the base of computations surface meteorological parameters that are measured/observed or forecast as shown in figure 2. Using this information, a second group of parameters are then calculated. Finally, upper air data on temperature, windspeed, wind direction, pressure and relative humidity is added. Together, this information will provide the basis for computing various information relating to the topics listed in figure 3. As combat aviators, we obviously have a vested interest in all of the areas listed. But, only two of the topics will be pursued here—Aviation and weapons and tactics effects.

ASL to date has programed performance planning charts from chapter 7 of the dash 10 for the AH-1S Cobra (PROD). By inputting certain variables like gross weight, calibration factor, cruise altitude, etc., the program will then compute a performance planning card (PPC) in a matter of seconds. Selected portions of the PPC are shown at figure 4. The old style PPC has been used for the demonstration phase so as to better appreciate the scope of the Aviation program in performance planning. Future refinements and additions will include use of the current PPC, the programing of performance planning charts for

```
************************************ DEPARTURE ************************************
PRESS.ALT        5000 FT     DENS.ALT        5787 FT     FAT     12 C        GRWT     9500 LB
CAL FACTOR: 64.0
VALIDATION FACTOR (10,000 LBS) AT 5 FT (CAL,IND): 90.6 95.1 %Q
------30 MINUTE OPERATION ECU OFF------
MAX-TQ AVAILABLE(CAL,IND):          100.0 104.9 %Q   MAX WT TO HOVER OGE:      10197 LB
TQ TO HOVER OGE (CAL,IND):           94.4  99.0 %Q   MAX HOVER HT(  9500.0 LB): 50 FT
TQ TO HOVER(5 FT) (CAL,IND):         84.2  88.3 %Q
GO OR NO GO(5 FT) (CAL,IND):         93.2  97.8 %Q
------CONTINUOUS OPERATION ECU OFF------
MAX TQ AVAILABLE(CAL,IND):           92.0  96.5 %Q   MAX WT TO HOVER OGE:       9336 LF
TQ TO HOVER OGE (CAL,IND):           94.4  99.0 %Q   MAX HOVER HT(  9500.0 LB): 15 FT
TQ TO HOVER(5 FT) (CAL,IND):         84.2  88.3 %Q
GO OR NO GO(5 FT) (CAL,IND):         82.0  86.1 %Q
------CONTINUOUS OPERATION ECU ON------
MAX TQ AVAILABLE(CAL,IND):           81.2  85.1 %Q   MAX WT TO HOVER OGE:       8536 LB
TQ TO HOVER OGE (CAL,IND):           94.4  99.0 %Q   MAX HOVER HT(  9500.0 LB):  2 FT
TQ TO HOVER(5 FT) (CAL,IND):         84.2  88.3 %Q
GO OR NO GO(5 FT) (CAL,IND):         72.3  75.8 %Q
**********************************
```

FIGURE 4: Computerized PPC extract. (Data for "obstacle clearance,""climb" and "arrival" is available.)

```
********************************** CRUISE ***********************************
PRESS.ALT        8000 FT                CLEAN CONFIG.
                                        FAT     4 C
------CONTINUOUS OPERATION ECU ON------                                  GRWT     9000 LB
CRUISE SPEED,TAS:          114.3 KNOTS
CRUISE TQ(CAL,IND):         75.5  79.2  %Q          CRUISE SPEED,IAS:        100.0 KNOTS
MAX ENDURANCE,TAS:          64.2 KNOTS              CRUISE FUEL FLOW:        619   LB/HF
MAX RANGE SPEED,TAS:       127.9 KNOTS              MAX ENDURANCE,IAS:        54.0 KNOTS
MAX TORQUE % AT MAX RANGE SPEED(CAL,IND):  90.9 95.4 %Q   MAX RANGE SPEED,IAS: 112.3 KNOTS
MAX FUEL FLOW AT MAX RANGE SPEED:  703 LB/HR
MAX R/C TORQUE(CAL,IND):    51.5  54.0 %Q
CONT XMSN(CAL,IND):         88.0  92.3 %Q
EXCESS TORQUE(CONT XMSN - MAX R/C TORQUE) (CAL,IND): 36.5 38.3 %Q
**********************************
********************************** CRUISE ***********************************
PRESS.ALT        8000 FT                4-TOW CONFIG.
                                        FAT     4 C
------CONTINUOUS OPERATION ECU ON------                                  GRWT     9000 LF
CRUISE SPEED,TAS:          114.3 KNOTS
CRUISE TQ(CAL,IND):         77.9  81.7  %Q          CRUISE SPEED,IAS:        100.0 KNOTS
MAX ENDURANCE,TAS:          64.2 KNOTS              CRUISE FUEL FLOW:        632   LB/HR
MAX RANGE SPEED,TAS:       127.9 KNOTS              MAX ENDURANCE,IAS:        54.0 KNOTS
MAX TORQUE % AT MAX RANGE SPEED(CAL,IND):  94.3 98.9 %Q   MAX RANGE SPEED,IAS: 112.3 KNOTS
MAX FUEL FLOW AT MAX RANGE SPEED:  721 LB/HR
MAX R/C TORQUE(CAL,IND):    51.9  54.5 %Q
CONT XMSN(CAL,IND):         88.0  92.3 %Q
EXCESS TORQUE(CONT XMSN - MAX R/C TORQUE) (CAL,IND): 36.1 37.8 %Q
```

FIGURE 6: Extract of message by type of equipment.

```
                    **** MESSAGES BY UNIT TYPE ****

***************
MECH INF  BN W/TANK CO
***************

**** PERSONNEL ****

PROBABILITY OF COLD INJURIES INCREASES RAPIDLY IN WET/WINDY CONDITIONS

**** 105MM GUN (TANK) ****
ONE WP ROUND WILL SCREEN 60 METERS FOR UP TO 25 SECONDS
ONE HC ROUND WILL SCREEN 45 METERS FOR UP TO 10 SECONDS

**** 60MM MORTAR ****
TEMPERATURE WILL CAUSE AN INCREASE IN SHORT ROUNDS
ONE WP ROUND WILL SCREEN 30 METERS FOR UP TO 10 SECONDS

**** M1 TANK ****
PRECIP WILL CAUSE FALSE RANGING RETURNS NOT READILY APPARENT TO THE OPERATOR
AIM AT CENTER OF ENEMY TANK

**** MASK, PROTECTIVE ****
WEAR ABC-M62A HOOD BELOW OUTLET VALVE ASSY TO PREVENT WETTING OF INNER CLOTHING

**** ALARM-CHEMICAL AGENT ****
ALLOW M-43 DETECTOR UNIT TO WARM UP FOR 30 MINUTES

**** AN/PVS-5 NITE VIS GOGGLES ****
TANK DET RNG: 340-620m / REC RNG: 170-250m  MAN DET/REC RNG:  140-180m
```

FIGURE 5: Extract of message by type of unit.

```
                    **** MESSAGE BY EQUIPMENT TYPE ****

**** NBC OPERATIONS ****
RELATIVE HUMIDITY IS MOST FAVORABLE FOR THE USE OF MUSTARD GAS
EXPECT AT LEAST A 50% REDUCTION IN EFFECTIVENESS OF LEWISITE
ATMOSPHERIC STABILITY IS MOST FAVORABLE FOR SMOKE OPERATIONS
WEAR ABC-M62A HOOD BELOW OUTLET VALVE ASSY TO PREVENT WETTING OF INNER CLOTHING
WITH LOW WIND SPEED, SMOKE/CHEM CLOUDS WILL REMAIN FAIRLY EFFECTIVE
WIND SPEED IS TOO HIGH FOR ANY EFFECTIVE SMOKE OPERATIONS
WIND SPEED TOO HIGH FOR RELEASE OF CHEMICAL AGENTS BY AERIAL BOMBS
CC AND L CHEMICALS CANNOT BE USED EFFECTIVELY EXCEPT FOR TOT ATTACKS
WET BIOLOGICAL AEROSOLS ARE MORE EFFECTIVE WITH THIS HUMIDITY
AGENT HD WILL BE MORE EFFECTIVE WITH THIS HUMIDITY
SNOW COULD CLOG FILTERS CAUSING REDUCED EFFECTIVENESS
ALLOW M-43 DETECTOR UNIT TO WARM UP FOR 30 MINUTES

**** AVIATION OPERATIONS ****
WHEN FLYING LOW OVER TREES, ROTOR WASH WILL LEAVE SIGNATURE/REDUCE VISIBILITY
WIND SPEED TOO HIGH FOR RELEASE OF CHEMICAL AGENTS BY AERIAL BOMBS
```

the UH-1 Huey, AH-64 Apache and CH-47 Chinook, and helicopter icing prediction. The AH-1S (PROD) program is completed. Work has started on the OH-58C Kiowa and the UH-60 Black Hawk performance planning programs and should be completed shortly.

Another invaluable application of TWI's surface meteorological parameters is the generation of tactical weather effects messages (TWEM). In this program for the Apple computer (the military version is the Microfix), weather observations or forecasts are compared against values of weather parameters known to have an effect upon threat/friendly systems or operations. To date, known information on threat systems in the motorized rifle regiment as well as friendly systems and their limitations due to weather factors have been programed. This program will alert commanders to constraints on their systems due to weather, will determine specific effects for threat/friendly equipment, will be tailored to customer needs, and will output information by specific equipment type or by unit designations. The value of this particular feature of TWI should be evident in light of the advanced systems now appearing on the newest helicopters and the increasing use of night vision devices.

Just to offer one example, weather, or in particular a variable known as absolute humidity, has a dramatic effect on forward looking infrared (FLIR) radar effectiveness. Absolute humidity is a measure of the total water vapor in the atmosphere. A warm atmosphere can hold more water vapor than a cold one. Since high absolute humidity reduces FLIR performance, cold temperatures give the best FLIR conditions. This capability to project the degradation in effectiveness of visioning, targeting and acquisition systems will provide a commander with the information to better maneuver his forces for maximum impact. It also will allow him to better estimate the opposing forces' capabilities and vulnerabilities.

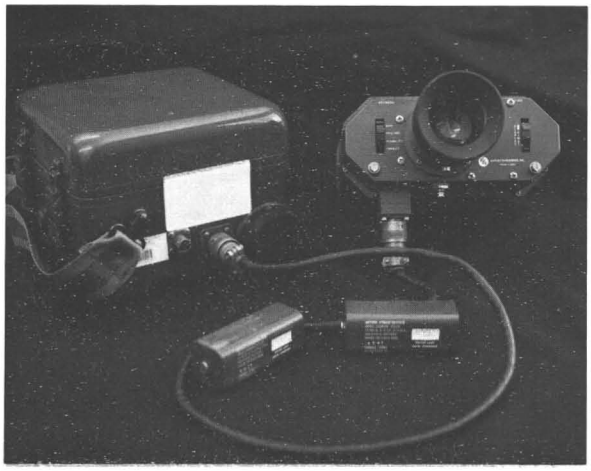
Figures 5 and 6 are examples of how a TWEM would read after the surface meteorological parameters had been updated and calculated. TWEMs can be generated according to different criteria, and can be as general or as specific as you desire. These examples were derived from a fictional set of meteorological parameters (see figure 2), which, in general terms, were below visual flight rules with light snow and a temperature of -1C. It is also night. Figure 5 shows a TWEM generated by unit type; in this case, it is a mechanized infantry battalion with a tank company attached. The known effects of weather on equipment are correlated with current conditions and limiting factors. The results are messages which alert the individual to the effects on a particular item of equipment. Figure 6 is an example of how a TWEM can be generated for a specific area of operations. It should be obvious how weather does affect our various systems.

TWI has been demonstrated extensively throughout continental United States (CONUS). It has been used by the 9th Infantry Division and 3d Armored Cavalry Regiment during actual field training exercises. Outside CONUS units which have received demonstrations are V and VII Corps, the 3d Armored and Infantry Divisions, and 2d Armored Cavalry Regiment.

While TWI may have top priority within ASL, work continues in other Aviation related areas. An atmospheric conditions collection package has been developed for integration into the remotely piloted vehicle and associated airborne platforms for cross-forward line of own troops surveillance missions. This gathering of weather data would occur as the platform traveled to and from the target area, and as it performs other missions over the target area. Vertical information would be obtained by flying at more than one altitude if necessary. Functional area applications of the resulting information would include guided munition delivery; nuclear, biological and chemical operations; Aviation operations; surveillance; and command, control and communications.

One final piece of equipment to be discussed should prove to be beneficial to the conduct of tactical operations. It is called the XE-3 Visioceilometer (figure 7). It is an eyesafe laser device capable of measuring visibility, both straight line and slant, and cloud height. This device is pushing the "state of the art" and has a considerable amount of development to go before it will be available as a fielded item of equipment. When used to determine cloud height, the visioceilometer's effective measurement distance is 50 meters to 3.3 kilometers. Visibility will be measured from 10 meters to 3.3 kilometers, with software algorithms to extrapolate that measurement to greater distances. The present

FIGURE 7: XE-3 Visioceilometer.

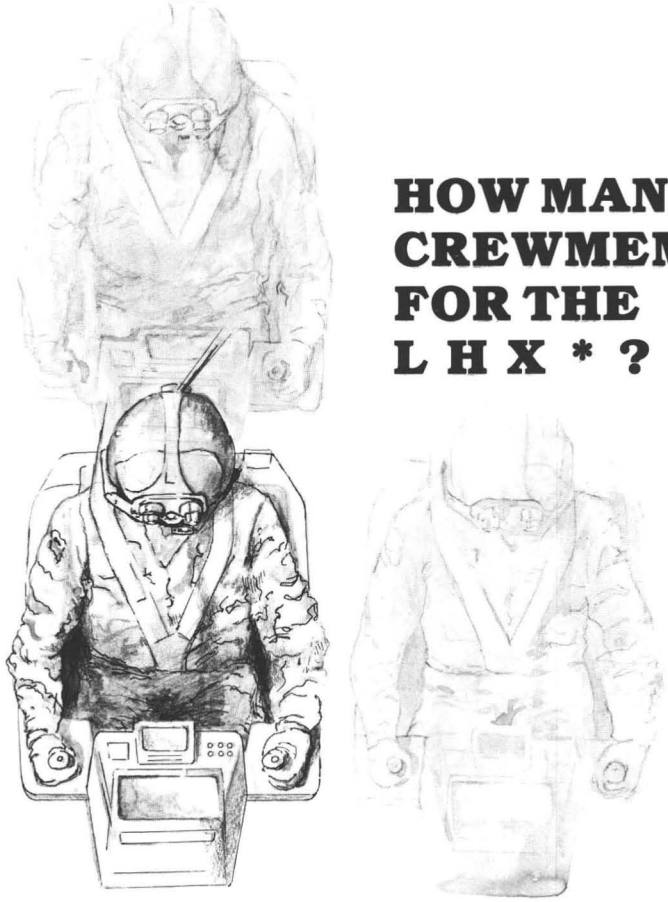


configuration of the equipment is two pieces totaling 13 pounds. However, the final configuration is programed to be one piece. This equipment also has the capability to operate at night, unlike most of the present-day equipment performing the same function. Perhaps most importantly, however, to the tactical unit commander is the fact that it does not require a trained weather observer to operate it. In the spirit of the original Kodak Brownie, just point for ceiling or visibility measurements, push the button and let the machine do the rest. The information will be displayed on the light emitting diode display. We anticipate that it would be most useful in Aviation, air traffic control and air defense applications.

These are just a few of the items under development at ASL that will significantly improve the conduct of Aviation operations. Some of these items, such as the TWI software for TWEMs and aircraft performance planning, are available now or in the near future (12 to 18 months). There are others, but they are still down the road.

However, to adequately gauge the possible concepts of use, input is needed from you, the potential user in the field, who would ultimately benefit from this equipment. For further information on any of these systems, contact the ERADCOM Aviation Office at AUTOVON 624-2116/2117.

Your input is needed! Efforts aimed at drastically shortening the present-day acquisition process are underway. Ultimately, it is you who define needs and use concepts for equipment to enable you to perform your mission more effectively. Working together, the achievement of gaining that critical combat edge is not beyond our collective grasp.



HOW MANY CREWMEMBERS FOR THE L H X * ?

Employing the *Light Helicopter Family in combat generated the question of how many crewmembers are needed for each aircraft. Some say one will be sufficient, others contend that there must be more than one. However, both sides must keep in mind that mission accomplishment is paramount.

Major Lawrence E. Casper

Major Casper conducted research on LHX crew configuration during his assignment at the U.S. Air Force Air Command and Staff College. He is currently assigned to I Corps headquarters, Ft. Lewis, WA.

THERE IS a storm brewing in Army Aviation that is almost as old as Aviation itself. The controversy is centered around the number of crewmembers necessary to operate an aircraft to ensure mission accomplishment.

From the Army's perspective, it involves how many crewmembers are required to man the proposed Light Helicopter Family (LHX) of the 1990s. This debate has narrowed quickly to the virtues of a single crewmember versus those of dual crewmembers. This controversy may seem new to the Army aviator, but it is an issue which has occupied many a Naval and Air Force tactical aviator's conversation.

Regardless of service, the problem is which crew size will best accomplish the mission. The solution is not simple and is complicated by bias and emotion. The Air Force and Navy aviators who are proponents of dual crewmember tactical aircraft will expound on advantages ranging from another set of eyes outside of the cockpit, to providing a "warm and fuzzy" feeling to the pilot. These aviators will point to the success of the F-4 and F-14. From the opposing view, aviators who advocate single seat aircraft will argue that with today's technology, the only purpose an additional crewmember provides is someone to distract the pilot and waste scarce training resources. These aviators will flaunt the successes of the F-15, F-16 and F-18.

The argument is further channeled when viewed in the con-

Some of the artists' concepts of the Light Helicopter Family that have been presented in the

text of mission. Where others debate philosophies that reflect such beliefs as air-to-air being better suited for single pilot aircraft, some advocate the air-to-ground arena as being best served by two seated aircraft.

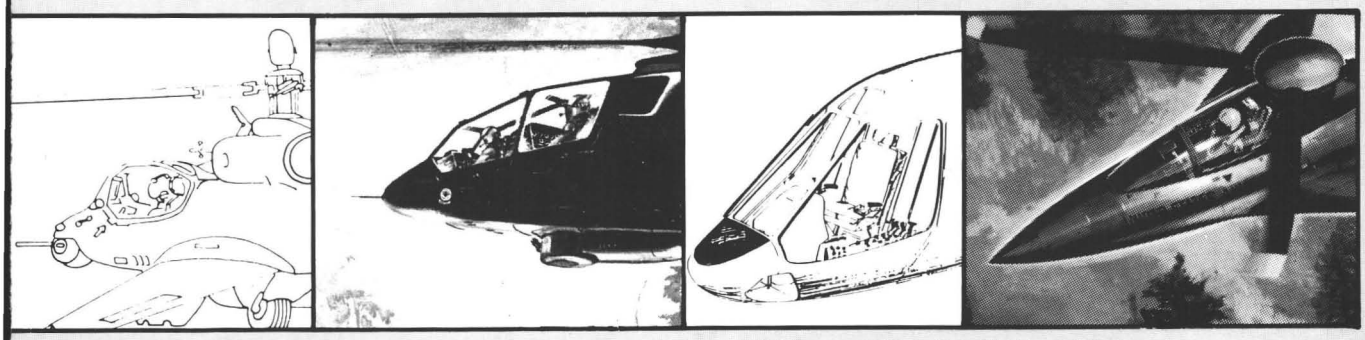
In the Army community it is evident that the Air Force and Navy analogies do not apply in their entirety. In the environment of 500 knot airspeeds, high gravity turns and fighting from the surface to an altitude limited only by the aircraft's performance, the jet aviator has ample room to exercise his aircraft and himself. His speeds are not conducive to recovering from mistakes, but his maneuver room is proportionate to his achieved velocities: Fighting space which is mission dependent and is exemplified by the greater maneuver space afforded an F-15 on an intercept over the Sea of Japan compared to that of an A-10 popping up over a hedgerow in Germany; space that tends to contract as the air defense sophistication increases. Although the Army aviator has many of the same restrictions imposed, he is challenged by an additional variable—one consisting of a dimension characterized by trees, buildings and wires.

Multiple missions and cockpit tasks differentiate between the demands placed on the LHX pilot and those of the "fast movers." When the Air Force F-111 (two crewmembers) or Navy A-6 (three crewmembers) are involved in either automatic or manual terrain following flight, the pilot remains on the flight controls monitoring the outside environment, navigation cues, etc., while the copilot or mission specialist controls mission management equipment. This would not be the case in a single pilot LHX, and unlike the Army aviator, they do not have the option to stop or go under.

The Army aviator's maneuver space is from the surface to 150 feet, and is commensurate with his aircraft's performance and his service's doctrine. He may stray above this altitude, but he is then subject to his allied 'fast movers' running him over or his enemy's air defenses shooting him down. In this confined area, the aviator will pilot his aircraft in the pitch of the night, between and under wires, and in constant peril of small arms fire: A unique setting for the Army aviator.

Employing the LHX in such a volatile environment generates the question, "Will the Aviation community have the technology to fly an aircraft manned by one crewmember and still accomplish mission requirements?" Many aircraft vendors will answer yes. Others in Aviation believe that the single cockpit would reduce manpower needs while increasing available airframes to the ground commander. Still others are concerned with the available technology to support such an aircraft and the increased aircrew training time that will be associated with this new advanced technology.

Despite the point of view pursued, mission accomplishment is paramount. Currently, missions required of the LHX are being performed by aircraft manned with two crewmembers. With the added requirement to provide both an offensive and defensive antihelicopter (air-to-air) mission, a single crewmember may experience task saturation. It is not difficult to imagine a utility version of the single crewmember LHX winding its way down a meandering riverbed in the dark of night. Project the scout/attack derivative in the same scenario and compound the crewmember's



past. They are not intended to endorse any concept that might be used by the United States Army.

piloting and navigational duties with attempts to acquire, fix and kill a target, and chaos may be the norm. Necessities, such as auto hover, will provide little relief to an aviator whose hands are literally full.

LHX simulation has verified what commonsense had concluded: As the number of tasks increase, the aviator in a single crewmember configuration approaches task saturation, which ultimately results in incidents of overload. In the scout/attack version, these incidents occur during the most critical segments of the mission—times of reconnaissance and acquiring, tracking and killing the target. One method for substantially reducing the workload is to share the tasks between two crewmembers. The other alternative is to substitute the second crewmember with technology. Herein lies the problem with the single crewmember LHX. It is technology dependent.

This dependency on technology places the Army decisionmakers in a precarious position as they consider the fate of 4,500 plus proposed airframes. If technology can provide the artificial intelligence needed or is able to systematically provide the magnitude of sensory inputs to the aviator in some logical sequence an average human being can digest, then maybe the man does not need to be there.

As absurd as that proposal may be viewed, consider that the pilot of an LHX will not be peering out of his cockpit with his naked eye in times of darkness and limited visibility. Instead, he will be aided by a myriad of optics, cameras and electronic imagery. These are tools which characterize a sophisticated remotely piloted vehicle (RPV); equipment which would afford an RPV to perform scout/attack missions while being piloted at a safe distance by an operator submerged in his electronics; an operator who could occupy the rear of a conventional helicopter or some other vehicle. Unquestionably there are a number of problems associated with such a proposal, some similar to those that plague the current LHX proposals. However, a fantasy it may not be.

The question inevitably returns to technology. Will it be available in time? When the battlefield environment the LHX is expected to fight and survive in is examined, or if the reader has flown a night nap-of-the-earth scout/attack mission using night vision goggles or Pilot's Night Vision System, the tremendous obstacles technology must overcome are apparent: Challenges which may not be insurmountable, but they may well be out of reach for an aircraft that is expected to be operational during the early 1990s.

So, the crewmember controversy is not just limited to the Army's counterpart services, although the arguments, missions, cockpit tasks and flying environments have their differences. It is a controversy that will remain active long after the decisionmakers determine what the crew size will be.

What is important, is that the LHX will eventually enter the Army inventory and will add that much needed 24-hour capability and the standardization and ease of maintainability that a single aircraft fleet provides. What form the LHX will take has yet to be determined. But it is absolutely essential that the Army provides the appropriate guidance to industry, and *demands* an aircraft that will accomplish the mission.

Major (P) David G. Hofstetter
TAC-TRADOC AirLand Forces Application Agency
Langley Air Force Base, VA

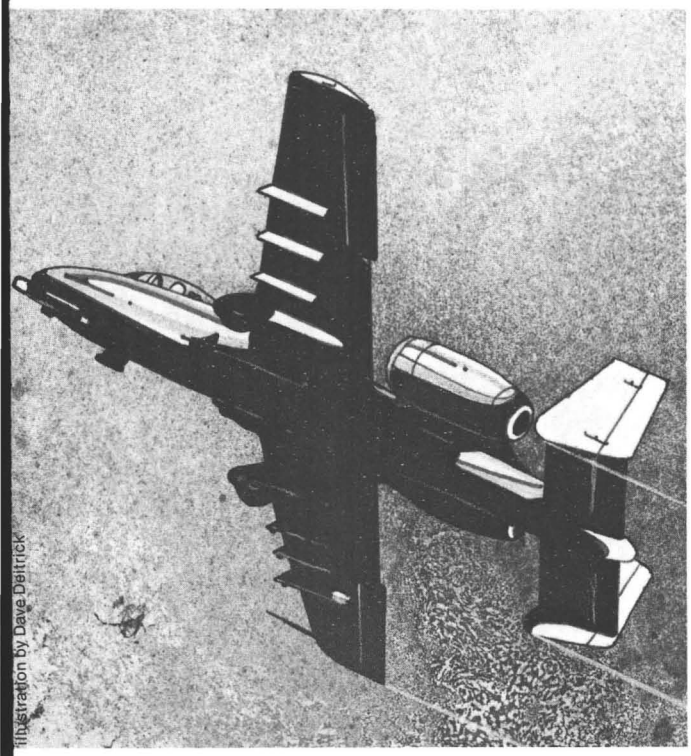
JOINT ATTACK OF THE SECOND ECHELON

This article is the second in a series that was introduced last month in "ALFA Agency" by LTC James B. McKenzie Jr. The AirLand Forces Application Agency was created in 1975 with a mission to manage activities of the Tactical Air Command — Training and Doctrine Command team efforts toward development of improved doctrine associated with the future AirLand Battle's success.

ABOUT 5 YEARS ago, the evolving aspects of the AirLand Battle doctrine and the continuing refinement of the fluid characteristics of the modern battlefield identified enemy second echelon or follow-on forces as targets of particular interest to both the air and land component commanders. The necessity to successfully engage these targets resulted in a program known as the Joint Attack of the Second Echelon or J-SAK with the overall objective being "to divert, disrupt, delay and destroy the enemy's capability for continuous operations by altering the momentum of his effort." Success in this objective will provide time and space for commanders to fight and take advantage of opportunities for offensive actions.

The J-SAK program consists of these primary components. The first of these is the *Concept*, which was published as a joint Tactical Air Command (50-26), Training and Doctrine Command (525-16) and Readiness Command (525-4) pamphlet on 13 December 1982. This document established the operational concept for J-SAK. It describes the command and control organization and the targeting process required to permit Army and Air Force elements to identify, plan and coordinate attacks against enemy second echelon targets. It addresses the necessary coordination and interface which must exist with a particular emphasis on the use of the existing Tactical Air Control System and Army Air Ground System. The target selection and planning processes described in the *Concept* are purposely broad in scope allowing for the worldwide applicability of J-SAK in any theater of operations.

The second component of J-SAK is the *General Operating Procedures* which was published as a joint Tactical Air Command (50-29), Training and Doctrine Command (525-45) and Readiness Command (525-8) pamphlet on 31 December 1984. This pamphlet expands upon the *Concept* and describes, in detail, the Army and Air Force planning and execution cycles, with an emphasis on the necessary interaction between the air and land component commanders and their respective staff elements. It focuses on the organizations of and the essential interface which must exist between the representative of the air component commander—the tactical air control center, and the representative of the land component commander—the bat-



tlefield coordination element, to ensure coordination of battlefield air interdiction with the ground scheme of maneuver. This document will be used by the Army and Air Force as general operating procedures for conducting joint training and operations involving the attack of enemy second echelon forces. It is also applicable to U.S. Readiness Command forces during training, exercises and contingency operations.

The third component of the J-SAK program is the Joint Service Agreement or JSA which was signed by General Gabriel, Air Force Chief of Staff, on 20 November 1984, and General Wickham, Army Chief of Staff, on 28 November 1984. This agreement incorporates the key provisions of the J-SAK *Concept* and *Procedures* pamphlets into an authoritative document that promulgates agreed upon joint doctrine between the Departments of the Army and Air Force. It provides guidelines for incorporating the doctrinal statements into Army and Air Force manuals, publications and curricula. The contents of the JSA serve as a basis for future development of joint doctrine and supporting procedures for the attack of enemy second echelon forces, and the provisions may be modified to fit theater specific command, control and international policy agreements. The JSA and the procedures pamphlet were distributed to soldiers and airmen worldwide in February 1985.

The J-SAK effort has been a laborious but rewarding one which has now resulted in operating procedures and joint interservice doctrine between the Army and Air Force. This program is but one of many being managed by the TAC-TRADOC AirLand Forces Application Agency with a number of others being Joint Application of Firepower, Joint Rear Battle, Joint Tactical Deception, Joint Laser Designation Procedures, Joint Suppression of Enemy Air Defenses and so forth. Although managed by AirLand Forces Application Agency, all of these programs continuously involve applicable Army and Air Force commands worldwide throughout the development, coordination and execution cycles.

Editor's Note: Watch future issues for more coverage of ALFA projects.

AVIATORS, PHONE HOME!

Captain Art Heffelfinger
U.S. Army Reserve Personnel Center
St. Louis, MO

AVIATION is the newest branch of the Army's combat arms, and the Army Reserve's Aviation Branch implementation is in full swing. Several actions have been completed, including the fielding of an Aviation Officer's Advanced Course in both U.S. Army Reserve school and correspondence versions (in addition to the Active Component's resident course).

Aviation Branch at the Army Reserve Personnel Center (ARPERCEN), St. Louis, MO, is now formally accessioning Reserve commissioned officer aviators. Specifically, Reserve officers holding Specialty Code 15 or 71 in grades of 01 through 05 are eligible to join Aviation Branch.

Invitations have been mailed to commissioned officer aviators of the Individual Ready Reserve and Active Guard and Reserve managed by ARPERCEN. If you fall into one of these categories, but have not yet received an Aviation Branching letter, please call ARPERCEN at 1-800-325-4365.

Obviously, your branch assignment has many implications for your Reserve career development. Personal preference, prior experience and current grade are all factors to consider in branching Aviation. We need *your* input, either by returning your branching letter or by telephoning Aviation Branch at ARPERCEN.

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Jenny Salhus photo by Steve Dougharty

Marking Discrepancy—Povidone-Iodine Ointment, 10 Percent

The following is a reprint of a U.S. Army Medical Materiel Activity message dated 281922Z February 1985.

This agency has been advised that the following medical materiel is incorrectly marked. Activities should perform a 100-percent inspection.

NSN	NOMENCLATURE	MANUFACTURER CONTRACT/LOT NUMBER
6505-00-148-7096	Povidone-Iodine Ointment, 10 Percent 1/8 oz (3.54 gram), Individually sealed, 144S	Nice-Pak Products, Inc., DLA 120-84-C-0134, 4E62724

REASON: Manufacturer has marked the intermediate and exterior carton with Lot No. 6274. Correct Lot No. *should read 4G62744*. The individual packets *are correctly* marked with Lot No. 4G62744.

Activities should obliterate the incorrect Lot No. (6274) on the intermediate and exterior cartons and remark with correct Lot No. 4G62744, citing the Defense Personnel Support Center Project No. D850181DQ as authority. Materiel is considered suitable for issue and use.

Materiel is a component of the following major assemblages:

6545-00-925-3950, MES GEN HOS 1,000 BED
6545-00-955-1880, MES HOSP STA 500 BED
6545-00-982-3739, MES HOSP STA 300 BED
6545-00-925-2700, MES GEN CLINIC 1
6545-00-925-2800, MES GEN CLINIC 2
6545-00-919-5800, MEDICAL EVAC 400 S-MO
6545-00-543-6730, MED EQ SET FLD HOS UNIT
6545-00-999-6451, MES FLD PHARMACY MUST
6545-00-116-4035, MES MED FLD TREAT SUR
6545-00-116-4036, MES MED FLD TREAT EVAC
6545-00-079-7146, MES MFTF MS CSH
6545-00-110-5546, MES AIRCRAF DEP MAINT
6545-00-931-4850, MEDICAL EQUIP MOB 60B
6545-01-120-2632, SURVIVAL KIT, TROPICAL

Request you pass this information through command channels to medical staff sections, supply officers and supported activities.

USAMMA will confirm this information in DA SB 8-75 series.

Point of contact is U.S. Army Medical Materiel Activity, ATTN: SGMMA-OC, Ft. Detrick, MD 21701.

Suspension System for Aviator Use Wearing the AN/PVS-5 Night Vision Goggles

I refer you to the PEARL's December 1984 article, which is about the same subject as the title above. This article has generated a great deal of interest not only from Aviation personnel but also those ground personnel who are required to wear the AN/PVS-5 night vision goggles in conjunction with some sort of helmet. The project officer for this item is Mr. R. Bradley Randall with the Army Materiel Systems Analysis Activity at Aberdeen Proving Ground, MD. If you would direct your questions concerning this matter to him, he would be more than happy to assist you. Mr. Randall can be reached at AUTOVON 283-6499/6496.

Disposition Instructions For Medical Materiel

The following is a reprint of U.S. Army Medical Materiel Activity message dated 211920Z January 1985.

Activities will dispose of the medical materiel listed below IAW AR 40-61, para 3-46, up AR 735-11, para 2-10, as unsuitable for issue and use.

NSN	NOMENCLATURE	MANUFACTURER CONTRACT/LOT NUMBER
6540-01-096-4496	Frame, spectacle, comfort cable temples, 42 by 52 eye, 20 bridge	Norton Co., DLA 120-81-C-5170, all lots

REASON: High failure rate.

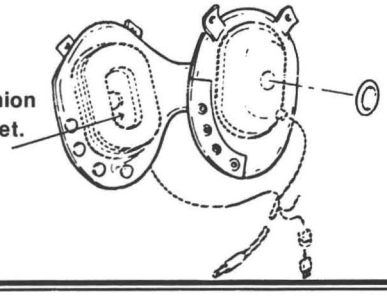
Request you pass this information through command channels to medical staff sections, supply officers and supported activities.

USAMMA will confirm this information in DA SB 8-75 series.

SPH-4 Helmet Repair

PEARL has received many calls from Aviation life support equipment technicians regarding difficulty in finding national stock numbers for some repair parts for the SPH-4 helmet. One item in particular is the earcup inset cushion, NSN 8475-00-122-6660 (see figure 1, item 1). This item does not appear in the original version of the SPH-4 Helmet Manual, TM 10-8415-206-13, dated April 1972. It does appear in Change 3, dated 12 April 1978, on page 3 of the change. This is found in Appendix C under the heading of "Organizational Maintenance Repair Parts List" which supersedes the original version.

This is a perfect example of the importance of maintaining not only your equipment but also your maintenance manuals and the changes to those manuals. If you are not receiving your changes, then check with your publications clerk to ensure the proper paperwork has been completed for you to receive changes.



Earcups inset cushion for the SPH-4 helmet.

PEARL thanks those of you who have called and encourages you to continue to bring these types of problems to our attention.

Aviation Survival Schools

We are in the process of compiling a listing of all types of Aviation schools. If you or your activity sponsors a school filling the requirements below, please contact CPT Greta Weaver, AMCPO-ALSE, AUTOVON 693-1218 or Commercial 314-263-1218, at your earliest possible convenience or not later than 15 June 1985. You may also write to me c/o PEARL'S, AMCPO-ALSE, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798.

SCHOOL REQUIREMENTS

- **Ongoing school (training), not just a one-time thing.**
- **Open to all Active Army, Army Reserves and National Guard.**
- **Billeting and mess facilities (i.e. quarters, hotels, restaurants nearby) for personnel attending the course.**
- **Program of instruction (submit to AMCPO-ALSE for inclusion into a catalog of survival schools).**

We hope this effort will provide you, the individuals that really need it, the capability for the best possible survival training available.

Availability/Distribution of Appendix M, TB 740-10 Quality Control Depot Serviceability Standards

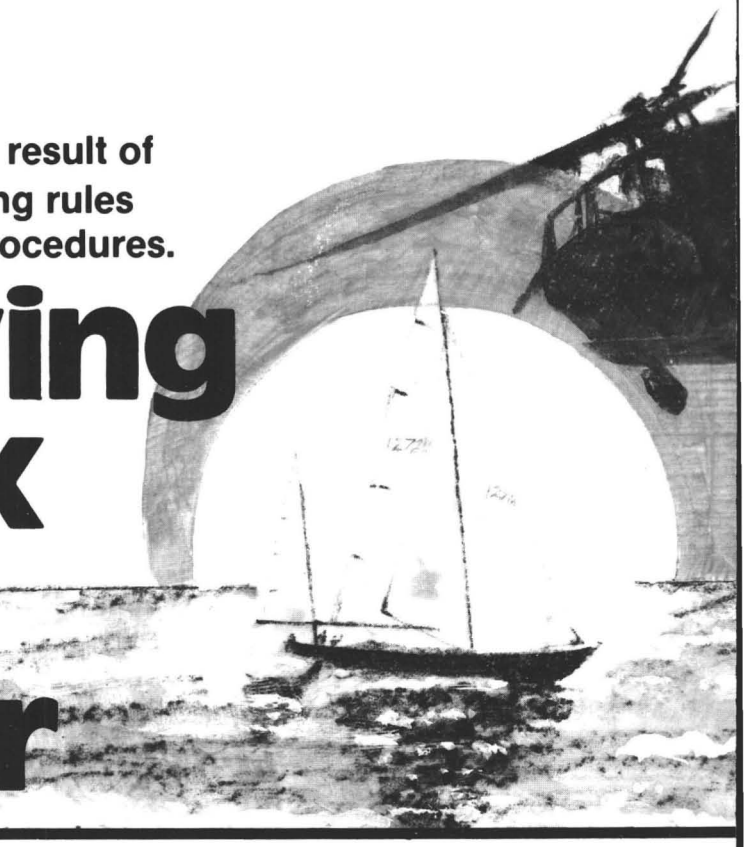
The Defense Personnel Support Center is in the process of updating Appendix M, TB 740-10.

Historically, the U.S. Army Medical Materiel Agency (USAMMA) has been the distributor for this publication. Responsibility for distribution of this publication has been transferred to The Adjutant General (TAG). All activities/units requiring this publication should immediately submit their requirements to TAG using DA Form 12-34 C-4, page 3. This form can be found in DA Circular 310-84/4, dated 15 December 1984. Units/activities which do not have the DA circular can receive a copy of the form by contacting the Commander, USAMMA, ATTN: SGMMA-OC, Ft. Detrick, MD 21701-5001 or by calling AUTOVON 343-2045/7235, FTS 935-2045/7235. Point of contact is SP5 Smith.

If you have a question about personal equipment or rescue/survival gear, write PEARL, AMC Project Officer, ATTN: AMCPO-ALSE; 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-1218/9 or Commercial 314-263-1218/9.

Most pilot error accidents are the result of crewmembers willfully disregarding rules and established safe operating procedures.

Identifying high-risk aviator behavior



STEADY improvement in flying machines has dramatically reduced the number of accidents caused by materiel failure and defects in hardware. Unfortunately, far less progress has been made in understanding and controlling the human factor in aviation accidents.

Historically, human error has been a cause in approximately 80 percent of all Army aircraft mishaps. A lack of self-discipline is by far the single largest cause of the pilot error accidents that account for most of these human error mishaps. It is the group of aviators who exhibit this lack of self-discipline who are of most concern to Army leaders at all levels. It is to them that the term high-risk aviator behavior applies. High-risk behavior is: "Willingly and knowingly violating Army regulations, SOPs, TCs, ATM procedures and other established procedures or **prudent air discipline.**"

This article reports on actions being taken by the U.S. Army Aviation Center and HQDA to identify and prevent high-risk behavior among aviation personnel.

The term aviator is not limited to those crewmembers aboard an aircraft. It also includes other rated aviators such as commanders, operations officers, platoon and section leaders and maintenance officers.

High-risk aviation personnel are the people the Vice Chief of Staff of the Army (VCSA), General Maxwell R. Thurman, was talking about in a "Thurman Sends" message, DTG 151325Z Mar 84. The VCSA concludes, "Commanders at all levels must be alert to these high-risk personnel and have them removed from aviation-related duties." General Thurman's meaning is quite clear. What remains is to establish the procedures for carrying out his mandate.

Who are the high-risk behavior aviators?

The aviators the Army is concerned about are not the ones who are willing to plan, prepare and perform the high-risk mission that gets the job done. They are aviators who have developed a behavior pattern in flying that leads them to **repeatedly take unnecessary risks and violate procedures,** such as the Huey pilot who made an unauthorized low-level flight over a bay and struck a telephone wire and supporting cables.

The wire strike damaged the nose and windshield areas and severed the tail rotor drive shaft, resulting in loss of antitorque control. The aircraft spun to the right three or four times during a landing approach that terminated in a hard landing on the edge of a field located above the shoreline. The aircraft hit the ground in a level attitude and rolled onto its right side.

The copilot was struck in the face and his nose was fractured when the wire shattered the windshield. The

pilot, crewchief and two passengers sustained major injuries during the crash, and the aircraft was destroyed.

The 35-year-old pilot had more than 3,000 rotary wing hours, with more than 1,600 hours in the UH-1H. Since being assigned to the unit, he had acquired a reputation for liking to fly at low altitudes, which he often did, although not required by the mission. He had been reported for low-level flying following maintenance test flights, and at one time was accused of chasing wild turkeys on the ground.

When the unit commander was made aware of the latest incident, which occurred approximately 1 year before the wire strike accident, without knowledge of any other evidence of similar high-risk behavior, he limited his disciplinary action to verbally counseling the aviator for violation of flight discipline.

Because there was no tracking system for recording similar breaches of discipline, he was unaware that during a previous assignment this same aviator had been grounded for a month, and restricted to copilot duties for an additional 3 months, for unauthorized low-level flight during a field training exercise. He was alleged to have buzzed a vehicle, causing it to run off the road.

The unit standardization IP was aware of the pilot's low-level flying during maintenance test flights and he had informed the unit commander of the allegations. The aviation safety officer was aware of the pilot's low-flying behavior in his current unit, but stated he was not aware of the grounding and restrictions to copilot duties some 2 years previous to those incidents.

There was a remark in the aviator's records about a Flying Evaluation Board, but other personnel in the unit had failed to notify the commander of the aviator's low-level flying in his previous unit. The incident that was reported was treated as an isolated instance rather than as an indication of possible chronic disregard for proper flight discipline and safety of other personnel.

When the pilot was questioned during the accident investigation about the incident with the vehicle, he acknowledged flying down a range road toward a truck. "We were flying tactical and the truck ran off the road because the driver thought we were too low. They got pretty angry about it."

During the flight when the wire strike occurred, this aviator had told his 20-year-old copilot (who had little more than 200 total rotary wing hours, with about 150 of these hours in the UH-1H) that he was going to show him some beautiful scenery. He took off, climbed to 500 feet above ground level until he sighted a bay, then flew toward it. The crew and

passengers were enjoying the scenery and looking at a yacht moored in the bay when the aircraft struck the wire at approximately 100 feet above the water's surface.

This is the undisciplined aviator the Army wants to get out of the cockpit.

Had there been a tracking system in place, the information regarding his past high-risk behavior would have been in the records when he arrived in the new unit. When additional instances of unauthorized low-level flying were reported to the unit commander, and he became aware of the fact that others did not want to fly with this pilot, then in all likelihood he would have taken action stronger than a verbal counseling.

If this aviator had been identified and tracked earlier, and corrective action taken, he might have changed his pattern of deliberately violating flight discipline and this accident may have been prevented.

Indications are that he must have been a technically proficient pilot—the action he took after the crash sequence began was correct and fortunately, although the aircraft was destroyed, no one was killed. The problem that made him a high-risk aviator, and eventually removed him from flight status, was a behavior pattern in flying that led him to **repeatedly take unnecessary risks and violate procedures.**

High-risk aviator behavior does not apply only to those with their hands on the aircraft controls. It also applies to those who command and control aviation assets.

One such mission commander was in the field with a unit supporting an infantry platoon. Five helicopters were committed to pick up troops at first light. They had accomplished similar missions for 3 days, but had canceled on the fourth day because of unfavorable weather.

On the morning of the fifth day, the No. 1 aircraft, with the air mission commander as pilot, was moved onto the strip to provide a reference for formation lineup of the other aircraft. The ceiling was estimated to be below 100 feet, and visibility was limited due to darkness and clouds. A nearby hill which provided the commander his weather estimate was in the clouds. Although he knew the weather conditions were less than those prescribed for flight under visual flight rules in AR 95-1 and local command regulations, the mission commander decided to continue with the form-up of the flight, shut down and wait for more favorable weather conditions.

It was a common practice in the unit to operate aircraft under VFR during tactical operations when environmental conditions were less than minimums prescribed in the regulations.

Another aircraft was successfully repositioned to the strip, although it entered clouds 20 to 35 feet above 50-foot-high trees. The copilot also noted that there was fog in a valley to the northeast.

When the next helicopter headed northeast, at just about treetop level, it started to enter clouds. The aircraft climbed 50 to 60 feet above the treetops, in clouds, paused, turned left and began a descent, going out of sight of witnesses. A loud explosion was heard, and a bright glow was seen. The helicopter had crashed on a rising slope, rebounded into the air, hitting two large trees before coming to rest on level terrain. All three crewmembers were killed.

A decision to ignore the minimums prescribed by regulations carried a large price tag. This mission commander's high-risk behavior cost three lives and an aircraft.

What are the costs of high-risk aviator behavior?

During FY 82, there were 4,483 Class A, B, C and D Army aircraft mishaps. These mishaps resulted in 86 fatalities, 115 nonfatal injuries, 51 destroyed aircraft and more than $63 million in costs. Ninety-six aircraft mishaps costing $10,000 or more were analyzed. These mishaps were selected for analysis because they were responsible for 90 percent of the cost, 100 percent of the fatalities and 93 percent of the nonfatal injuries in Army aircraft accidents.

Sixty-four percent of the mishaps analyzed were caused by two factors:

Lack of self discipline (45 percent)—aviators who knew better but chose to violate

regulations, operating procedures or prudent air discipline.

Supervisory Error (19 percent)—failure of commanders and immediate supervisors to require by-the-book performance by aircrews.

By contrast, materiel failure was responsible for 15 percent of the mishaps.

It was the high percentage of accidents involving lack of self-discipline and supervisory error, revealed by this analysis, that prompted high-level interest in identifying and tracking high-risk behavior in aviation personnel.

What can be done?

The Aviation Center is developing an identification and tracking system for Aviation Behavior Characteristics (ABC) and the automated DA Form 759. ABC have replaced the term high risk. High-risk aviators will be eliminated.

The identification and tracking system is designed to assist the chain of command by providing a historical profile of an individual's behavior. This will facilitate the identification and removal of those individuals who have been deemed as high risks. This system will apply to all Army aircraft systems and the persons involved in the operation of such aircraft and systems.

The unit chain of command will be responsible for identifying those individuals in their unit that have exhibited ABC. These ABC will include both positive and negative behavior characteristics; i.e., letters of commendation, safety awards, Broken Wing Awards, collaterals, Flying Evaluation Boards, letters of reprimand, UCMJ actions, revocation of orders (such as pilot in command, instructor pilot, unit trainer, crew chief, technical inspector, etc.). ARs 385-40 and 385-95 will be changed so that all Class A, B or C aircraft mishaps will require a collateral investigation. Operational Hazard Reports (OHR) where the flight crew willingly and knowingly violates established rules or procedures will also require a collateral investigation.

The individual ABC data base will store all ABC information and will consist of two components: a restricted and an unrestricted file. The unrestricted file will be maintained within the "Remarks" section of the automated DA Form 759. DA MILPERCEN will have access to only the information contained on the DA Form 759 (unrestricted file) and not to that which is contained in the individual's restricted ABC file. Access to the restricted information will be controlled at the 05 (LTC) command level. This file will provide the Army a means of maintaining reprimands, suspensions and other administrative actions taken to correct inappropriate behavior that would not result in a mandatory entry in the unrestricted file. This is extremely important because under the present system there is no method of tracking this information. If the crewmember's behavior is corrected, then the individual's restricted ABC file should not be immediately visible. However, if an individual's behavior does not change, then subsequent commanders must have access to this restricted information in order to determine the appropriate action. The individual will have access to and may appeal any information placed in his file under the same rules which govern an AR 15-6 investigation. Removal of information in either data base will be accomplished only when a reason exists as to why the information should not have been there originally.

The stiffer regulations, coupled with the means of tracking an individual as a complete entity, are extremely important to the future success of Army Aviation. Consideration is being given by the ODCSPER, HQDA, to the development of a commander's safety profile similar to that of the senior rater's profile. It will serve as an indicator of the commander's effect on his/her unit's overall safety program.

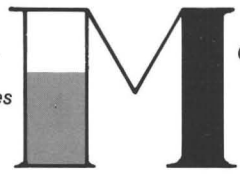
The exact procedures that will be established to identify and track Aviation behavior characteristics will be staffed with the MACOMs, HQDA and approved by the Vice Chief of Staff of the Army. They may differ in some aspects, from those discussed in this article, but it appears certain that aviators who lack the self-discipline to do what they know is right will have to change—or face elimination from the Army's flying profession.

The high costs of aircrews and equipment dictate that those aviators who lack self-discipline no longer be allowed the privilege of flying Army aircraft or commanding and controlling aviation assets.

Point of contact in Directorate of Evaluation and Standardization, U.S. Army Aviation Center, is CPT Mundt, AV 558-2770/3589.

Goal —
$2,500,000

APRIL 1985 —
$1,550,000
cash and pledges



Army Aviation MUSEUM

This is a series about the Army Aviation Museum Foundation fund drive. Currently, plans call for building a modern complex to house your Army Aviation Museum. Since last month additional donations have been received. However, we still have a ways to go, as the barometer above shows. If you would like to help "build" the Army Aviation Museum's new home, you are invited to send a tax deductible contribution to: The Army Aviation Museum Foundation, Box H, Ft. Rucker, AL 36362-5000, If you desire additional information call Mr. Ed Brown at (205) 598-2508.

A Look at What's In Your Museum

The C-47H is the most widely known and used aircraft by all services and commercial airlines, and has a longer operational life span than any other aircraft. Once nominated by General Dwight D. Eisenhower as one of the four weapons which won WWII, the C-47H also served during the Korean and Vietnam conflicts. During the Vietnam crisis, one C-47 was heavily armed and was affectionately donned "Puff, the Magic Dragon," after a famous song of that era. Although originally manufactured as an R4D-5 in 1943 for the Navy, it entered service with the U.S. Army on 6 July 1966 as a C-47H to be used for a VIP, liaison or cargo aircraft. This "Gooney Bird" won a trophy at an experimental aircraft association fly-in held in California for being the oldest antique aircraft that flew the furthest distance to attend the event. In November 1974, the C-47H was transferred from the Army Aviation Center to the Museum.

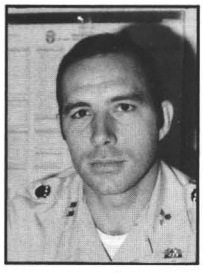
What does USASAM stand for?

a) Unsung student aviators solo and miserable.

b) Unselfish senior aviators serious about marriage.

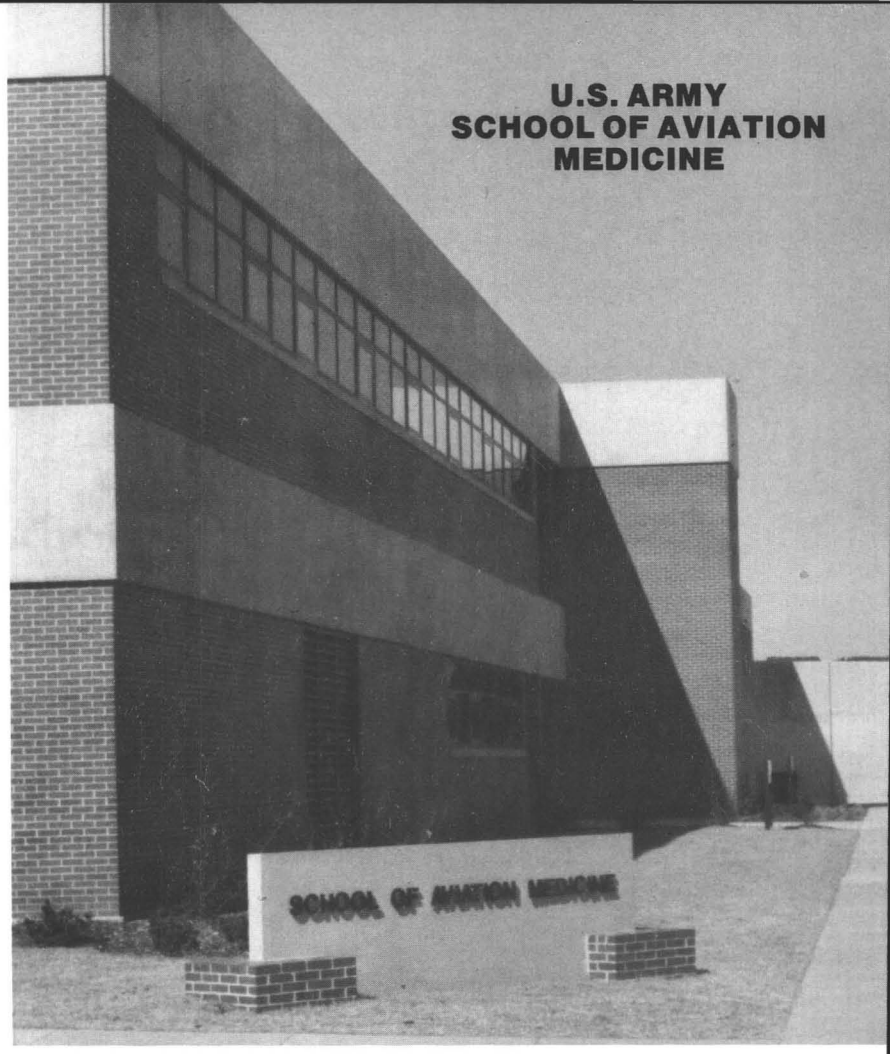
c) United services against secret acronym makers.

d) None of the above.



Captain Ronald E. Wilson
U.S. Army School of Aviation Medicine
Fort Rucker, AL

UNLESS YOU HAVE created a bizaar private club or joined a rare fraternity, you probably selected d) as the correct response. But how many of you actually know what USASAM stands for? Better yet, how many of you know where we are located and what our mission entails? Well, if you are one of those who selected any response other than d) above, or you are still not sure what USASAM is, don't worry. I have given countless explanations of USASAM to everyone from local personnel clerks to Department of the Army (DA) level career managers and, not surprisingly, have reached the conclusion that it is indeed time for USASAM to go public.



USASAM is the United States Army School of Aviation Medicine.

Although you might not be acquainted with us, we are very familiar with many of you. If you are associated in any way with Army Aviation, we have probably examined you, instructed you or refreshed you at some time during your career.

USASAM was born on 1 October 1984 when it officially became a branch school of the Academy of Health Sciences (AHS). Prior to that date, we were a part of the United States Army Aeromedical Activity (USAAMA), and we were known as the Department of Education and Training. USAAMA continues to exist today, but it no longer has a teaching mission. USASAM has taken on that role and we have expanded and reorganized the old USAAMA Department of Education and Training into USASAM. Our goal is a simple, but demanding one; to provide the U.S. Army Aviation community with the best Aviation medicine and aeromedical training programs possible.

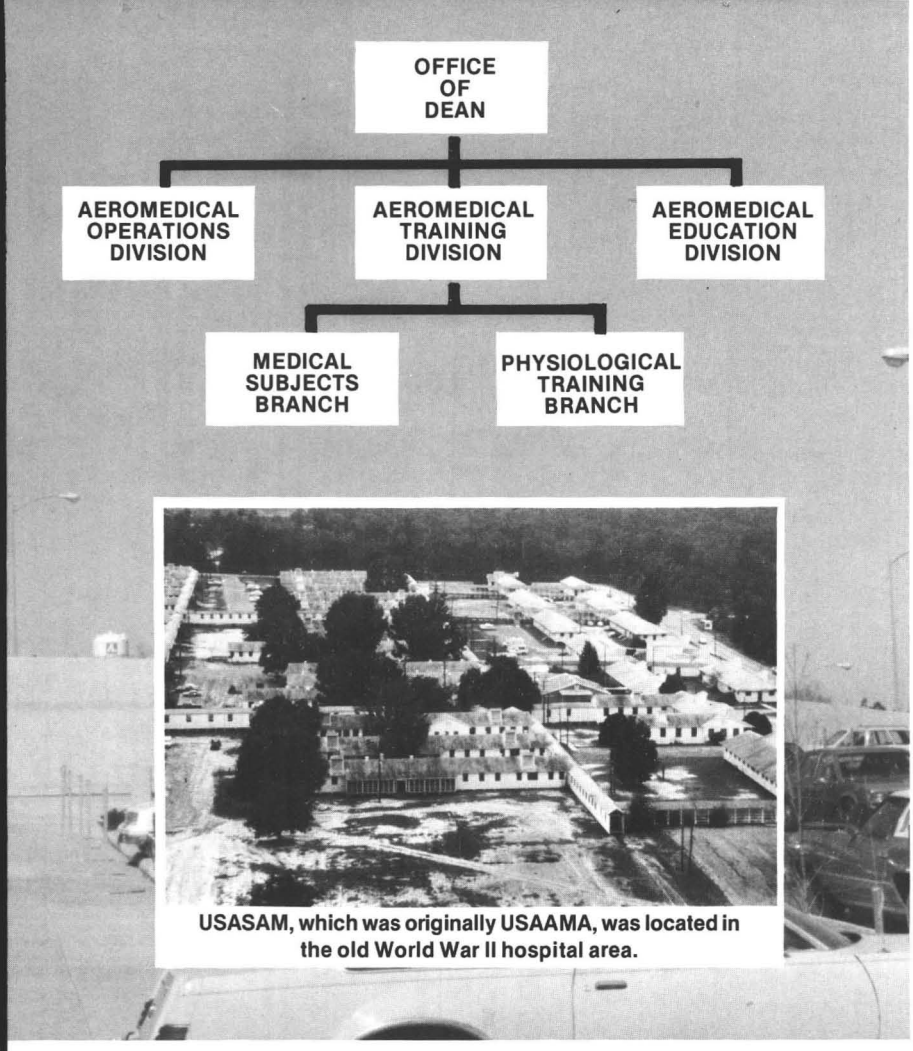
The lineage of USASAM dates back to 1952 and the creation of a medical Aviation section in the Office of the Surgeon General (OTSG). These pioneers were tasked to supervise and coordinate functions of the OTSG relating to Army Aviation, to furnish technical advice to Department of the Army on medical matters pertaining to Army Aviation and to evaluate and plan for aeromedical evacuation requirements.

In 1963, the OTSG Aviation section was redesignated the Department of Aeromedical Education and Training (DAET) and placed at Ft. Rucker, AL, under the U.S. Army Aviation School. As a result of this shift, DAET established the U.S. Army Flight Surgeon Course from which 16 physicians were graduated in 1964. DAET continued to function as a member of Training and Doctrine Command and the Aviation School until 1973.

As a result of the "STEADFAST" reorganization in 1973, the DAET mission was transferred to the newly formed Health Services Command (HSC) and assigned to what was then the Ft. Rucker Medical Activity (MEDDAC). At that time our designation was changed from DAET to USAAMA. Later that same year, Ft. Rucker MEDDAC, as a result of USAAMA's incorporation, was renamed the United States Army Aeromedical Center (USAAMC). That relationship remained constant for the next 11 years as USAAMA continued to grow and mature.

From 1973 to 1984 USAAMA provided a diverse array of services for Army Aviation. Our functions ranged from the review and disposition of flight physicals (more than 40,000 in 1983) to the conduct of aeromedical training for flight surgeons, flight medics and student aviators from around the globe. Other responsibilities included the development of aeromedical policy letters, the review and writing of Aviation medicine regulations 40 series and other Aviation-related publications, the establishment of an aeromedical consultation service, Aviation and standardization training seminar (ASTS) visits, the review of aeromedical problems (such as the medical guidance for aircrews using tactical lasers) and the development of a computerized data repository service for all Active Army, Reserve Components, DA Civilians, civilian contract and air traffic control flight physicals.

Given the diversity of our organization, and together with the emergence of the Army's new Avia-



USASAM, which was originally USAAMA, was located in the old World War II hospital area.

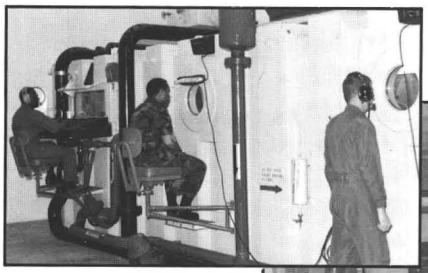
tion Branch, the commander of the USAAMC, Colonel ElRay Jenkins, felt it important to clarify the mission, roles and responsibilities of USAAMA by securing a new name that clearly identified the institution as being responsible for Armywide aeromedical training, policy and doctrine. Therefore, on 7 May 1984 he requested that USAAMA be redesignated the United States Army School of Aviation Medicine.

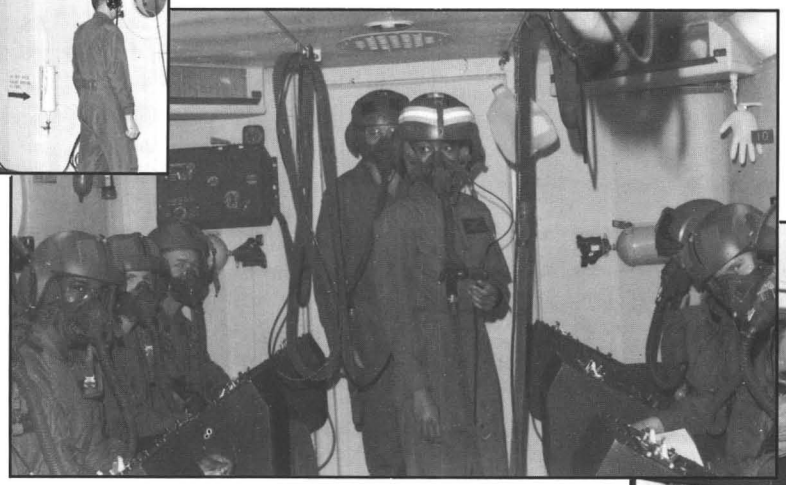
After much deliberation, HSC finally approved the transfer of the Department of Education and Training from USAAMA to the AHS and redesignated it the United States Army School of Aviation Medicine with an effective date of 1 October 1984. The director of USAAMA, Lieutenant Colonel Ronald M. Rossing, was given the additional title of dean, USASAM, and the executive officer, Lieutenant Colonel Bill N. Colbert, was appointed assistant dean of the school. A memorandum of agreement was signed on 14 October 1984 by Major General William P. Winkler, the commandant AHS, and Colonel Jenkins, which tasked the USAAMC to provide administrative and logistical support for USASAM while the command and control of USASAM shifted to the commandant AHS.

The USASAM is housed in the Aeromedical Center complex at Ft. Rucker in the northwest wing of building 301. Our modernistic facilities were completed during the summer of 1984 as part of the USAAMC phase I construction project. (USAAMC is undergoing a total of six phases of construction and renovation at a cost of some $27 million.) This allowed us to consolidate all of our training in one central location (our hypobaric chamber was formerly located some 10 miles away at Hanchey Army Airfield), and it provided us with a sparkling new home for the Army's newest school. Army aeromedical education finally had the showcase it needed to better support the new Aviation Branch, and the Army had firmly established itself alongside the Naval Aerospace Medical Institute and the U.S. Air Force School of Aerospace Medicine as a dynamic partner in the fascinating field of Aviation medicine.

Currently, we train more than 5,800 students per annum and provide in excess of 4,300 hours of classroom instruction. Our topics are included in more than 22 programs of instruction here at the Aviation Center, which emphasizes the crucial role we play in aircrew training. Our present facilities represent a tremendous improvement over our former structure. In addition to new office space, we now have three 100-person classrooms and a unique night vision laboratory. Our physiological training branch is now collocated with us and during 1984 it conducted more than 280 high altitude chamber flights and thereby educated 3,050 students to the dangers and physiological limitations of man in the flight environment.

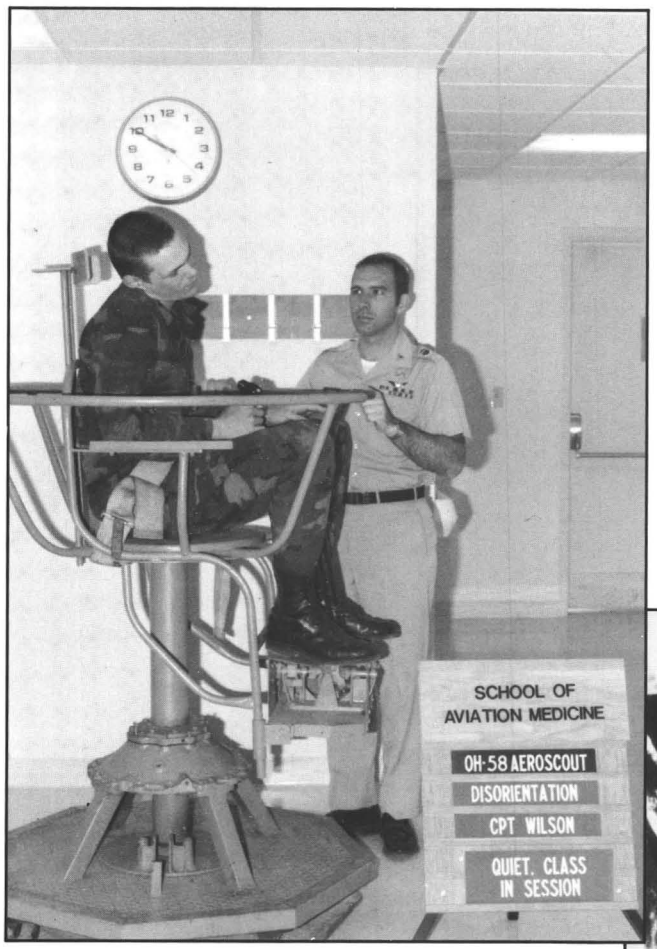
In addition to our support for the Aviation School, we conduct three Army Medical Department military occupational specialty producing courses: the Army Flight Surgeon Course, the Army Aviation Medicine Orientation Course and the recently approved Flight Medical Aidman Course. Statistical data for calendar year 1984 reveals that we graduated 90 flight surgeon students and 119 flight medics. These graduates are expected to forge a direct link between USASAM and the field commander and, through appropriate feedback, help us tailor our instruc-





Three views of the altitude chamber:
LEFT: **The lock operator, an observer and the crewchief.**
RIGHT: **The initial entry rotary wing students inside the chamber.**
FAR RIGHT: **The main chamber operator, the narrator and the recorder.**

USASAM photographs by Donna C. Wilson



A student in the Barany chair, a spatial disorientation training device.

Underwater egress training in the helodunker is currently being done at the Naval Station in Pensacola, FL; but it is being considered for inclusion in the training at the School of Aviation Medicine at Ft. Rucker.

tion to provide the optimum support for Army Aviation.

As for the future, it has been said that tomorrow is not meant for those who are content with today. We at the School of Aviation Medicine could not agree more. Although we have progressed dramatically during the past few years, much remains undone.

Recent events in Grenada highlighted a need for some type of underwater egress training for helicopter aircrews. We have been tasked by the Aviation consultant to the Surgeon General to explore the feasibility of including underwater egress training in the initial entry aviator course. (The Navy presently trains only our flight surgeon and flight medic students in Pensacola, FL.) We are also trying to upgrade our spatial disorientation training by acquiring a vertigon or vertifuge cockpit to replace our outdated Barany chair which we use to induce the coriolis illusion. Our physiological training branch has been given the "go ahead" for the establishment of a hyperbaric (dive chamber) capability and, pending funding decisions, should be operational in that capacity before 1986. We also envision an expansion of our recent participation in the Aviation Standardization and Training Seminar Team and anticipate an increase in exportable training. The OTSG has also tasked us to expand the specialty (residency) training in aerospace medicine by an additional year to 3 years. Beginning in July 1986, six aviation medicine residents per year will come to USASAM after their year at a civilian school of public health and another year at the USAF School of Aerospace Medicine for an additional year of Army-specific Aviation medicine training. This will result in a higher caliber of Army aeromedical expertise in our profession and better support to Army Aviation.

Indeed, the future does appear bright and, accordingly, our goals are lofty. We at USASAM stand poised to support our Aviation community with the best training and education possible. Remember, we are your school and we are here to serve *you!*

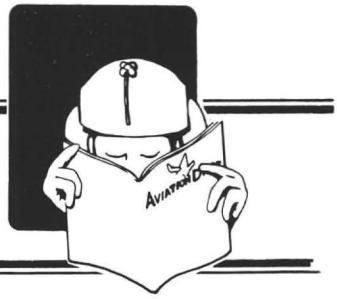
Providing today's instruction for tomorrow's challenge: The United States Army School of Aviation Medicine.

FY 85 TRAINING
U.S. ARMY SCHOOL OF AVIATION MEDICINE

Fixed Wing Multiengine Course	143 Hours
U-21 Instructor Pilot Course	176 Hours
OV-1 Aircraft Qualification Course	154 Hours
OV-1 Instructor Pilot Course	52 Hours
Initial Entry Rotary Wing Officer/Warrant Officer Course	1200 Hours
CH-47 Aircraft Qualification Course	84 Hours
AH-1S Instructor Pilot Course	36 Hours
Rotary Wing Qualification Course	16 Hours
Aviation Pre-Command Course	60 Hours
OH-58 Instructor Pilot Course (82) OH-58 Aeroscout Night MOI	60 Hours
UH-1 Night Instrument/Night Vision Goggles MOI	24 Hours
Enlisted Aerial Observer Course	56 Hours
Aviation Officer Advanced Course	128 Hours
Aviation Officer Basic Course	140 Hours
Rotary Wing Refresher Course	416.5 Hours
UH-1 Instructor Pilot Course	78 Hours
UH-1 Instructor Pilot Course (Local MOI)	78 Hours
Aviation Warrant Officer Advanced Course	40 Hours
Flight Surgeons Course	922.5 Hours
Flight Medics Course	426 Hours
Aviation Safety Course	40 Hours
Total Hours	4354
Students	5832
Essential AMEDD Aviator Course (Currently conducted at AHS, Ft. Sam Houston, TX.)	1800 Hours
Students	200

Captain Wilson is a Medical Service Corps officer assigned to the Operations Division of USASAM. In addition to being a dual rated Senior Army Aviator, he is a school trained aerospace physiologist, instrument flight examiner and instructor pilot in several rotary wing aircraft. Any questions concerning USASAM may be directed to the Operations Division at AUTOVON 558-7460/7464.

VIEWS FROM READERS



Editor:

Thank you for contributing to Black History month with the interesting article written by Major Phillip E. Raschke in the December 1984 issue. Many people never knew of the entity of black aviators who served and fought eminently in World Wars I and II.

When the bullets start to fly all blood does run red.

SP4 Darrell E. Latson
219th Trans. Co.
Scott AFB, IL 62225

Editor:

The number of articles and responses concerning the problems relating to aeroscout/OH-58 operations have indeed been numerous and well thought out. Having been an aeroscout platoon leader, I wonder if many problems are not essentially related to aeroscouts having "second rate status" when dealing with the other elements in the Aviation community? I will use three examples to illustrate:

An aeroscout and his observer/copilot are not only responsible for collecting battlefield intelligence but generally provide the command and control for all participating attack and Air Force elements. The AH-1 Cobra gunner/copilot is responsible for employing a weapon system which apart from the aircraft is no more complex than ground weapon systems now being commanded by sergeants and SP4s. Except for "status" does it not make more sense to place an SP4 in the Cobra front seat where his decisions and performance will only affect the operation of one weapon system than in the scout where decisions are being generated which affect mission success and the platoon's survival?

With its replacement in sight we continue to spend great amounts on upgrading the Cobra. At the same time we offer their scout counterparts an only slightly improved taxicab in the "C" model (OH-58) with no self-defense or target acquisition gear. If money is being withheld due to AHIP [Advanced Helicopter Improvement Program — OH-58] fielding why is money available for the Cobra in view of the AH-64 Apache? Had the "C" model been equipped with an upgraded tail rotor, combination FM/AM VHF radios, Doppler, roof mounted stabilized sights, and a weapon system (any weapon system) all of which were and are available "off the shelf," the OH-58 could flourish in the scout role today rather than looking to tomorrow.

Last, as the Army begins production of its multibillion dollar Apache contract it can only show prototype pictures of its companion scout, the AHIP. It seems strange that we spend millions for a helicopter capable of sustaining direct 23 mm hits when its mission is to launch weapons from behind protective terrain and then send an aeroscout which can be destroyed with slingshots and BB guns (AHIP included) to hover in front of that protective terrain and laser designate. It would appear that the Army is being sure that the AHIP is to the Apache what the OH-58 is to the Cobra—OUTCLASSED.

Programs which provide better aircraft (AHIP) and more pilots are a step in the right direction. The real boost, however, will not come until the Aviation community stops joking about how landing zones should be marked with burning (expendable) '58s and instead accepts the contribution of the aeroscout as something more than trivial.

CPT Clifford N. Cox
Executive Officer
B Co. 159th AVN
Ft. Campbell, KY

Editor:

Concerning Colonel Grayson's excellent article on Army Aviation's role (November 1984 issue, "Army Aviation, 1984 to 2015") I would like to add this quotation from an old Meiji saying.

"We shall fall behind our fellows in the world, if, when we should advance we make no move at all."

David S. Nobriga
USAREUR Materiel & Equipment
Oil Analysis Labs

Editor,

With regard to your recent article on survival procedures, I have the following comments to make.

The hypothetical situation was; a successful precautionary landing was made in a [UH-1] Huey, in a snowstorm, the pilot had failed to get a Mayday out and now, on the ground, it is impossible to establish communications and night is coming on. The landing was made because of a transmission oil light.

Now, the next line says, "First you must find shelter," and goes on telling how doors may be taken off, seats removed, cowling removed and used as a fire or heat reflector, and every bit of the advice is *inappropriate* for that situation.

Follow those instructions and you will be methodically destroying the best shelter you have — that totally intact Huey.

Is there any reason the engine can't be restarted? How about checking the transmission oil? A fault "indication" is no reason to assume the aircraft is totaled. How about starting that engine and the cabin heaters, periodically, throughout the night? What's to stop you from doing that, as long as you have fuel and battery power. The next day the sun might be out and you might have found a grounded chip detector wire or found you had

several quarts of oil aboard. In some cases you wouldn't try it, but in some you might want to try to take off again, which you can't do if you have disabled the aircraft by tearing off the cowling and letting the engine become inoperable.

The key to survival is to keep your head and to use efficiently the resources you have.

Let's make it worse. We've had a hard landing, and the Huey isn't airworthy. Again, are there fuel leaks? Will the engine run? OK, the engine won't run, and a chin bubble is broken out, and the wind and snow are blowing in.

Plug up the hole, and that fuselage will still provide a far more efficient shelter than a makeshift structure.

As snow piles around the fuselage (help pile it, if nothing else), it will tend to insulate the aircraft; ask any Eskimo that lives in an igloo, or any sled dog.

The wind chill factor is your biggest problem. Stop the wind, stay out of it and it is like adding temperature. In a true arctic blizzard condition (not indicated in the article) the difference might be as much as 50 to 70 degrees.

Last Christmas at Ft. Campbell, KY, we had temperatures around zero, but with a stiff breeze the chill factor ranged from -40 to -50 degrees. Zero, inside a Huey (or any aircraft) is still zero. But, outside in the wind, using up energy and losing body heat to build a makeshift shelter that at best will still have a higher chill factor than you'd face inside a closed aircraft, is counterproductive and might be suicidal.

In a survival situation the old line, "Do something even if it's wrong" has no place. You must *think*, and do the best you can, with what is available.

Incidentally, studies and research have been done by civilian organizations that prove clearly under any set of conditions (*weather,* not a fuel soaked cabin) short of a totally destroyed fuselage, a survivor will stay warmer if he stays inside rather than in a makeshift shelter.

The measure recommended might well be acceptable and even efficient, under some circumstances, but the key is, the intact fuselage. Under some circumstances, a man might make snowshoes or skis out of rotor blades and find his way back to civilization, but in most cases I wouldn't recommend it.

Truckers who drive the Alcan and some other remote Canadian routes are told to follow these general rules if stranded in blizzard conditions.

Stay with the truck, even if you see lights ahead. It might be a house, but it also might not. Even 500 yards can be deadly if there's no shelter at the end — and you might not make it.

If the engine will run, run it and the heater higher than normal. Only if fuel is very much a concern or if there's a loss of oil pressure or overheating is it recommended to even shut a diesel down too long because it might not restart. Due to the stacks, carbon monoxide is usually no concern.

If the oil pressure is *gone,* start the engine periodically, even if it throws a rod it may still run for awhile and it will keep you warm. The idea is to use every bit of heat that the engine can provide for as long as it will run.

The engine won't run? Drain fuel and set fire to it, in a bucket or other container. This serves as a beacon of sorts. A person can take some of the chill off and a *small* container with a rag for a wick can even be used inside the cab if ventilation is provided. Fuel gone? Torch the spare (in some cases, there are two). A truck tire makes a tremendous fire, lots of radiant heat, lots of light and lots of smoke.

Follow that tire with each of the other tires, one at a time with each being burned as close to the cab or tractor as possible. The burn rate can be adjusted by throwing snow on the fire. I've never heard of any trucker who burned all his tires, but there are still the seats and perhaps the cargo.

One driver of a refrigerated (actually temperature controlled) truck moved into the trailer in a blizzard. The refrigeration unit mounted on the trailer with its own fuel supply was kept running and the 40 degree setting for the lettuce he was hauling was no doubt "tropical" compared to outside.

The point of this is to illustrate that arctic or winter survival procedures must always be *geared* to the prevailing circumstances.

A person doesn't want to do as the (probably fictional) Air Force or Navy Aviation cadet did when he had been told, "In case of engine failure, always land with the gear up." In the story, he lost power over his home field and promptly did a wheels up landing — on the main runway.

Always "think survival." Imagine different situations and actions that you could or should take which would be most effective. But don't (and don't let anyone tell you you should) immediately execute step D unless you've tried or eliminated steps A, B and C.

Joe R. McCrary
Route 1
Trenton, KY 42286

Editor:

I have just completed reading the article by CW4 Mark O. Wrinn, "What Do You Mean I'm Not in the Aviation Branch?"

I could not disagree more with Mr. Wrinn. I'm not in, nor do I ever want to be in, the Aviation Branch. Before I'm tarred and feathered and maybe passed over let me explain my position.

What I get from the article is that Mr. Wrinn has been in a lot of units. From his statements I bet he has worked with and for Armor, Infantry, Cavalry and maybe even Artillery. All of his jobs were Aviation in nature but nonetheless he worked in different branches.

I started my Aviation training in Cavalry, then Armor, on to TRADOC and at present I am an Artillery aviator. My collar says warrant officer; my wings say aviator; my training says Armor, Cavalry, Infantry, Artillery and TRADOC instructor pilot.

Yes, I am glad that Mr. Wrinn's commissioned friend is now able to fly and get promoted in the new Aviation Branch, but as for me I think my broad background is a bigger asset. Just call me combined arms AVIATION WARRANT.

CW3 James G. Brosnaham
Detachment Commander
25th Aviation Company

Articles from the *Aviation Digest* requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Ft. Rucker, AL 36362-5000.

Standardization— Too Much or Too Little?

BEFORE ATTEMPTING to answer this question we need to know what is meant by standardization. One definition is: "The condition to which a standard has been achieved or effectively applied."

That statement sums up standardization quite well. It is easy to understand, easy to remember, but one must remember that standardization can be far more complicated than such a simple definition would indicate. Check with your installation or area Aviation Standardization Committee whose mission it is to supervise and coordinate the command implementation for the U.S. Army Aviation Standardization Program and see how many will agree on just what standardization is and how much is enough.

The question is often asked, "Is standardization, in fact, desirable?" Maybe it would be best to consider what you are about to say before trying to answer. In answering this question we can go to two extremes. On one hand, we have the nonstandardized aviators who do things out of habit or in a way they believe to be best. Of course, they read a lot, have observed a lot and have a great deal of experience. Because of their knowledge and vast personal experience, they are able to easily justify their way of doing business. To summarize, they have their way of doing things which they know to be best because experience (and maybe sometimes a lot of luck) has convinced them. If these aviators were the only ones in the skies, we would be able to stop here. At this point, they would have achieved standardization.

Because of the increased use of aircraft in today's world, we must work with many others in the Aviation profession who are not so standardized. Someone once had the idea that there is an inherent and potential danger in more than one aircraft trying to occupy the same airspace simultaneously; therefore, it might be best to have everyone doing the same thing in the same way. While this might sound good in theory, it brings us quickly to another extreme. If Aviation policymakers could provide aviators with every possible problem situation, coupled with procedures to follow in the event they might encounter these problems, then we might achieve standardization in its purest form. Unfortunately, this is humanly impossible for the present.

So then, if nonstandardization is undesirable, and total and complete standardization is humanly impossible, how much standardization is a good thing? *Each aviator must acquire and maintain the highest possible level of proficiency and standardization which will allow him/her to handle the maximum number of planned and emergency events he/she might encounter while still permitting mission accomplishment.*

These thoughts bring us to yet another point. How can we acquire the right amount of standardization? Unofficially, we pass information through the "grapevine": hangar talk, preflight briefs, mission briefs, aircrew training manual (ATM) discussions and other Aviation gatherings. Officially, we go to our standardization committees, chains of command and stacks of communications affectionately known as orders, messages, instructions, standing operating procedures, modification work orders, field manuals, technical manuals, training circulars, field circulars, letters of instructions, Communications-Electronics Operation Instructions, standing signal instructions, etc. These official and unofficial sources provide us with the means for consistency and continuity in getting our work accomplished through standardization.

So back to that often asked question, "Is standardization desirable?" If we feel that standardization is achieving that level of proficiency which will allow each

aviator to handle the maximum number of planned and emergency events, while permitting mission accomplishment, then we must answer wholeheartedly "yes," and for some very important reasons which I feel compelled to mention:

- When procedures are reasonably standardized, any aviator in most situations will have at his/her disposal both the official and "peer" group consensus of how to best handle a given situation. These standard procedures can then be used for both an initial response and later as a general guide on how to best solve the problem. Because of the peculiarities of the situation, an aviator may choose to follow the standard procedure to the letter, modify it or he may choose to discard it entirely. At the very least, the aviator has been given some guidance to draw upon in making a decision.
- The achievement of standardized ATM tasks provides the Army aviator the ability to perform the worldwide Army Aviation mission. When changes in assignment occur, the performance of this important mission continues to be accomplished with a minimum amount of train-up time, as a result of all ATM tasks being uniformly applied.
- With reasonably standardized procedures established, every aviator knows what to do in most planned or emergency events. If all aircraft and all aviators always worked perfectly, the benefit of these standard procedures would be minimal. But, as we all know, occasionally things do go wrong and we are all safer when everyone knows the standardized procedures and can reasonably anticipate what the other person is going to do.

Now, if you are convinced that a reasonable level of standardization is a good thing to have, then what is the problem? Why then must we remind ourselves that our way is not necessarily the standard way and, therefore, should not be used? Perhaps it is because some who fly aircraft and assert their independence, competence, ability, dedication, fearlessness and self-reliance (and occasional disdain for those who would stay on the ground) find it is against their basic nature to conform to standardization of anything. However, as members of the Army Aviation Branch we must disregard this trait as we demonstrate our capability and flexibility as a member of the combat arms team.

Simply put, we need a reasonable level of standardization because, other factors being equal, standardization can reduce mishaps, save manpower and equipment, and permit us—personally—to enjoy life for many years to come.

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 36362-5000; or call us at AUTOVON 558-3504, FTS 533-3504 or Commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or 205-255-6487 and leave a message.

U.S. Army Class A Aviation Flight Mishaps

	Number	Flying Hours (estimated)	Rate	Fatalities	Total Cost (in millions)
FY 84 (to 19 April)	22	807,149	2.73	21	41.2
FY 85 (to 19 April)	29	796,516	3.64	27	50.1

AVIATION PERSONNEL NOTES

LTC J.A. Orahood
Chief, Aviation Plans/Programs Branch
Military Personnel Center

Army Civilian Education Goals and Requirements

An Army goal is for all commissioned officers to have a baccalaureate degree and a sufficient number of selected commissioned officers to have advanced degrees to fill Army Educational Requirements Board (AERB) requirements. All warrant officers should have an associate degree by their fifteenth year of service, and a sufficient number of selected warrant officers will be educated to the baccalaureate and master degree levels to meet AERB requirements.

The fully funded program is a full-time civil schooling program for which the Army pays tuition and fees and authorizes limited reimbursement for textbooks and supplies. The individual draws full pay and allowances and is authorized a permanent change of station to attend school. Current fully funded programs include the following:

• *Advanced Degree Schooling* — provided to meet specific DA requirements established by the AERB. Disciplines must support Officer Personnel Management System specialties, and officer must agree to serve in an AERB position for 3 years following graduation.

• *Warrant Officer Associate Degree Program* — offers warrant officers an opportunity to obtain an associate degree in a field of study directly related to their military occupational specialty (MOS). The maximum period of study is 18 months; however, warrant officers normally attend for 12 months or less.

Some recent advanced civil schooling initiatives are:

• *Technological Enrichment Program.* Newly commissioned officers are educated to the master's degree level in emerging high technology disciplines. Thirty second lieutenants are anticipated for selection in fiscal year (FY) 1985. Education occurs prior to officer basic course attendance.

• *Military Personnel Center (MILPERCEN) Nominated Ph.D. Candidates.* MILPERCEN will select 25 officers for doctoral studies in FY 85, in engineering or physical science curriculums.

• *Warrant Officer Officer Research, Systems and Analysis (ORSA) Education.* In FY 84, MILPERCEN input six warrant officers into ORSA related disciplines. Study may be at either the bachelor or master's level.

Selection for these programs is competitive and is based upon a comparative evaluation of academic and military records, with overriding consideration given to service performance record. Many disciplines require undergraduate knowledge of calculus. The GRE or GMAT, as appropriate, should be taken as soon as possible.

To apply, submit DA Form 1618-R (Application for Detail as Officer Student at a Civilian Educational Institution or at Training With Industry). AR 621-1 gives details of how to prepare and forward applications.

Officer Advanced Course Advanced Assignment (OACAA) Program

The OACAA program, through a coordinated effort between the Aviation Center, at Ft. Rucker, AL, and the Aviation Officer Assignments Branch at MILPERCEN, provides aviator selectees with post-OAC assignments prior to attendance at OAC. The intent is to eliminate uncertainty about the future and involve officers more with long-range professional and personal planning.

Advanced assignments are provided for 100 percent of each OAC class population. Officers being considered for nominative assignments (e.g. advanced civil schooling, Reserve Officers' Training Corps, United States Military Academy, United States Army Recruiting Command) will be notified of this consideration and their specific assignment usually will be determined after their arrival at OAC.

Officers are requested to submit a preference statement within 30 days of being placed on orders for OAC. Assignments, of course, are based on Army requirements and professional development considerations as well as the officer's desire. Officers are notified of the projected follow-on assignment 2 to 4 months prior to OAC start date.

AH-64 Apache Fielding

MILPERCEN is filling the new AH-64 battalions starting this year. The warrant officer MOS is 100K, the additional skill identifier (ASI) for pilots is 1L, the enlisted MOS is 67R and the ASI for enlisted MOS in the 35 and 68 series is X1. Pilot prerequisites for aviator qualification course (AQC) are qualification in AH-1S, minimum of 2 years as an aviator and a tour in an air cavalry or attack helicopter unit as well as the normal currency required for all other AQC. Enlisted prerequisites for MOS 67R are qualification in a 67 series MOS for at least 2 years; for MOS 66R, qualification in a 66 series; for ASI X1, qualification in the appropriate 35 or 68 series MOS for which the ASI position requires. All personnel selected will incur a 3-year service obligation. To be one of the first members of an Apache unit let your MILPERCEN assignment officer know.

1985 Army Astronaut Selection Board

The Army has nominated 32 officers, in grades captain through lieutenant colonel, to the National Aeronautics and Space Administration (NASA) for possible selection as astronaut candidates. The Army nominees represent an impressive array of scholastic, scientific and military talent. Their academic disciplines include: aeronautical, aerospace and electrical engineering; biology, microbiology; occupational therapy; chemistry and biochemistry. Eight are physicians. Fifteen are graduates of the U.S. Military Academy. Fifteen are aviators. Eight are graduates of the Naval Test Pilot School at Patuxent River, MD. Impressive as the nominees' credentials are, there is no guarantee that any of them will be among the 8 to 12 new astronauts NASA selects in 1985.

For the 1985 Army Astronaut Selection Board, applications were received from Active Army members, Army National Guard members, Army Reservists, enlisted, warrant officers and commissioned officers. The 32 nominees include one Army National Guard member, one Army Reserve member and two females. The nominees are:

LTC John O. Benson
CPT Courtland E. Bivens
CPT Walter L. Bogart
CPT Stephen P. Bruttig
LTC Ronald B. Carpenter
MAJ Tomas Coronado
MAJ Marvin L. Hanks
MAJ George R. Holt
MAJ (P) Hardy M. Howell
MAJ Michael M. Lieberman
MAJ (P) Edward W. Mayer
MAJ George J. Nepereny
MAJ Randall G. Oliver
MAJ Paul B. Rock
MAJ (P) Joseph L. Bergantz
CPT (P) Merrill S. Blackman
CPT (P) James D. Brown
CPT (P) Waldo F. Carmona
CPT (P) Michael R. U. Clifford
CPT Charles D. Gemar
LTC Warren W. Higgins
MAJ Jerry W. Hope
MAJ Robert J. Kainz
MAJ Robert MacMullin
MAJ William S. McArthur
MAJ (P) Barbara Nylund-Morgan
MAJ Terrance L. Reininger
CPT (P) Richard L. Vincent
MAJ James S. Voss
MAJ Ronald P. Turnicky
LTC Thomas L. Vollrath
MAJ (P) Linda K. Weir

To *apply,* you need at least an undergraduate degree from an accredited college in engineering, mathematics, a biological or a physical science. If you are applying for a mission specialist position, you also need 3 years of experience in your qualifying degree. If you are a pilot applicant, you must have at least 1,000 hours pilot in command time for high performance aircraft (minimum 3,000 pounds thrust per engine). Combat and/or test pilot time helps for either position. It is important to note that even though our nominees are top heavy in Aviation and medicine, they are all being recommended for the mission specialist's category and were selected mainly for their engineering and scientific credentials. Applicants must be able to pass a NASA Class I or Class II flight physical (for pilots and mission specialists respectively). NASA's flight physicals are similar to the Army's but NASA allows no medical waivers for new astronauts.

The Aviation Advanced Non-commissioned Officer Course

Master Sergeant Ron Hannon
U.S. Army Aviation Logistics School
Fort Eustis, VA

THE U.S. ARMY Sergeants Major Academy, Ft. Bliss, TX, has assumed Armywide proponency for all advanced noncommissioned officer courses (ANCOC). This will enhance the education of all senior noncommissioned officers (NCOs), and standardize common skills training for all NCOs, regardless of their career management field.

This course emphasizes leadership, communications skills, training management, effective writing and other selected common military skills. It assures field commanders that all senior NCOs are being trained by the Army's most competent trainers, thus adding credibility to the NCO education system.

In addition to the common core, ANCOC has a 2-week Aviation track that teaches the Aviation senior NCO Aviation management. This course introduces the Aviation NCO into skill level 4 duties as a production control NCO, maintenance platoon sergeant or shop platoon sergeant. Examples of items being taught to the Aviation NCO are: Aviation maintenance concepts and policies, manpower and equipment authorizations, production and control procedures and unit readiness reporting.

During the introductory phase of the Sergeants Major Academy ANCOC common core, we've noted that many NCOs would benefit if they'd improve their reading comprehension skills through speed reading or related reading courses prior to attendance at ANCOC. Because of the enormous amount of reading required by the SMA's common core, it is advisable for any NCO selected to attend ANCOC to go to the Education Center and bone up on the basics.

The future of the Army is based on retention of NCOs who have fine-honed leadership abilities and who display technical competence in a sophisticated, high-tech environment. The Aviation senior noncommissioned officer must be skilled, competent and a professional to excel in Army Aviation today and be able to adapt to the Army of the future.

THREAT

Mr. Edward J. Bavaro
Threat Branch
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL

The OMG—
One Tough Proposition

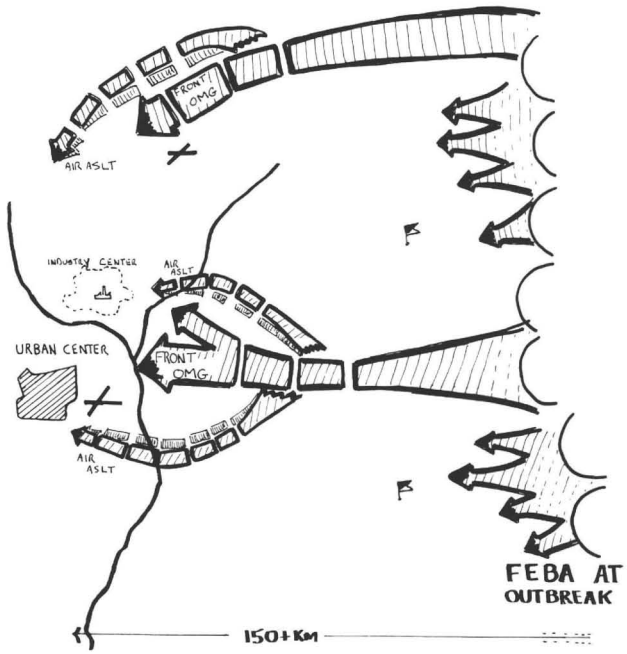
Combined arms exercise with Hind-Ds and BMP.

As a means of striking deep into the enemy's rear area and destroying NATO nuclear systems, the Soviets have formed operational maneuver groups (OMG). The most significant threat to the OMG, however, is the attack helicopter.

OFFENSIVE OPERATIONS encompassed in a Soviet theatre of military operations include the strategic mission of defeating and destroying enemy field forces and capturing vital territory. The Soviet offensive would be characterized by a high rate of advance that, over a period of several weeks, would approximate 50 kilometers per day. If a nuclear conflict were being waged, a higher rate of advance would be expected. When confronting a well-defended enemy, the Soviets will attempt to drive to the enemy's rear area, whenever possible, by bypassing his major force concentrations. They will attempt to avoid a costly, time-consuming battle of attrition and will try to crumble the enemy's defensive framework by quickly penetrating through to his rear area.

In recent years, the Soviets have refined a concept of offensive operations known as operational maneuver groups (OMG) as a means of achieving that deep penetration into the enemy rear area. See *Aviation Digest*, September 1983, "OMG," authored by CPT Jim Herberg. By causing North Atlantic Treaty Organization (NATO) forces to fight in their own rear areas, the Soviets would upset the cohesiveness and integrity of the defense. More importantly (besides the predictable political inhibitions of using tactical nuclear weapons against the OMGs in western territory) the proximity of Soviet forces to NATO troops may mean that the nukes will produce unacceptable losses of friendly troops. The swift action of Soviet offensive operations is mandated by the necessity to preclude a protracted war. Soviet military doctrine stresses that a war in Europe must be won quickly. The obvious risk of sustained warfare will, they feel, lead to a disastrous strategic nuclear engagement. Moreover, the strain of a sustained war would severely undermine the Soviet bloc from within. The Soviets have always been concerned about unenthusiastic support from Soviet bloc members in the event of a war. In a protracted war, the Soviets would have to continually look over their shoulders.

Another refinement in the Soviet plans to achieve a rapid rate of advance at the outset of hostilities (to exert a maximum amount of shock on NATO forces) is the air-ground assault groups. These raiding groups, as an extension of the OMG, will include tanks, armored personnel carriers, logistical support vehicles, and fixed and rotary wing aircraft. Conditions and forces available will determine the makeup of the assault group. The air element will include fighter and strike aircraft and a large number of helicopters. This offensive



FRONT LEVEL OMG

- **Could be multiple OMG.**
- **Committed on day 2 or 3 of conflict.**
- **Penetrate up to 300 kilometers.**
- **Missions: Destroy nukes, reserves, captured key terrain and airfields.**
- **Link-up with airborne, heliborne or air assault forces.**

The OMG

pressure seeks to cripple the command and control systems and deny NATO the time to seize the initiative by restricting their options. Key objectives will include the destruction of as many NATO nuclear systems as possible.

Helicopters in Command and Control

The Soviets feel that OMGs and raiding groups require considerable air support and much of that air support must be provided by their helicopters. Attack and assault helicopters could provide a rapid reaction capability to allow the commander to respond appropriately to the ever-changing situation. They would be used to take advantage of a break in NATO's defense or to engage a counterattacking force. Ideally, NATO helicopters in forward locations should be targeted as they pose a significant threat to the Soviet attack. The Soviets may regard airborne command posts (in helicopters) as increasing the timeliness of the application of combat power in response to NATO forces threatening their groups. A junior air force officer would likely accompany each raiding group, OMG battalion or regiment of first echelon main forces. He would have attack helicopters on call. The attack helicopters in the air element would, among other missions, supplement artillery fire. Some of their targets in the assault would be tanks, antitank weapons, multiple launch rocket systems and enemy helicopters in the air and on the ground. The importance of the helicopter support to the formation commander has led to reorganization of the Soviet Air Force, whereby aviation assets are decentralized for better integration with ground forces. The reestablishment of Army Aviation allows the formation commander to use organic and assigned helicopters more effectively.

Air Defense of the OMG

Soviets stress the use of small arms against helicopters. They do practice small arms antiair training and contend that, regardless of helicopter armor protection, some vital parts are susceptible to ground fire. They teach that engaging aircraft head-on takes advantage of the greater projectile energy and presents the best angle of incidence. They insist small arms are effective against helicopters and have some value as a deterrant. At the least, they will serve to distract aircrews. This position is obviously tempered by their experience in

Afghanistan where the heavily armed Mi-24 Hind (with 1,100 kilograms of armor plate) has often been brought down by small arms gunfire.

Besides the array of small arms weapons, especially the automatic weapons mounted in their vehicles, the Soviets feature a mobile suite of organic air defense systems at division level. They provide a comprehensive overlapping of engagement envelopes to reduce the effectiveness of NATO air attacks. All divisions have the SA-7/14, ZSU-23-4, SA-9/13, and SA-6/11 or SA-8. The SA-8's ability to operate autonomously, as opposed to the SA-6 which relies on off-carriage battery acquisition and fire control radars, is better suited for OMG-type operations. The SA-8 transporter erector launcher (TEL) is amphibious while the SA-6 TEL is a nonamphibious tracked vehicle. On the other hand, the SA-8 is able to travel at higher speeds on the road and, combined with its amphibious capabilities, is especially well suited for pursuit or exploitation operations.

Air Threat to OMG

The Soviets probably anticipate that enemy aviation will place high priority on attacking their OMG. Lead vehicles would be targeted to help create obstructions for the subsequent vehicles, resulting in a concentration of targets for follow-on attacks. This type of problem for the Soviet OMGs is intensified by the presence of helicopters equipped with antitank guided missiles (ATGMs). The lethality of ATGMs and the standoff advantage of their employment greatly aggravates the obstruction problem, disrupting and possibly slowing the OMG's intended time schedule. Any delay to the OMG buys valuable reaction time for NATO forces. The Soviets know that their ability to detect and defend against attack helicopters while on the offensive is much less than while in a defensive posture. Nap-of-the-earth flying techniques and the constantly changing terrain patterns while moving forward greatly degrade the ability of the Soviets' visual and radar surveillance systems to provide timely warnings. The brief exposure of the attacking helicopters gives Soviet air defense systems little detection time and even less engagement time.

The OMG's vulnerability is amplified at choke points such as river crossings, populated areas and major road junctions. The air defense effort is less structured on the march and is certainly not the formidable, redundant proposition it would pose under more static circumstances. This imposing array of air defense systems is optimized more toward the defense of Air Force aircraft and any inherent capability against helicopters is reduced while on the move.

Air defense then is the "Achilles' heel" that could preclude a successful OMG operation unless effective air cover and air support are at hand. Much of this protective support will have to be done by attack helicopters. Today, everyone is aware of the growth of the Soviet fleet of attack helicopters and the impact they are having on Soviet tactics and doctrine. Originally, the emphasis was on the type of aerial platform that could provide a good volume of fire support (i.e., Hip and Hind) and had some staying power. These sturdy aircraft, however, are helicopter versions of fixed wing, close air support (CAS) aircraft, best given to running-type ordnance delivery. The helicopters, as it turns out, are more responsive than the fast movers, are more easily coordinated and integrated into the tactical scheme, and can lay firepower support closer to friendly troops. The Soviets emphasize their (helicopters') inherent ability to operate despite bad weather, while the fixed wing CAS aircraft are grounded. More importantly though, Soviet attack helicopters can dilute the effectiveness of NATO attack helicopters operating against the OMG, thus mitigating that air defense Achilles' heel. This is important because, according to C.N. Donnelly (in his *International Defense Review* article, May 1984), *"the Soviets report that . . . each NATO helicopter should be able to destroy three or four tanks per sortie and complete an average of five sorties."*

The antihelicopter requirement is an obvious necessity for the Soviet attack helicopters if the OMG or any deep attack is to be successful. If a NATO attack helicopter could eliminate more than half of a Soviet tank battalion by itself, no sustained attempt at a deep strike could be effected. Major General M. Belov (a leading Soviet helicopter theoretician) obviously recognized this problem when he talked of the need for "fighter helicopters for destroying enemy combat helicopters." He envisions a helicopter of special purpose design, possibly a one-man helicopter, that is light, swift and maneuverable with an optimal weapon system that includes cannon and ATGMs. Apart from nuclear weapons, the most significant threat to the OMG, according to the Soviets, is the attack helicopter. Surely, then, NATO can reasonably anticipate the emergence of some form of Soviet fighter helicopter to protect against our attack helicopters.

OMG Logistics

The Soviet approach to logistics is well suited to the conditions of mobile warfare. Soviet divisions are supplied according to need as determined by the planners at Front level. Those attacking on a main axis are given

priority over those attacking on supporting or minor axes or meeting light opposition. Their concept of centralized control ensures flexibility and promotes economy. That flexibility is aided in timeliness as well because the higher echelons have the responsibility of resupplying their subordinates. It is common to skip an echelon (i.e., an Army-level transport may deliver directly to a regiment). The Soviets contend this technique reduces the transport traffic flow on roads which otherwise might restrict mobility.

Advancing forces are always ready to exploit civilian fuel resources and captured military supplies. Soviet fuel engineers have special pumps and adapters for that purpose. The OMG would have begun the operation substantially well stocked with logistical augmentation. Logistical want should not be a limiting factor during the early days of the OMG's advance. Furthermore, the Soviets claim that, in their experience from World War II, forces conducting a rapid exploitation tend to consume fewer of their supplies than those fighting through organized defenses.

Servicing the OMG Helicopters

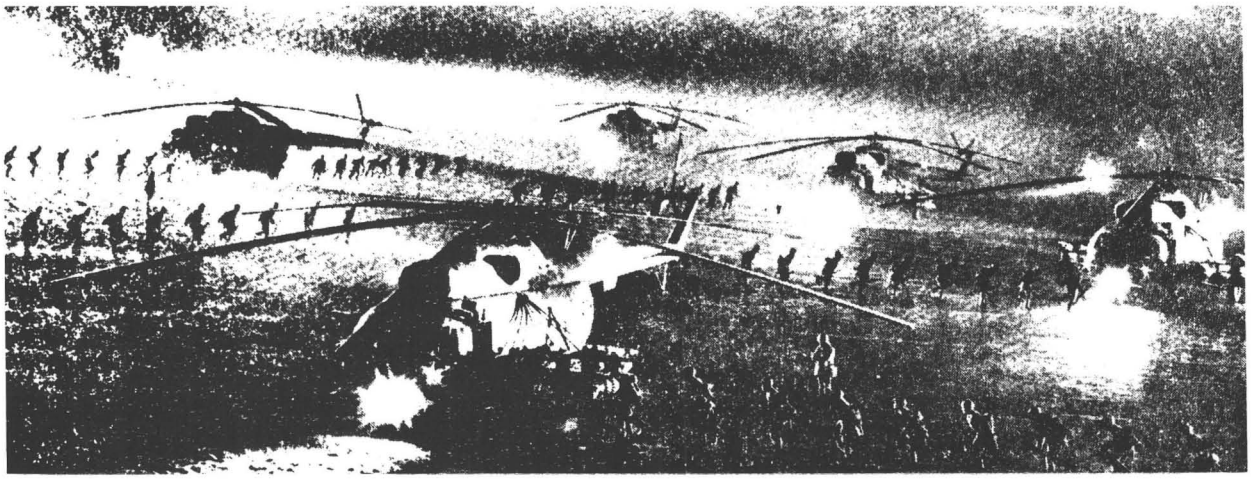
The Soviets have a fleet of fuel service trucks fully capable of refueling aircraft in forward areas as well as on hard surfaced areas. A good example is the TZ-30 fuel service truck. This vehicle, with a 30,000-liter (L) capacity, is uniquely configured to give it offroad mobility. The four-axle tractor and two-axle semitrailer truck have all wheels, including those on the semitrailer, as driving wheels. It is the largest fuel transporter with offroad mobility. The independent pumping system provides 2,000-L/minute fuel flow using two hoses during pressurized refueling and 1,000-L/minute using two hoses during open refueling. A newer, smaller vehicle, designed specifically for aircraft refueling, is the TZA-7.5-500A. This vehicle has a 7,500-L capacity and can be tranported by the AN-12 Cub, Mi-6 Hook or Mi-26 Halo.

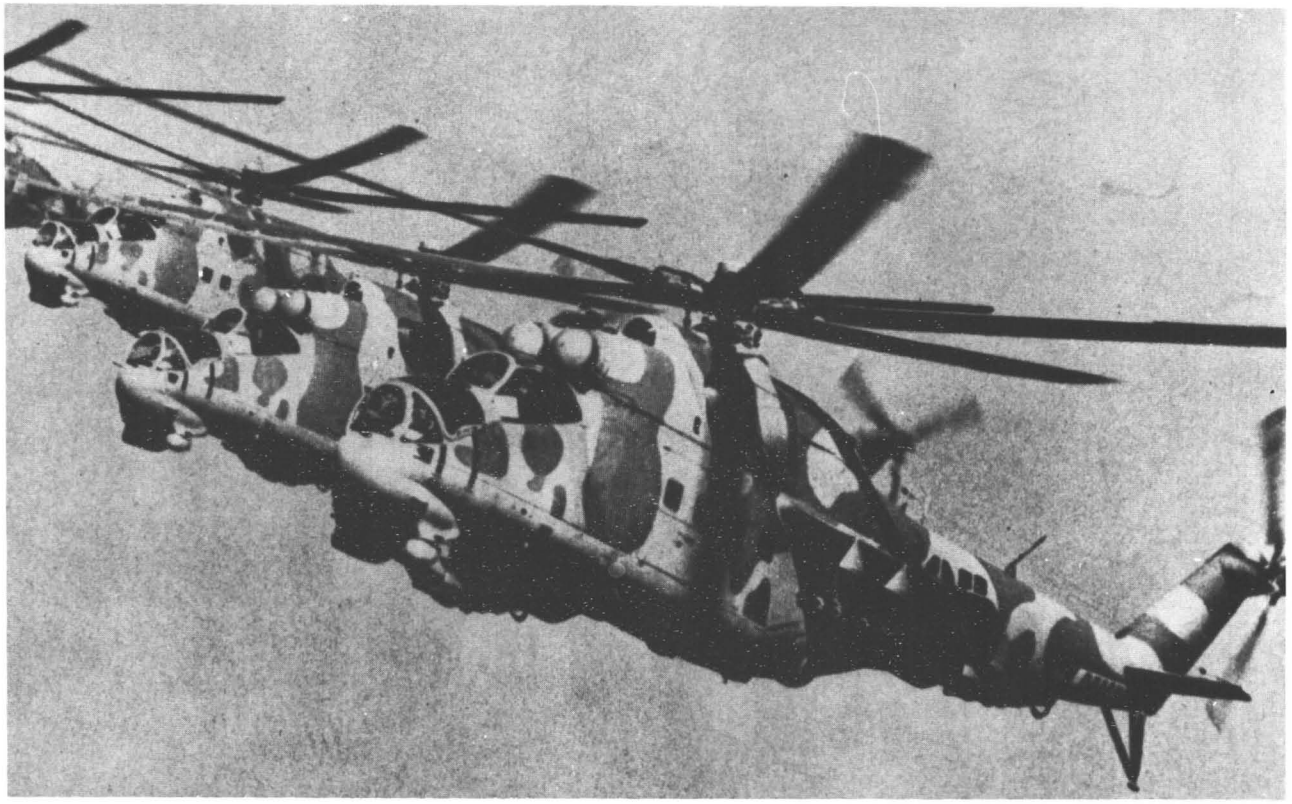
The newest and largest Soviet fuel service truck is the ATZ-60-8685. It mounts a 60,000-L cistern and is designed for high-speed refueling of heavy combat aircraft. Unlike the TZ-30, however, it is not a heightened-mobility vehicle and normally would be expected to be used at improved airfields captured by the OMG.

The Soviets will use a forward arming and refueling point (FARP)-type process to support their helicopters. These vehicles could constitute the FARP but they currently have the drawback of being able to handle only two helicopters (TZ-30) or one helicopter (TZA-7.5-500A) at a time. In addition to ground vehicles, the Mi-6 or Mi-26 could be used as a flying tanker. (The Soviets also have fuel bladders with auxiliary power units that could be located at more isolated temporary refueling sites.) With regard to captured jet fuel, all Soviet jet engines can use U.S. jet fuels for subsonic applications, provided adjustment can be made to the air/fuel ratio.

Generally, maintenance support would not be available at these FARPs. The bulk of maintenance assets are found at Army and Front levels. This arrangement allows the military planners to concentrate the maintenance effort in critical sectors. The primary objective is to situate repair equipment as far forward as possible, with priority of maintenance to equipment that can be repaired onsite. A triage-type process pro-

Troops loading in the early morning for an air assault operation.





A great deal of ground support from Aviation would be from attack aircraft like the Hind-D shown here.

vides prioritization of repair to the least damaged so that they can be returned to combat with a minimum of delay, creating a vigorous combat multiplier. During World War II, 75 to 80 percent of disabled Soviet equipment was returned to service and 80 to 90 percent of that was returned in 1 or 2 days. Thus, by having repair facilities in the areas that have had the heaviest fighting, time-wasting evacuation to rear areas can often be avoided.

New Attack Helicopters

The OMG, then, represents the most threatening aspect of evolving Soviet strategy for land warfare. The success of any employment of an OMG, Army- or Front-level, is dependent upon the Soviets winning at least a stalemate in the air war environment. That, particularly, has relevance in the lower air regime where the attack helicopters ply their trade. If the Soviet fast movers stem the effectiveness of NATO fighter aircraft without similarly forestalling the impact of NATO attack helicopters, the OMG will suffer unsustainable attrition.

Even more important from the NATO view, is the time factor involved. NATO is going to have to contend with having hours, rather than days, to implement their defense. If that attrition can upset the Soviet timetable enough to allow the ground defense reserves to properly deploy, then the first step has been taken toward defeating the OMG. If the attack helicopters are left free to attack Soviet armor, then, according to LTG Reznichencko (Soviet military scholar) in a 1976 article, the tank to helicopter losses will run from 12:1 to 19:1 in the helicopter's favor. The Soviets are now all too well aware of this eventuality. Their recognition of the helicopter threat is the main impetus behind the development of the new Mi-28 Havoc helicopter. New tactics are undoubtedly under study. These tactics may include organizations that include dedicated helicopter fighter units. Air combat is no longer a term that can be applied only to the fast movers as the dimension of helicopter warfare continues to expand.

The opportunity for our attack helicopters to inflict telling damage on the OMG will still exist, but not without having to deal with Soviet attack helicopters on the prowl. The scout/attack teams will have to contend with this threat—often while outside of friendly air defense coverage. Whatever their assigned mission, the implied air-to-air (ATA) mission must be integrated in all planning, recognizing that preemption of other missions is a very likely possibility. Trying to integrate and coordinate ATA after the battle has been joined could be futile. Another factor in the complex business of battle management planning has been added.

Help For the Instrument Flight Examiner Course Candidate

To prepare you for battle for the "Dark Side"

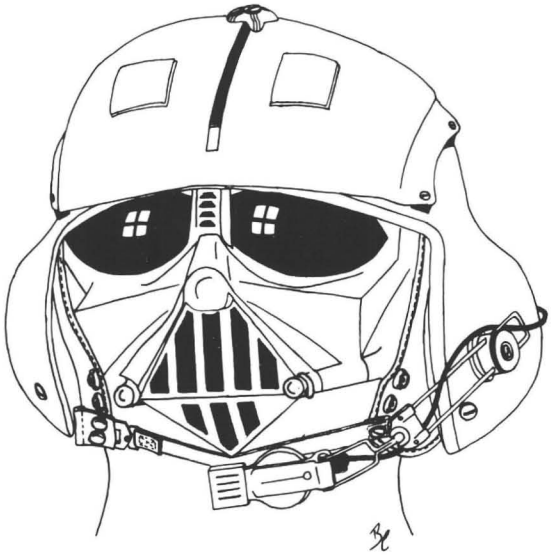


illustration by 2LT Barton G. Combs

CW4 Lawrence L. Snyder
Aviation Training Brigade
8th Aviation Training Battalion
Fort Rucker, AL

A GREAT DEAL has been said about the Rotary Wing Instrument Flight Examiner Course (RWIFEC). "It's difficult," "they don't train you," "hardest course in Army Aviation," etc., are some of the kinder comments heard. As in any honest observation, there lies a thread of truth to all the aforementioned comments; the RWIFEC is a difficult course!

RWIFEC is designed to graduate highly proficient instrument pilots as instrument flight examiners (IFEs). There is no scheduled syllabus time available to train or refresh students in instrument flight tasks. In the past the required training was accomplished in the unit by the assigned IFE. However, current training constraints and incompatible unit missions have caused many students to attend this course with little or no preparation. The results of this lack of preparation are an excessive failure rate and "horror" stories at the club.

In an attempt to help prospective RWIFEC candidates, a study guide is now available whic, if used conscientiously, will better prepare you for course attendance. Working this study guide in conjunction with a comprehensive practical application session with your local IFE will give you an "edge" never before available to Army aviators. *You can receive this publication by writing to: Commander, 8th Aviation Training Battalion, Attention: Company B, Ft. Rucker, AL 36362-5000; or by calling AUTOVON 558-5820/2720.* Your questions concerning this study guide will be answered.

Reference to the article "So You'd like to be an Instrument Examiner" in the February 1985 issue of *Aviation Digest* will give you additional insight into the function of the course. Copies are available by writing to: Editor, *Aviation Digest,* P.O. Drawer P, Ft. Rucker, AL 36362-5000, or calling AUTOVON 558-3619.

First Heavy Division Aviation Brigade

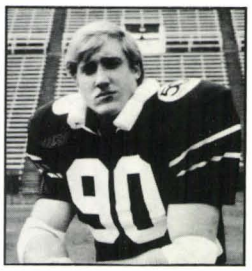
On 15 March 1985, the 3d Infantry Division activated the Army's first Heavy Division Aviation Brigade under the Army of Excellence. This activation under the command of Colonel Raymond Boland marks the beginning of all divisional Aviation brigades forming within the next 2 years. The two attack helicopter battalions are under the command of Lieutenant Colonel Mowery and Lieutenant Colonel Williams. On behalf of the Aviation community — Congratulations to 3d Infantry Division!

Gold Bars and Silver Wings

PERHAPS YOU'VE seen or heard it elsewhere: The Army has more than 8,000 helicopters—from small and swift scout choppers and all-weather attack helicopters to giant Chinook transports. Also, the Army possesses more than 500 fixed wing aircraft. All these aircraft need officers who can be aviators.

Before you get in a helicopter you should get into a university's Army Reserve Officers' Training Corps (ROTC).

Graduation earns the cadet the gold bars of a second lieutenant. If you're selected for the Aviation Branch, you'll go to the Aviation Officer Basic Course and training as an Army aviator at Ft. Rucker, AL.



2LT Kevin Greene

Take the Greene brothers, both Auburn University War Eagles. Keith was graduated from Auburn in 1983. A history major, he excelled academically and in Army ROTC. He was commissioned a second lieutenant in Army Aviation. After completing flight training, he qualified to become a pilot for the Black Hawk helicopter, and is now flying with the 82d Airborne Division at Ft. Bragg, NC. Kevin, already a second lieutenant, was graduated from Auburn last month. A criminal justice major, he has also excelled academically and in Army ROTC. This past season he held down the end on Auburn's defensive football team. Upon graduation Kevin will transition to the offense. He plans to join the Army Aviation team and ultimately become a pilot in the AH-64 Apache, the Army's advanced attack helicopter. Today, many ROTC graduates are Army aviators. They, like Keith and Kevin, have met and are still meeting the test of scholastic, physical and personal excellence that it takes to fly with America's best.

1LT Keith Greene

You don't have to stay on the sidelines. Find out if you can earn the gold bars and silver wings. The college ROTC program offers opportunities in many career fields. For more information, see the Army ROTC Professor of Military Science at your college.

MONTHLY WRITING AWARD

Part I of this article, "The Battleground," last month introduced the Combat Mission Simulator (CMS) geographical gaming area technical and tactical design. Technically, the terrain is modeled in 1 kilometer pieces called "area blocks." The processing capacity of the visual computer is proportioned differently among the various area block types according to the level of detail the area blocks need. As an example, nap-of-the-earth (NOE) area blocks are allocated three times the average processing capacity and non-NOE area blocks half the average processing capacity.

Tactically, the 32 by 40 kilometer battleground is divided into an airfield area and a tactical gaming area. The tactical gaming area supports NOE flight across valleys and atop rolling high ground and plateaus. The pilot maneuvers within the tactical gaming area to elevated battle positions while the gunner engages a high fidelity threat array at extended range. The realistic navigation task is complemented by a 1:50,000 scale topographic map of the battleground. Copies of last month's article are available by writing to Editor, *Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362-5000, or by calling AUTOVON 558-6680.

AH-64 APACHE
Combat Mission Simulator

Kill or be Killed

Part II: The Apache

THE AH-64 APACHE helicopter aerodynamic computer model is to date the most advanced aerodynamic model used in any Army aircraft simulator. The simulation includes all onboard avionics, aircraft survivability and navigation equipment of the Apache helicopter.

Major components of the Target Acquisition Designation System, Pilot's Night Vision System and Integrated Helmet and Display Sighting System subsystems of the Apache helicopter are used in the simulator. These Apache subsystems and their displays along with a three display out-the-window visual system in each of two trainee stations of the CMS represent the most sophisticated suite of visual displays ever integrated into a training simulator.

Because CMS is a combat training device, fidelity of the Apache weapon systems simulation is critical to the program. The HELLFIRE missile, the primary helicopter weapon system and the key to its survival, has received unparalleled attention by the Government and contractor development team. With the same emphasis that is placed on aerodynamic modeling to achieve the realism of aircraft flight through simulation, the world's first high fidelity HELLFIRE missile model has been developed for the CMS. To assure a positive training transfer from the simulated world to the real world, the simulated HELLFIRE missile will perform with the identical aerodynamic affects and effects that place critical demands on aircrew training.

To accomplish the simulation, one entire computer is being used to run the HELLFIRE missile model. The missile seeker field-of-view, scan pattern, missile-autofly program, turn rates, G-Bias programs, maneuverability, lags, accelerations and drag coefficient equations all demand accurate, real-time com-

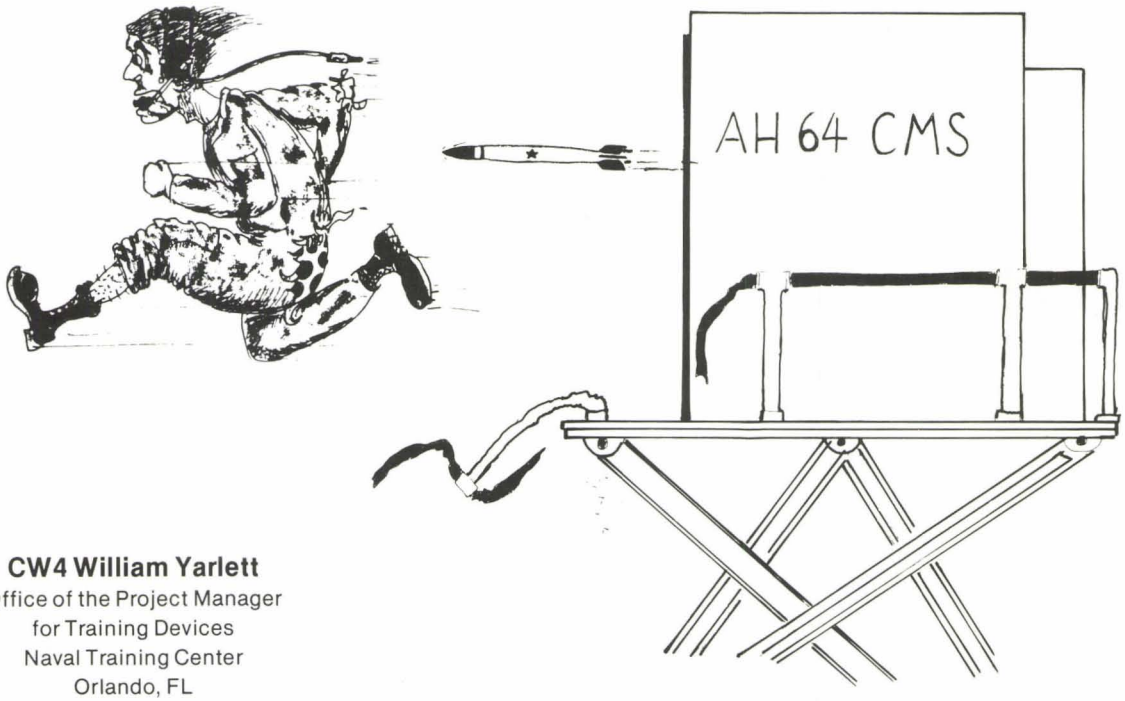


illustration by Edwin R. Pullen Jr.

CW4 William Yarlett
Office of the Project Manager
for Training Devices
Naval Training Center
Orlando, FL

putations to ensure positive training transfer.

While flying the CMS, the crew will engage a realistic, quasi-intelligent threat force which will kill the Apache when its equations for acquisition and hit probabilities have been satisfied. Apache crews will be scored and evaluated while fighting this threat and will advance to a level of combat skills proficiency never before achievable. At a fraction of the aircraft cost and within the safe confines of ground training, crews will learn the ramifications of launching HELLFIRE missiles while hovering too close to the mask, too low to the ground or out of launch constraints. Gunners will accurately learn the effects of lasing too late, launching out of range or outside of the remote designator window, and over controlling while manually tracking targets. The payback of intensive CMS combat skills training with a high fidelity HELLFIRE missile model will be an Army with the most proficient tank killers in all the world.

Real-World Training Problems and CMS Solutions

The HELLFIRE missile is programable and can be deployed by the aircrew under any of three launch modes: lock-on before launch, lock-on after launch low or lock-on after launch high. Crews are trained to launch missiles within the appropriate launch mode envelope to avoid mission failure.

One mistake that's better learned in the CMS than in the Apache helicopter is firing from an altitude that does not permit the missile to clear the terrain directly forward of and below the aircraft (G-Bias). The high fidelity HELLFIRE model would direct the missile to accurately arc as it leaves the launcher and to impact the terrain if sufficient hover clearance is not maintained by the pilot. The visual system will display the impact and explosion of the missile appropriately at its computed impact point. A lesser degree of fidelity would result in a negative transfer of training.

Another helicopter anomaly the CMS can better train crews to avoid is remotely fired missile impact on the near side of terrain mask. Because missiles pitch up following launch and climb at a preprogramed angle for a period of time corresponding to the launch mode, crews must train to maintain adequate standoff distance from the mask terrain to allow the missile to clear the mask as it climbs.

After remotely launched missiles climb for a designated period of time, they level off, and the missile seeker starts to scan the terrain below and forward of its airborne position. CMS trained crews will learn to recognize terrain too high for the missile to clear. Pilots will learn to modify the launch attitude of the helicopter accordingly to ensure terrain clearance before launch and to avoid missile impact below the peak of the mask terrain.

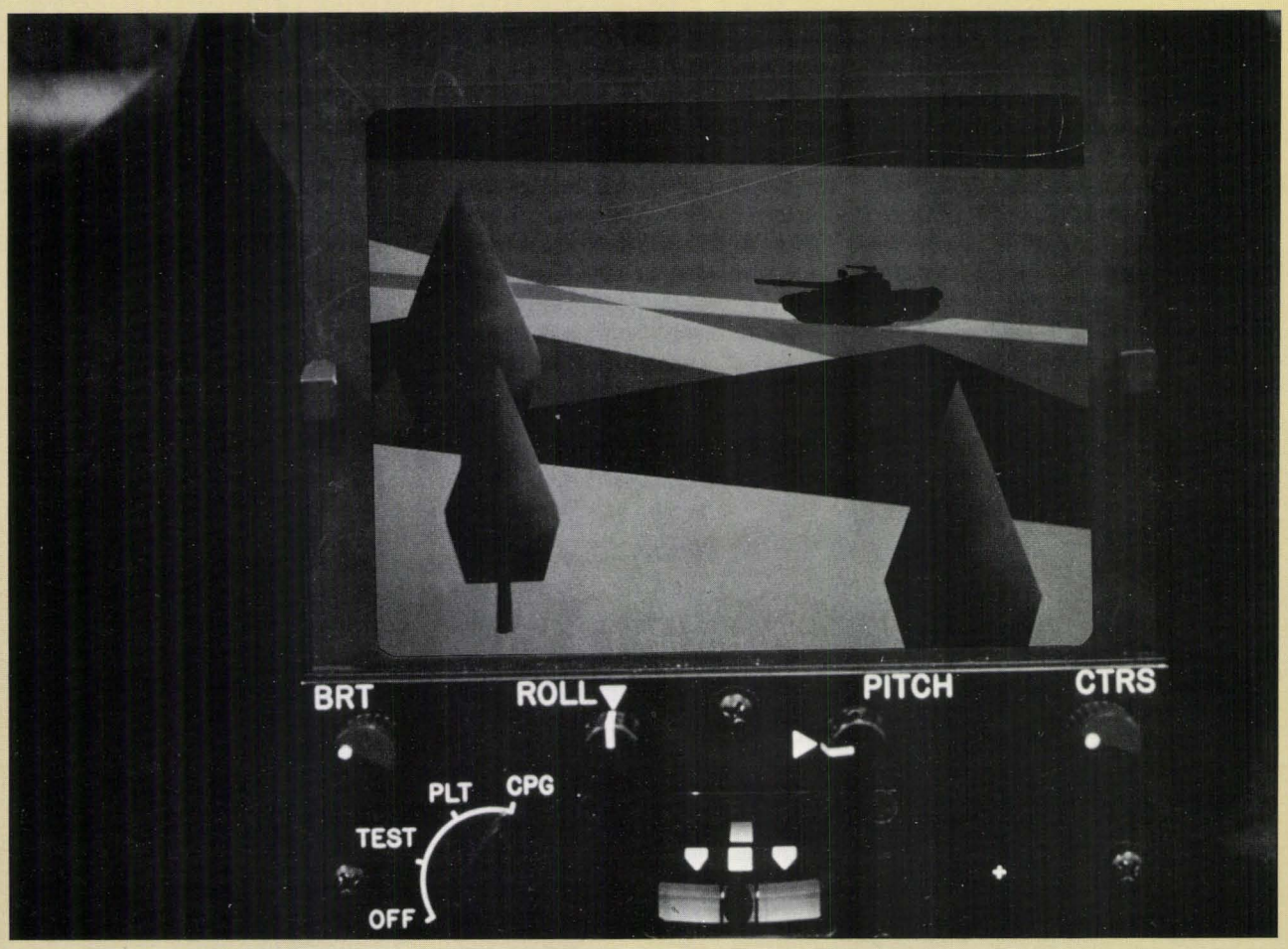
During marginal weather conditions, the HELLFIRE missile autofly program could unknowingly direct the flight of the missile through cloud cover causing the seeker to break lock or never acquire the reflected laser energy. Aircrews trained without a CMS will have to learn to avoid this anomaly by studying it in a textbook. A CMS trained crew, however, can experience it firsthand and acquire the insight to select a launch mode that keeps the missile below the cloud ceiling. They also will experience the effects of atmospheric attenuation on the missile seeker. In all, Apache crews will come away from CMS better prepared to make launch decisions during visibility conditions that may or may not be laser penetrable.

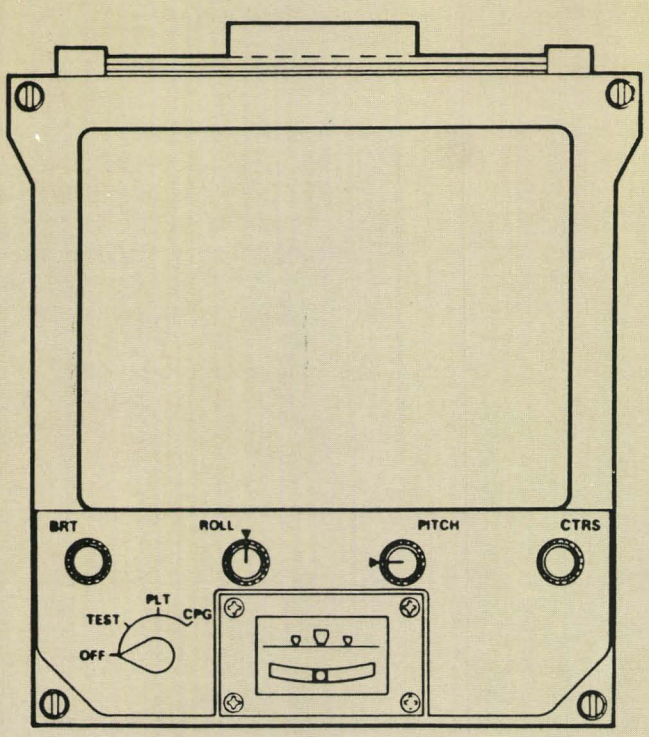
Missile seeker search patterns, scan rates, field of regard and field of view are also accurately modeled. Remotely launched missiles can and do overfly near-in targets before the seeker may have a chance to acquire the reflected laser energy. For this reason, the lock-on after launch mode has both a maximum and a minimum range. The missile model simulates this anomaly and will accurately demonstrate the characteristic results.

In summary, the simulated missile in the CMS will turn, climb, accelerate, decelerate and do all the things HELLFIRE missiles do in the real world. Gunners will receive immediate and accurate missile tracking feedback, and aircrews will leave CMS training knowing how they will perform in the actual aircraft.

The Aerial Rocket Control System

The aerial rocket control system (ARCS) simulation interfaces the actual helicopter ARCS control panel furnished as Government equipment to the actual fire control computer (FCC) also furnished as Government equipment. The FCC rocket model used in the Apache aircraft is simulated in CMS. The rocket flight path is visually projected along with the appropriate impact and explosion cues. High-explosive, submunition, smoke and illumination

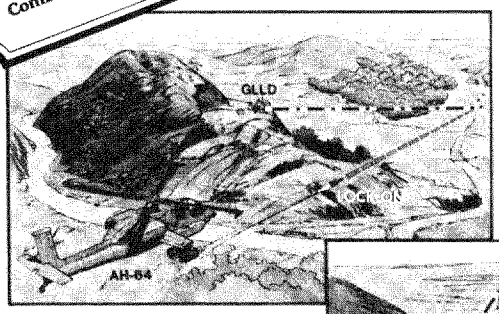




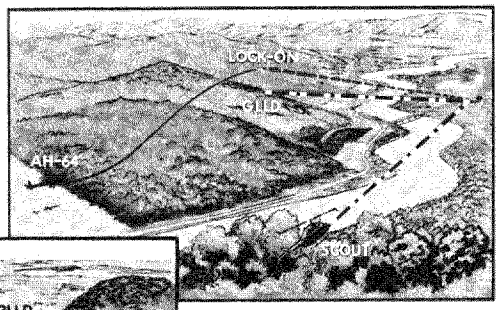
The video display unit (VDU) is located in the pilot's vertical instrument panel. It is capable of displaying the video from either the pilot or copilot/gunner selected sensors, independent of the integrated helmet and display sighting system. This permits the pilot to have a simultaneous display of the pilot's night vision system (NVS) video on the helmet mounted device and copilot/gunner video on the VDU. In the event of pilot helmet device unit failure, a limited night terrain capability is available by selecting pilot video on the VDU and placing the pilot night vision system in the NVS fixed position. The combat mission simulator computer generated image is that of a Soviet T-80 tank.

AH-64 APACHE
Combat Mission Simulator

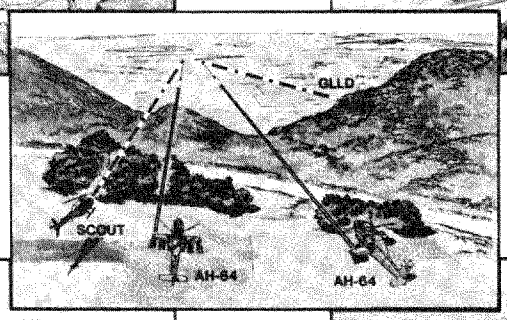
Laser HELLFIRE Operational Modes



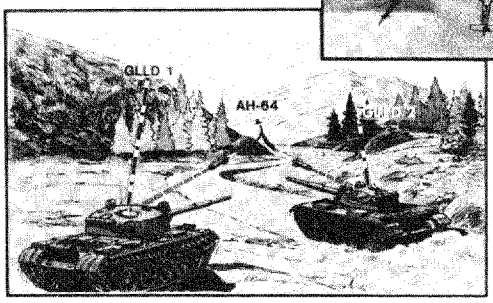
HELLFIRE Direct
(lock-on after launch)



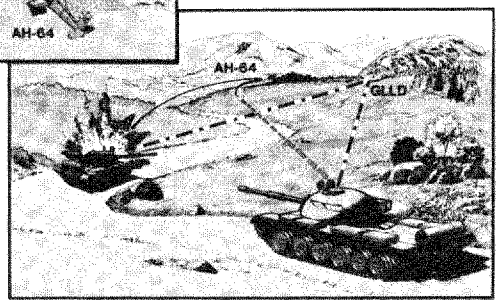
HELLFIRE Indirect



HELLFIRE
Direct
(lock-on
before
launch)



Ripple Fire



Rapid Fire

rounds are all simulated. All FCC preprogramed kinematic and ballistic rocket equations are resident and used in the CMS.

30 mm Area Weapon System

The 30 mm gun is simulated in CMS, and its accuracy is driven by ballistic equations resident within the FCC. The impact of 30 mm rounds will be provided to the aircrew by the visual system.

Weapons Lethality

The CMS simulation of Apache weapon systems accuracy is equivalent to that of the aircraft weapon systems accuracy. When rounds impact a threat they will register either a "kill" or "hit" dependent upon the type of round fired and the type of threat vehicle impacted. For instance, the 30 mm gun will hit and kill a truck; however, the 30 mm round will only hit a T-80 tank. Also, certain rocket types kill only certain threats. As a final example, the HELLFIRE missile will kill anything it hits.

Apache weapons systems will be simulated with all the capabilities and fidelity of the actual aircraft. Mistakes made in CMS will not be simulator peculiar but honest real-time feedback of what would have happened in the actual helicopter under identical circumstances. CMS training will prepare crews much better for the real thing than any training device ever has provided in the past.

In the next issue, we will take a close look at the CMS Tactical Threat Algorithm which manipulates the threat armor and anti-aircraft weapons systems under computer control. It is subtitled "The Threat" and describes the first Army flight simulation employing a quasi-intelligent threat force.

Part I introduced the battleground, Part II introduced the weapons systems, Part III will introduce the spoiler, "The Threat." Just three CMS characteristics which provide the means to train Apache crews as no attack pilots have ever before been trained—trained to kill . . . or be killed.

U.S. Army Information Systems Command
ATC ACTION LINE

Fly Neighborly Program and Installation Compatible Use Zones

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ARMY REGULATION 95-1 states that Army aviators will participate in fly neighborly/noise abatement programs. Noise abatement is not just an objective of Army Aviation, it can affect the entire mission capability of an Army installation. The Noise Control Act of 1972 and Quiet Communities Act of 1978 state that:

> "Federal agencies shall, to the fullest extent consistent with their authority under federal laws administered by them, carry out the programs within their control in such a manner as to . . . promote an environment for all Americans free from noise that jeopardizes their health and welfare."

The Department of the Army's goal is to control noise produced by Army activities to protect the health and welfare of its members and the public, within, adjacent to and surrounding Army installations. One of the objectives in meeting this goal is to achieve noise abatement through modern land-use planning. The Army policy on land-use planning is implemented by the installation compatible use zones (ICUZ) program.

The ICUZ program is designed to prevent degradation of the installation's mission due to political controversy and litigation over noise impacts, while at the same time protecting the health and safety of the local community.

The ICUZ study process is an analysis made of the noise generated by Army activities; i.e., artillery, explosives, vehicle and aircraft movement, and the impact of this noise on the surrounding community. Present and future incompatible land uses, both on and adjoining the installation, are identified. An effort is made to negotiate joint agreements with local communities or other agencies to prevent or minimize incompatible development on land adjoining the installation as determined in the ICUZ analysis. The incompatible land-use zones also affect land use on the installation and impacts on the Installation's Master Plan, which is an integrated series of documents which presents in graphic, narrative and tabular form the present composition of the installation and the plan for its orderly and comprehensive development to perform its various missions in the most efficient and economical manner during a period of 20 years.

The ICUZ study process also fulfills the Army's obligations under the Noise Control Act of 1972. The Assistant Secretary of the Army for Installations, Logistics and Financial Management directed in February 1983 that the Army complete its obligations under the Noise Control Act by fiscal year 1987.

The minimum ICUZ process involves the following eight steps and fulfills the Army's obligations as stated above:

- Preparing noise zone maps.
- Identifying existing or potential incompatible land uses.
- Preparing a draft report identifying alternative actions.
- Reviewing by Installation Planning Board/community.
- Major Army command/Department of the Army review of proposed solutions.
- Providing official report to the public.
- Implementing action plan.
- Updating and reviewing.

The Fly Neighborly Program is Army Aviation's contribution to the ICUZ process. Its goal is reducing the noise impact created by Army aircraft. Noise abatement can be accomplished through pilot technique and technological advances in Aviation to reduce the acoustical signature of the aircraft. The pilot's understanding of Fly Neighborly and ICUZ assists the study groups' analysis by allowing complete and accurate assessment of the noise generated by aircraft and is essential for completion of the ICUZ analysis for each military installation.

Further information on how ICUZ impacts the Army Environmental Noise Abatement Program and the development and approval of master plans for Army installations can be obtained by referring to AR 200-1, "Environmental Protection and Enhancement," and AR 210-20, "Master Planning for Army Installations," respectively.

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Readers are encouraged to address matters concerning air traffic control to Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22304-5050.

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painting by Robert D. Sloan

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