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ARMY AVIATION

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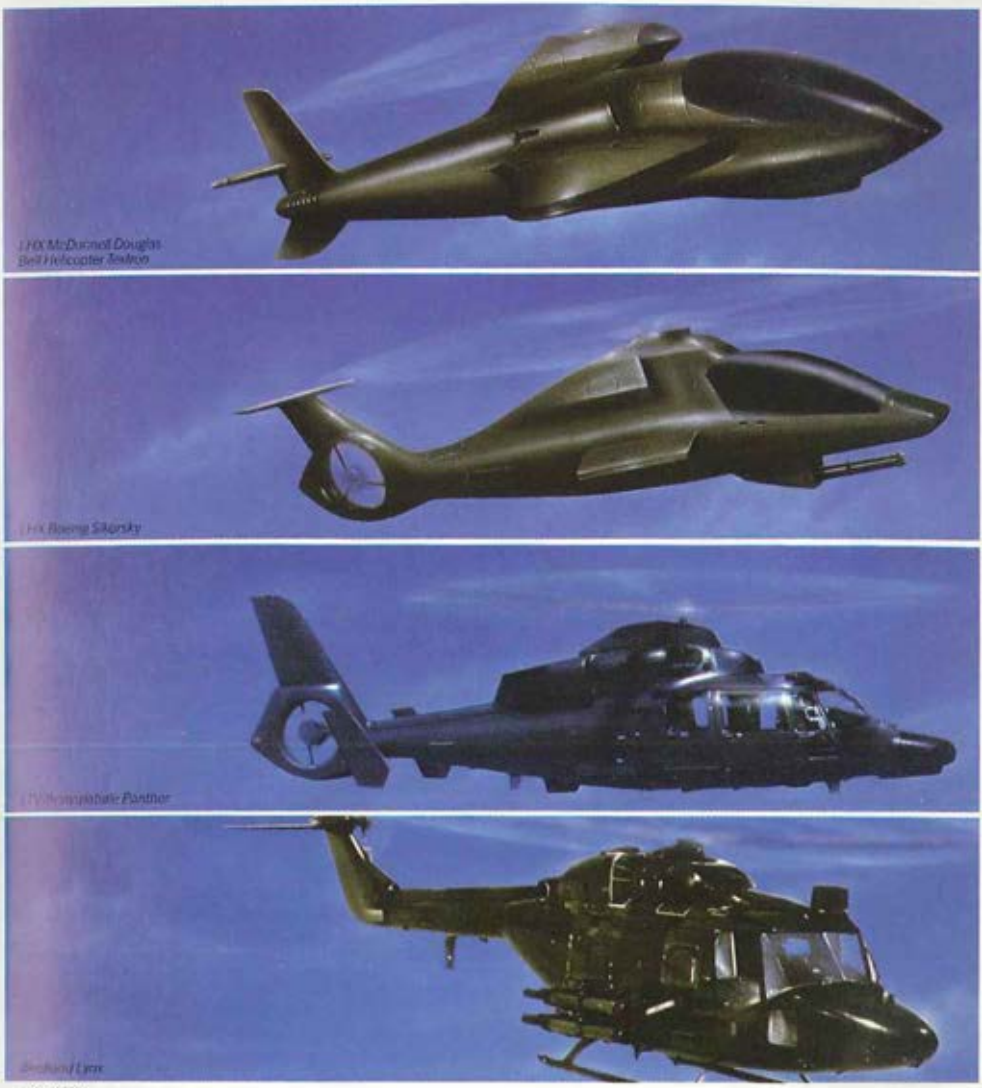

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The Army Aviation Modernization Plan: Priorities and Adjustments

By Lt. General Donald S. Pihl

In the November 1989 issue of ARMY AVIATION MAGAZINE, I presented you with an overview on the Light Helicopter Program (LHX). It continues to be the Army's centerpiece for aviation modernization. The recent events of budget reductions and the ongoing negotiations with Conventional Forces in Europe (CFE) have dictated that the Army continue to revise the 1988 edition of the Army Aviation Modernization Plan (AAMP).

The goal of the AAMP to modernize the fleet through level funding and retire obsolete aircraft has not changed. Overall budget reductions have had immediate impacts on aviation program affordability. Tough decisions were made at the highest levels. Near and mid term procurement goals had to be re-looked. The bottom line is that major acquisition programs had to be terminated or curtailed. Priorities for the May 1988 AAMP were directed at fielding the first to fight units. The anticipated CFE impacts and, most importantly, the realized budget reductions impacts have caused a re-direction of priorities. The AAMP will rely even more on RDTE (Research, Development, Test & Evaluation) efforts and will be revised to incorporate the latest force structure and budget decisions. CFE options are envisioned to affect primarily force structure, but are anticipated to ripple down to procurement programs. As we move closer to CFE agreements, we will better understand the total impacts. CFE discussion remains dynamic and will be for some time.

LTG Pihl is the Military Deputy to the Assistant Secretary of the Army (R,D&A), Washington, D.C.

The AAMP 1988 edition is the latest approved summary document which outlines the updated objective plan for equipping Army Aviation with a modern, capable, cost effective, warfighting fleet. This edition includes difficult trade-offs and decisions regarding aviation programs. The AAMP focuses and establishes priorities for

the ongoing Aviation modernization programs and defines a strategy that enhances current capability and fulfills future systems and organizational requirements for the Total Army aviation forces.

This edition reflects a level funding concept that provides for resources of approximately $3.4 billion in Fiscal Year 1989 with no real growth and escalated dollars over the Program Objective Memorandum (POM) period; identification of initial useful life criteria for aircraft based on age and warfighting requirements for various aircraft categories; and provisions for Army Aviation force structure reductions.

The 1988 edition of the AAMP included:

- Continued production of AH-64A, UH-60L, OH-58D, CH-47D, and aircraft to support Special Operations Forces.
- Product improvements to fielded systems to protect aviation investments by maintaining required warfighting capabilities and effecting appropriate safety modifications.
- Decision points for improvement programs or new aircraft developments.
- Retirement of some aircraft including those no longer capable of defeating the threat, or surviving on the battlefield, at the rate of 200-250 per year.
- Initial Operating Capability (IOC) of an armed, light, reconnaissance and attack system (LHX) by FY 1997.
- A strategy for High-low technology mix management.

Major Budget Decisions

As mentioned before, some hard decisions had to be made for acquisition programs. Affordability, along with the idea of providing a robust force, became the major factor in deciding on terminations and curtailments. The fallout of budget reductions and how Congress dealt with the proposed budget is as follows:

The AH-64A APACHE procurement was reduced from the program budget decision of 975 to a total of 807. Instead of a four year multiyear procurement for 240, the APACHE procurement would be terminated in FY91 by procuring 66 in FY90 and 66 in FY91. The 807 APACHEs will field 40 attack battalions, instead of the 47, along with the training base and replenishment floats. The current proposal is to field active battalions with 18 APACHEs and Guard and Reserve battalions with 15 APACHEs. The total unit fielding approach will continue. Congress accepted the decision to terminate the APACHE program in FY91 and provided resources to procure the final 132 APACHEs. Congress also provided additional language requiring the Army to re-look the APACHE program and report the findings back to the committees. The AAMP called for retiring all the AH-1 COBRAs. The result of the budget reductions will mean that about 400 COBRAs will have to remain operational in the fleet past the year 2000.

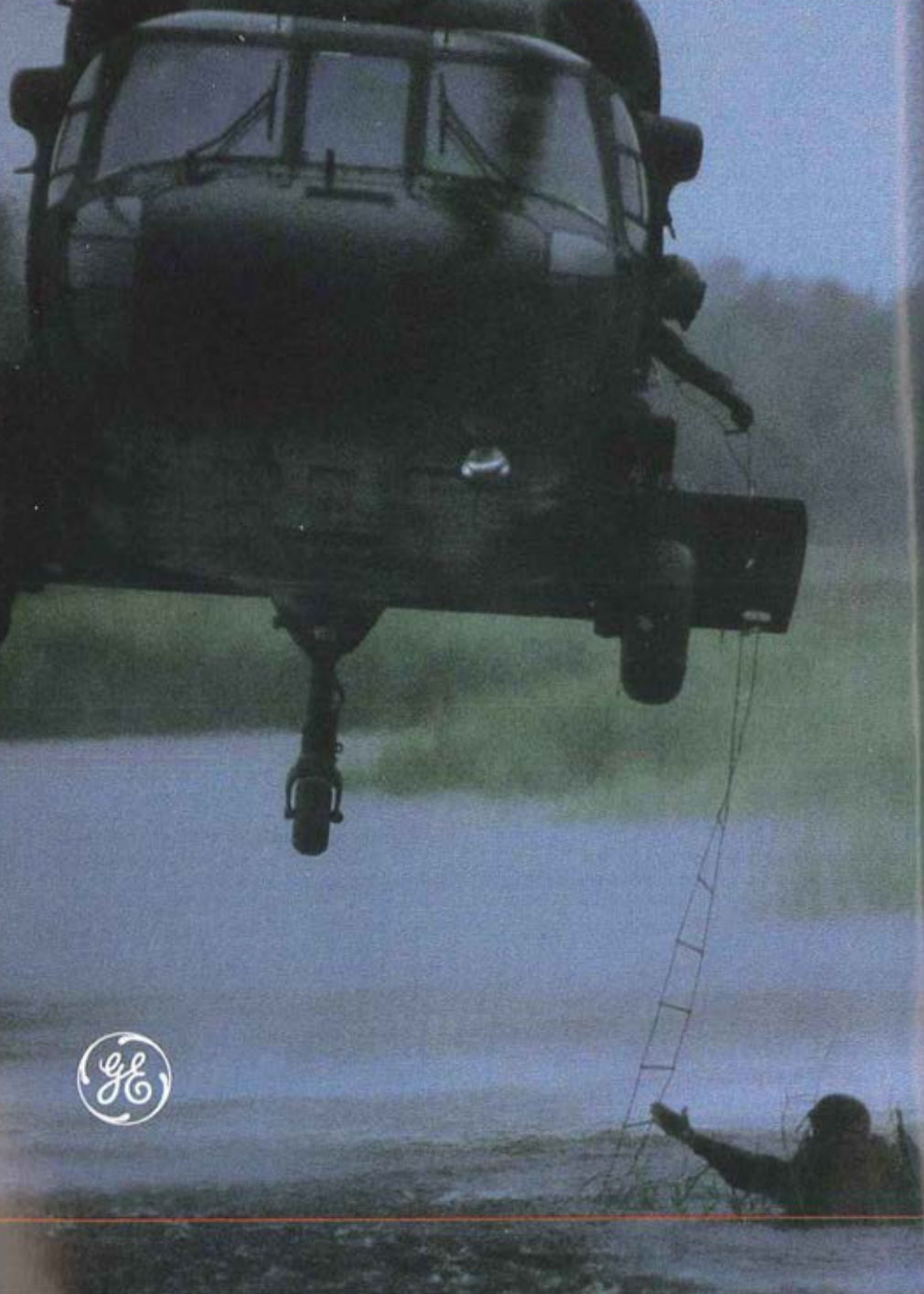
The APACHE is recognized as the best attack helicopter in the world. With the advent of CFE and the visibility of the APACHE worldwide, there has been keen interest in the APACHE from numerous foreign countries for sales and co-production. The LONGBOW APACHE development effort is on track. The production decision will be made in FY90. LONGBOW could provide a true fire-and-forget capability.

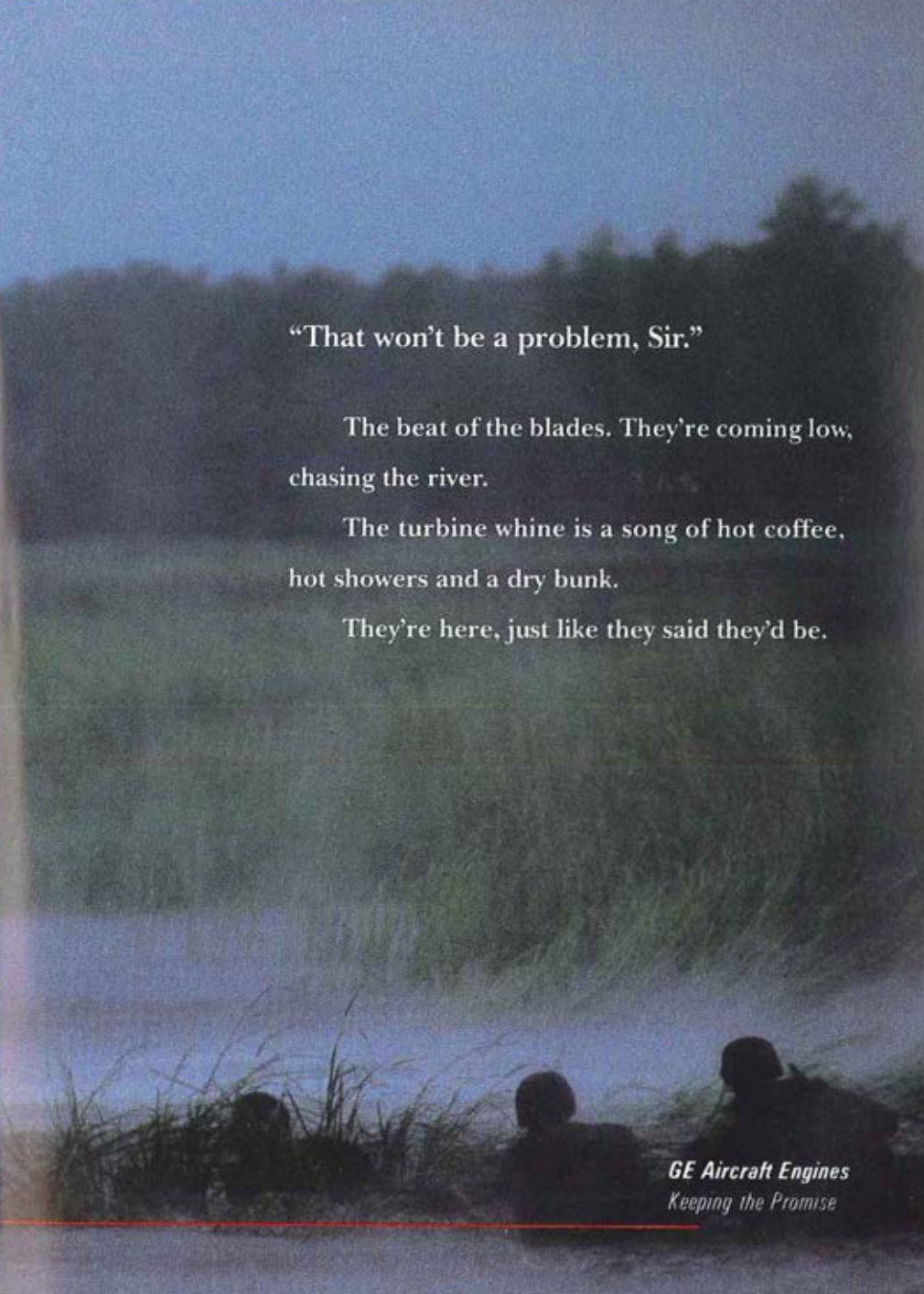
BLACK HAWK

The UH-60 BLACK HAWK procurement will continue based on the 1988 edition AAMP objective of 2253. It is the only ongoing program which was not terminated. Congress supported this procurement and provided language and resources to procure 72 in FY90 and 72 in FY91. Of the 144, 22 are for Special Operations to be modified as MH-60K aircraft. As the Long Range Research Development and Acquisition Plan (LRRDAP) is being finalized, the production rates for the UH-60L may be reduced. If so, some UH-1s will have to remain in service longer than expected.

The OH-58D AHIP program was terminated in FY89 for a total buy of 207. A tentative Army decision was made, in August 1989, to arm the OH-58D with Air-to-Air STINGER (ATAS) and Air-to-Ground (ATG) weapons. The last 18 of the 36 OH-58Ds procured in FY89 will be

(AAMP — continued on page 64)




"That won't be a problem, Sir."
The beat of the blades. They're coming low, chasing the river.
The turbine whine is a song of hot coffee, hot showers and a dry bunk.
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Keeping the Promise

The 1989 Aviation Brigade Commanders' Conference

By Major General Rudolph Ostovich, III

The 1989 Aviation Brigade Commanders' Conference was conducted at Fort Rucker amidst the backdrop of a rapidly changing world situation — one marked by revised national priorities, troop withdrawals and reduced defense spending. This year's conference theme was "The Challenges of Leadership." The conference brought together a total of 122 Aviation Brigade Commanders, MACOM Aviation Officers, AVSCOM Program Managers and numerous liaison officers from all over the world.

The conference began with a series of informational updates from subject matter experts. These updates included such areas as force development and force structure, tactics, techniques and procedures for deep operations, safety, evaluation and standardization, and a review of aviation employment experiences at collective training centers. Briefings were also presented by representatives from AVSCOM on aviation logistics subjects; the TEXCOM Aviation Board; TRADOC Systems Managers for the LHX, Scout, and Weapons Programs; and the Aviation Logistics School.

MG Ostovich is Chief, Aviation Branch, Commanding General, U.S. Army Aviation Center and Ft. Rucker, AL and Commandant, U.S. Army Aviation Logistics School.

After the presentations, participants broke into working groups to examine the current status of our branch. Prior to the conference, I had requested each commander identify three areas in which he thought Army Aviation was doing well and three he felt needed improvement. We compiled the results and used the items most commonly mentioned as work group topics. The groups were divided into the areas of combat, combat support, combat service support, personnel, modernization, and training. The work groups enabled the participants to brainstorm their "Challenges to Leadership" and identify solutions. Some

"Action is now in progress to enhance the robustness of the APACHE battalions and improve the reliability of our new high-technology systems . . ."

of the many challenges identified during panel discussions included:

- Development/improvement of Aviation unit employment at Collective Training Centers.
- Reserve component integration and the Capstone Program.
- Air traffic service doctrine and its ability to do garrison and tactical missions simultaneously.
- AVUM resourcing (personnel and equipment).
- Forward Support Battalion for the Aviation Brigade.
- Retention of the aviation force.
- Standardization requirements versus MTOE versus ability to man the force.
- Aviation brigade headquarters' TO&E (personnel and equipment).
- Command and control aircraft.
- Army mission training plans and Aircrew Training Manuals.
- Reserve component training.

Two Important Issues

On the final day of the conference, the work groups presented their findings. These became our "Challenges to Leadership". Two issues deserve particular attention.

First, the modernization of Army Aviation, austere force designs, new equipment that is not yielding expected reliability, challenges in the training environment, and worldwide deployments of aviation units to unexpected, remote areas have created a pace that commanders are struggling to meet — quite often at the expense of good soldiers and safety. The consensus across the board is that the Army of Excellence has stretched our assets to the breaking point. Aggressive training programs that are fraught with new equipment "growing pains" or, in some instances, the absence of equipment altogether, have forced commanders to piecemeal the employment of their assets. Deploying to combat training centers as ad hoc support packages, for example, has driven false "lessons learned" and given our ground and aviation maneuver commanders an incorrect view of Army Aviation's value added. Action is now in progress to enhance the robustness of our APACHE battalions; improve the reliability of our new high-technology systems, and equip our aircraft with credible MILES devices so that attack helicopters can compete on a level playing field at combat training centers. Though some "fixes" have been placed in motion, much more work is needed.

The second issue is that of aircrew training manuals and crew drills. The aircrew training manual is a misnomer since it is a pilot manual and not an aircrew manual. It currently stresses iterations rather than proficiency. All agreed that the emphasis needs to shift to the latter. Commanders want the USAAVNC to develop aircraft-specific crew drills which incorporate all members of the crew. Individual requirements and mission essential task lists need to be integrated into battle scenarios and linked to the training philosophy established in FM 25-100.

Training the Forces

The emphasis here is to obtain greater proficiency for the training dollar. Leadership challenges now facing our branch are being prioritized and addressed. You should know that your branch chief and the entire Aviation Center team is committed to meeting the challenges you have presented. IIIII

Acquisition Issues: The PEO Perspective

By Gary L. Smith

The Program Executive Office (PEO), Aviation has evolved again. BG Dave Funk retired 1 September 1989 and I took over effective that date. COL Larry Holcomb assumed the position of Deputy PEO on 11 December 1989. Mr. Robert Hutson has moved back to his permanent PEO position as Director of Systems Management. As will be discussed by several of our PMs, there have been significant aviation program changes. As elsewhere, the political situation in Europe is having a significant impact on Army Aviation defense planning and budgeting. The AH-64 will continue production through 1991 and then will stop at 807 aircraft.

A dedicated team, the APACHE Action Team, was established last year composed of industry and Army team members to work all APACHE readiness issues. Fixes have been identified and are being implemented for all known problems and shortcomings. The field is beginning to see the results. We do anticipate follow-on production in foreign military sales.

Mr. Smith is the Program Executive Officer, Aviation, St. Louis, MO.

The LONGBOW (formerly AAWWS) was approved in July to enter into the initial design phase of full scale engineering development. LONGBOW is the millimeter wave fire control system and Fire and Forget HELLFIRE missile for the AH-64. The LONGBOW is planned to be integrated and retrofit into 227 APACHEs.

In December, the Secretary of the Army approved the program to arm 243 OH-58Ds and designate the Armed AHIP as the multipurpose lightweight helicopter for contingency forces. The nickname for the armed aircraft will be "WARRIOR". Congress had earlier provided funding for an additional 36 AHIPs in the FY90 budget increasing the total to 243 aircraft. The appropriation bill also includes language potentially leaving the door open for the

Army to request approval and funding for additional aircraft in the out-years.

The BLACK HAWK Multi-Stage Improvement Program (MSIP) was terminated last summer as an affordability issue. We see no major future upgrades to the BLACK HAWK at this time. The UH-60L model with the T-700-701C began delivering in October 1989.

We have, over the last year, experienced drive train problems with the CH-47Ds. We believe all those problems are now behind us. Vibration analysis equipment is being delivered to the field to help diagnose any drive train problems before they occur. Aircraft, as they come off the production line, are being acceptance tested with this new equipment. We expect advanced vibration analysis equipment to reap significant savings in maintenance costs across the fleet of all aircraft besides the CH-47s. Production of the CH-47Ds will continue through 472 aircraft.

self-deploy. We have unmatched loss/exchange ratios and are developing further weapon system improvements. Aviation can rapidly respond to low intensity conflicts and will be prepared to respond to any contingency operations. We are filling a critical need to provide the Armed AHIP (WARRIOR) until the LHX comes on-line.

We need to reflect for a second on what we have achieved and where we might have done better. We have had reliability problems with the AH-64 APACHE. Why is that? We began development of the AAH in 1973. We started production in 1981. We believe we rushed the aircraft through development (1973-1981) and apparently didn't do all the testing necessary to mature the system. There have been 928 hardware ECPs (Engineering Change Proposals) submitted to date and the system is still maturing. The APACHE Action Team, the APACHE General Officer Steering Committee, and the VCSA APACHE Reviews all

"We must ask: is our lightweight design philosophy compatible with a 20-40 year design life?"

The Special Operations Aircraft (SOA) program (MH-47E and MH-60K) is in full development and proceeding on course. It is going through some restructuring due to budget adjustments and not being able to take advantage of V-22 developments. The SOA schedule now leads the V-22 for development and production of some major subsystems.

The AH-1 COBRA is basically in a fleet sustainment status with continued foreign military sales.

The ASE and ALSE PMOs continue to provide the needed support to the aircraft PMs to keep our fleet current with electronic warfare equipment and life support equipment.

With this status of programs, I also have some general thoughts and concerns about where Army Aviation is going. I see continued strong support for aviation. We have the best mobility of any battlefield weapon systems. We can rapidly deploy or

have focused our attention on the issues and we are beginning to see the improvements in readiness.

What did we not properly do or design in development? Did we do the right type of testing? I am concerned by the amount of sheet metal repairing we have been performing in our AVIM shops. All our aircraft seem to be experiencing this trauma.

Reflecting back to the AH-64: one of the reasons it was selected was the lightweight design philosophy of then Hughes Helicopter. The CH-47D continues to experience abnormal maintenance of sheet metal and structure. There was a weight reduction program on the BLACK HAWK.

We must ask: is our lightweight design philosophy compatible with a 20-40 year design life? What happens to our structural fatigue lives as we add equipment to these aircraft, increase mission gross weights,

(PEO — continued on page 63)

Air-to-Air STINGER

By Lt. Colonel James O. Emerson

Lack of a self-defense capability against a formidable air-to-air threat is one of Army Aviation's major deficiencies. Much thought and effort has been directed at developing an optimal, cost effective and timely solution to this deficiency. The

Air-to-Air STINGER (ATAS) program was initiated to provide a near term solution as well as contribute to filling the air defense void left by cancellation of the SGT YORK program. ATAS was selected based on several factors. First, it is generally accepted that the best defense against an Air-To-Air (ATA) armed helicopter is an ATA armed helicopter. Second, adaptation of an existing missile to the ATA role would be the most timely and cost effective near term solution. STINGER was selected as the ATA missile based on weight, availability, lethality, and adaptability to helicopter application.

LTC Emerson is Product Manager for ATAS, PEO Aviation, St. Louis, MO.

The ATAS Product Manager's Office is currently responsible for development and qualification of the ATAS system on the OH-58C/D, AH-64A, and AH-1F aircraft. Primary focus of the ATAS program is to provide the Aviation Commander the ability to defend his helicopters against attack from enemy aircraft while accomplishing his primary mission and contributing to total air defense. Below is a discussion of the ATAS system for each aircraft with an integration schedule.

Background

The ATAS concept was successfully demonstrated in field tests using helicopters with STINGER tracking head trainers during the 1978-1979 Joint Countering of Attack Helicopters (J-CATCH) test and the 1982 Self-Protect Air-to-Air Missile Concept Evaluation Program (SAMCEP). These tests were conducted using AH-1 and OH-58 aircraft and demonstrated the ability of a helicopter-borne STINGER missile system to

acquire and track air targets flying at low altitude and in a cluttered environment. During the J-CATCH and SAMCEP exercises, over 1,300 STINGER acquisitions were accomplished against a variety of targets under varying test conditions. Additionally during 1984, a STINGER launcher was installed on the AH-1S and two missiles were fired at fixed targets.

OH-58C/D Update

The first OH-58 ATAS flight was by Bell Helicopter Textron, Incorporated in September 1985. Government Development and Operational Tests (DT/OT II) were completed 15 September, 1986. This DT/OT II provided the first opportunity to qualify STINGER missiles for aircraft use. Test results identified maximum engagement ranges based on weather, terrain, background, and target type, speed, altitude, and position.

Armed OH-58D Helicopters with ATAS were fielded at Ft. Bragg, NC, in December 1987. These aircraft were used to meet urgent requirements during the Persian Gulf crisis. Delivery of production armed OH-58D aircraft will begin in January 1991. These aircraft will include integrated weapons control and dual sighting options via the Mast Mounted Sight and the ATAS sighting system which was qualified in the OH-58C program.

Government/Contractor Production Tests utilizing Basic STINGER for the OH-58C was completed in FY89. The AVSCOM Materiel Release Review Board held in September 1989 recommended a training release for Training and Doctrine Command (TRADOC) and a conditional release for Forces Command (FORSCOM). ATAS fielding to TRADOC is scheduled for 1QFY90, FORSCOM 2QFY90, and U.S. Army Europe 3QFY90.

AH-64A ATAS Update

The AH-64A ATAS program consists of four phases of which two have been completed. During Phase I, McDonnell

Douglas Helicopter Company developed an initial approach for integrating ATAS into the AH-64A. Phase II Technical and User Tests (TT/UT) included weapons integration firing to demonstrate compatibility of the 30 millimeter gun, 2.75 inch rocket, and STINGER. In addition, there were 942 captive flight trainer engagements and nine live STINGER firings. During Phase II testing, TRADOC identified a requirement for a Missile Control Set (MCS) with seeker slaving, MIL STD 1553 compatible data bus, capability for dynamic boresight, and growth potential for multiple air-to-air missiles.

Phase III will integrate, test and qualify the MCS. Results of this effort will be used to support a production decision and lead to Phase IV Modification Work Order (MWO) Installation. The ATAS program strategy calls for the ATAS MWO to be applied concurrently with the Airborne Target Handover System/Avionics Integration (ATHS/AI) MWO. Phase IV testing, scheduled for 1QFY92, will fully test the ATAS production system with ATHS/AI. AH-64 ATAS fielding is scheduled to begin 2QFY92.

AH-1F ATAS Update

American Electronics Laboratories (AEL) was awarded a contract in April 1989 to integrate ATAS into the AH-1F and COBRA-NITE (C-NITE) aircraft. The technical approach is to use existing ATAS components qualified during the OH-58C program.

Integration

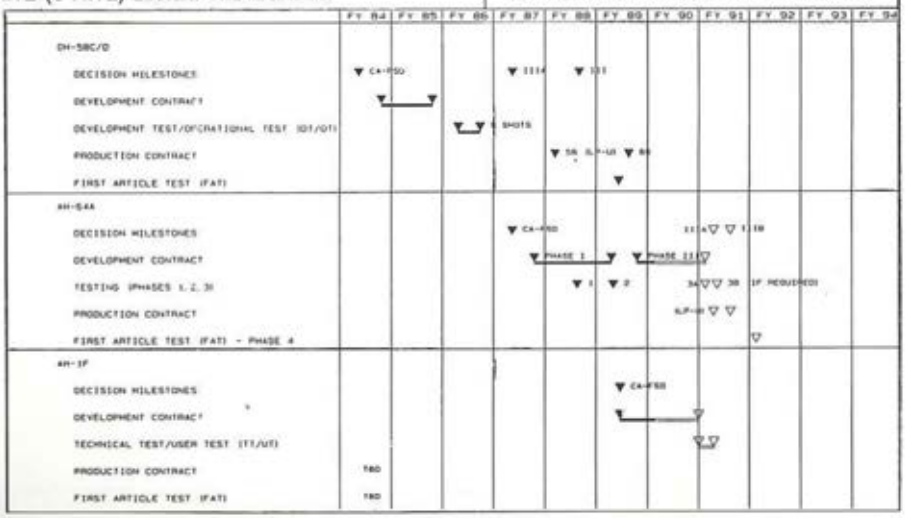
Additionally, AEL will design and build the interface to provide electronic interface between ATAS and the Fire Control Computer. When integrated, the AH-1F and C-NITE aircraft will be able to launch ATAS missiles from one or all four of the existing wing store stations. Government TT/UT is scheduled for FY90/91. Currently, there is no funding allocated for AH-1F ATAS production.

Conclusion

All in all, ATAS is working well. ATAS has met Army Aviation's expectations to provide a timely, near term solution to a defensive shortcoming. It is the best solution available today for a self-defense capability.

But the search must continue. Army Aviation must strive for better solutions to ever increasing and more sophisticated ATA threats. An ATA missile with enhanced countermeasures and increased performance is needed for the combined arms team to provide aviation crews the "Decisive Edge."

ATAS INTEGRATED SCHEDULE



AHIP: The Army's Multi-Purpose Light Helicopter

By Colonel James T. Huey

It is hard to believe that a year has passed since our last update. It has been a year filled with a number of important events. This article will briefly recap the key events.

Those of you who follow Army Aviation, and specifically the AHIP program, remember that the May 1988 Army Aviation Modernization Plan (AAMP) projected a requirement of 477 OH-58Ds. The 477 figure was reduced to a procurement objective of 375 aircraft during the initial FY89 budget process. The amended budget that was submitted last spring terminated the OH-58D program after the FY89 procurement. The Congress, however, reinstated the program for FY90 and requested the Secretary of Defense review the requirement for the AHIP and report back to the Congress by April 1990 regarding additional AHIP requirements. It appears Congress believes the dramatic changes in the world situation during the past year coupled with the success of the Armed AHIP in the Persian Gulf, and the increased importance being placed on contingency forces, demands a re-look at the AHIP program.

COL Huey is Project Manager, Army Helicopter Improvement Program, St. Louis, MO.

In April of 1988 the XVIII Airborne Corps documented its requirement for a Multi-Purpose Light Helicopter (MPLH). The aircraft had to be armed and include the capability to reconfigure for troop transport, medical evacuation or external lift (2000 lb cargo hook). The MPLH aircraft needs to be air-transportable in a C-130 and be able to off-load and fly away, mission ready within 15 minutes of landing. Two AHIPs demonstrated that ability at Fort Bragg, NC, during a night operation in March 1989. The Vice Chief of Staff of the Army determined in May 1989 that given an Army decision to arm the AHIP with Air-to-Ground (ATG) weapons in addition to the Air-to-Air STINGER, that the AHIP would be the MPLH.

Armed AHIP

The Army has successfully operated 15 AHIP aircraft with the Air-to-Ground (ATG) weapons i.e., HELLFIRE laser guided missile system, HYDRA-70 rockets, and a .50 caliber machine gun, in addition to the Air-To-Air STINGER missile, for the past two years. In August of last year an Army Systems Acquisition Review Council (ASARC) recommended that the Army arm the AHIP fleet with the ATG weapons. This can be done efficiently and effectively when retrofitting the aircraft for ATAS and accompanying RAM modifications. Funds were included in the Army's FY91 budget submit to OSD to begin retrofitting the fleet with ATG weapons. Under the current schedule fully armed aircraft will begin fielding in April 1992. The final distribution of the limited number of AHIPs (243) is undergoing review, however, the majority will probably go to air cavalry units to replace the older, less capable OH-58A/C and AH-1 aircraft that have virtually no night warfighting capability. Although there is some weight increase associated with the incorporation of the ATG weapons suite, there is no significant performance degradation due to upcoming improvements in both the transmission and engine. An article in a future issue of ARMY AVIATION MAGAZINE will go into detail regarding the Armed AHIP with the ATG weapons suite.

Fielding

Fielding of the V and VII Corps Target Acquisition Reconnaissance Companies (TARCs) was completed in September 1989. This completed the fieldings in support of the Field Artillery Aerial Observer (FAAO) role. The current fielding status is: FORSCOM 57; EUSA 6; USAREUR 54; TRADOC 24 — for a total of 141. The next fielding is scheduled to be to the 1/17th Cavalry, 82d Airborne Division, at Fort Bragg, NC, beginning in February 1990. Production deliveries continue to be on time and total package fielding is a reality.

Readiness

The biggest issue concerning fieldings and you, the Army Aviation person, is readiness. In September 1988, the worldwide FMC rate was 80 percent. It is currently around 60 percent compared to the Department of the Army goal of 70 percent. The reasons for this drop are numerous. A lack of robustness in TOEs (e.g. only one 68N and 68R), coupled with personnel malassignments and nonaviation maintenance demands on unit personnel, result in reduced maintenance man hours actually on the equipment. However, the primary adverse impact on AHIP

readiness continues to be the lack of spare and repair parts for the Mast Mounted Sight (MMS).

Since we are a lead time away from the ideal supply support status, we must optimize other areas which impact readiness, e.g., continued reliability improvements, training enhancements, eliminating personnel malassignments, return of unserviceable repairable items for repair, reduce repair turnaround time, etc. Although many procedural changes, increased technical support to the field, training of MICOM (U.S. Army Missile Command) LARs (Logistics Assistance Representatives), etc., have or are taking place as you read this article, the real impact of these changes won't be felt until late spring or early summer. All issues relevant to readiness are being worked very hard by the AHIP PMO, MICOM, AVSCOM, the TRADOC Systems Manager (TSM), and the contractors. The AHIP has the potential to surpass the 70% FMC DA goal and once again realize 75-80%, however, that requires continuous cooperation from all AHIP team members including the user.

Awards

During the past year the personnel who manage, build, and fly the OH-58D received four prestigious awards. The Army Aviation Materiel Readiness Award for a contribution by an Industry Team was given to Bell Helicopter Textron, Inc. (BHTI), for their efforts in arming the AHIP for its contingency mission. The AAAA Robert M. Leich Award was presented to the Commander of the XVIII Avn Bde, TF 118, for the successful operation conducted in the Persian Gulf. During the April 1989 Atlanta AAAA convention, the Deputy Program Manager for the OH-58D program, Mr. John McLaughlin, was presented with the Dept. of the Army Civilian of the Year Award. Capping this award-winning year, the OH-58D joined the distinguished ranks of military aircraft such as the F-4, F-15, F-16, and B-1B by receiving the prestigious Daedalian Weapon System Award. This award is presented to the recipient judged by the respective service as having made a major contribution to the development of the *most outstanding* weapon system used by that service.

The AHIP, in only three years since initial fielding, has established itself in a manner unprecedented in Army Aviation history. It has demonstrated its unique capabilities and warfighting advantages, not only at major training exercises, but in actual combat — and walked away with well deserved honors.

The challenge we face in the future is to improve upon and sustain the high standards already established. IIIII

CH-47 Modernization

By Colonel Ronald N. Williams

You may recall that the 1989 CHINOOK report was not an optimistic one. The day before that report was mailed we had an accident in Honduras with multiple fatalities. This began a long period of investigations and fixes. After a year and several groundings, one lasting four months, we again feel good about the aircraft. This report provides details of the investigations, conclusions and work done to fix the problems.

In a January 1989 meeting, then MG (now LTG) Parker, MG Stephenson, and Mr. Chesnut, President of Boeing Helicopters, decided to conduct a comprehensive technical review of the CH-47D. LTC Jim Verity led the review, with Mr. Bill Jones of Boeing as co-director. They worked from March to June 1989, calling on independent experts from outside the Army and Boeing as well as within. Thirty-one issues required attention. Most were already known with solutions in hand; some confirmed suspicions; some were surprises. The aircraft was found to be properly qualified for operations as they are being conducted. But new technology now allows more comprehensive testing and we have provided Boeing an airframe to do this additional work. Boeing was found to have one of the best quality programs in the industry. There were some unfortunate lapses recently in applying this program that have led Mr. Chesnut to appoint a safety director to overwatch quality efforts. He is Mr. Bob Hazlett. His charter is so broad and access to top management so direct that he is being called the "Safety Czar." LTC Verity recommended changes in the application method for modifications to the aircraft and was instrumental in accelerating some modifications. The results of the review were presented to the Vice Chief of Staff in June, and all of the

COL Williams is Project Manager for CH-47D/Army V-22 Aircraft Programs, St. Louis, MO.

recommendations have been or are being implemented.

I would like to describe some of the major work. Since 1985 there has been concern for fire damage to control tubes in the CHINOOK's tunnel area. Those tubes were aluminum and have now been replaced with stainless steel. Beginning in 1984 we had problems with engine transmission clutches failing to engage. It was not a safety problem so much as an operational deficiency, although it once caused a cross shaft to be thrown during ground operation at Ft. Bragg. All affected clutches have now been reworked to a more reliable configuration. It is still thought, but not proven, that the 1988 accident near Chico, TX was caused by a cracked cross shaft. We believe that a narrow band of aircraft have some unknown characteristic which shortens shaft life. We cannot determine the root cause. The only effective fix is a new single piece cross shaft, and a changeout program can be expected this spring. Until then we will rely on frequent inspections to insure cross shaft integrity.

Transmission Cooling Fans

The most difficult problem is the failure of combining transmission cooling fans, first noted in April 1985. The decision to continue to fly the old fans was not taken lightly, and I am very much relieved that it turned out to be a sound decision. Although the failure mode is well understood, we were uncertain of the cause. In developing a second source for fans an appropriate design change was made and tested over 750 hours. All went well. Then, when the new design was installed, a manufacturing defect appeared. After eliminating the possibility of this error we again tested the new fan on a bench for 200 hours. Flight testing was done at Ft. Bragg, and at the Development Test Activity. First indications are that the fixes, with reduction of vibration in drive components, have at last given us a safe, reliable fan.

The past year is one in which the CHINOOK community came to grips with a number of long term problems. The units, the Boeing Co., AVSCOM and the PM shop aggressively attacked each problem. Quality was our first priority, before production and fielding. And the focus of our quality efforts is safety.

Vibration Analysis

We are continuing to improve the CHINOOK. Units are getting vibration analyzing equipment. We are developing, with Boeing, a program to extend the use of this equipment beyond tracking and balancing of rotors to the higher speed rotating components. We need to smooth out the CH-47, and can do so with the new equipment.

In 1990 we resume fielding to reserve component units and complete deliveries to the active force. To this point CH-47 fieldings have been well executed, thanks to the logisticians in St. Louis and the fielding teams in Korea and Europe. Fieldings will now be managed from St. Louis. I expect that they will continue to be successful. With the recent improvements made to the CH-47, we look forward to good fieldings and safe, trouble free operation.IIIII

BLACK HAWK Passes in Review

By Major Alan J. Bacon and
Major Marsha S. Finley

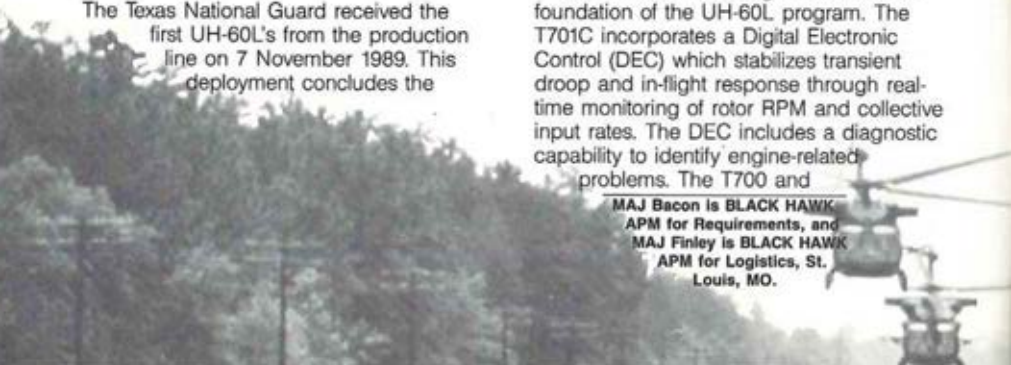
In 1989, the Army BLACK HAWK passed in review, completing its first fielded decade with several major milestones: UH-60L fielding launched successfully in the fall, BLACK HAWK units initiated testing of the Global Positioning System (GPS), and EUSA completed fielding of the ENHANCED BLACK HAWK. USAREUR approved the "EMBASSY" HAWK requirement in 1989, and received the airframes in the same year, and Fleet retrofit for Electromagnetic Environmental (EME) Protection began on schedule. Each element builds upon successes, and creates a dynamic future for BLACK HAWK.

UH-60L

The Texas National Guard received the first UH-60L's from the production line on 7 November 1989. This deployment concludes the initial phase of the Non-Developmental Item (NDI) engine program which began when Congress directed a competitive turboshaft engine procurement for the H-60 series aircraft. In 1988, the government competitively selected the General Electric T700-GE-701C for multi-year procurement with initial deliveries of the UH-60L beginning in October 1989.

The T700-GE-701C engine became the foundation of the UH-60L program. The T701C incorporates a Digital Electronic Control (DEC) which stabilizes transient droop and in-flight response through real-time monitoring of rotor RPM and collective input rates. The DEC includes a diagnostic capability to identify engine-related problems. The T700 and

MAJ Bacon is BLACK HAWK APM for Requirements, and MAJ Finley is BLACK HAWK APM for Logistics, St. Louis, MO.



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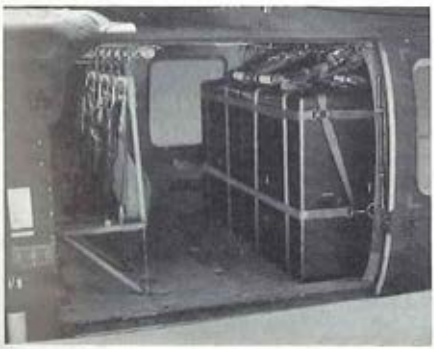

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AVIATION
Range Extension Fuel Systems

H-60 SERIES CONFIGURATIONS

MDS	POPULAR NAME	ENGINE DATA	DEPT.	DESCRIPTION
UH-60A	BLACK HAWK	T-700-GE-700	AF/ARMY	FULLY ARTICULATED, SINGLE ROTOR, UTILITY/TACTICAL TRANSPORT WITH 2 MAIN WHEELS, 1 WHEEL (3 CREW, 11 COMBAT TROOPS).
HH-60A	NIGHT HAWK	T-700-GE-700	AF	UH-60 CONFIGURED WITH NIGHT OPERATIONS AVIONICS, EXTENDED RANGE AND UNIQUE COMBAT RESCUE EQUIPMENT.
SH-60B	SEA HAWK	T700-GE-401	NAVY	UH-60A CONFIGURED FOR NAVY USE WITH DIFFERENT AVIONICS AND LAMPS MK III SYSTEM.
YEH-60B	BLACK HAWK	GE T-700	ARMY	UH-60A MODIFIED FOR RADAR INSTALLATION AND SPECIAL AVIONICS, PROTOTYPE FOR STANDOFF ACQUISITION SYSTEM.
YSH-60B	SEA HAWK	T700-GE-401	NAVY	SH-60B AIRCRAFT WITH UNIQUE CONFIGURATION REQUIRES MORE MANPOWER AND SPECIAL PARTS.
EH-60C	BLACK HAWK	GE T-700	ARMY	UH-60A MODIFIED WITH SPECIAL ELECTRONIC EQUIPMENT AND EXTERNAL ANTENNA (QUICK FIX).
HH-60D	NIGHT HAWK	T700-GE-401	AF	UH-60A CONFIGURED FOR AF USE WITH AVIONICS NIGHT/ADVERSE WEATHER OPERATIONS, EXTENDED RANGE, AND UNIQUE COMBAT RESCUE EQUIPMENT.
HH-60E	NIGHT HAWK	T700-GE-701	AF	HH-60D WITHOUT NIGHT/ADVERSE WEATHER AVIONICS.
SH-60F	SEA HAWK	T700-GE-401	NAVY	MODIFIED SH-60B WITH DIPPING SONAR AND RECONFIGURED AVIONICS.
MH-60G	PAVE HAWK	T700-GE-700	AF	MODIFIED UH-60A INCLUDING INFLIGHT REFUELING CAPABILITY, RANGE EXTENSION TANK, MAP DISPLAY WEATHER RADAR, AND OTHER IMPROVED EQUIPMENT.
HH-60H	SEA HAWK	T700-GE-401	NAVY	MODIFIED SH-60F WITH DEFENSIVE AND OFFENSIVE WEAPONRY.
HH-60J	SEA HAWK	T700-GE-401	NAVY	MODIFIED SH-60F, SINGLE MAIN & TAIL ROTOR CLASS II HCPTER.
HH-60J	JAY HAWK		CST GRD	MODIFIED HH-60J
MH-60K	BLACK HAWK	TBD	ARMY	UH-60A WITH MODIFIED COCKPIT TO INCLUDE HUMAN ENGINEERING TO REDUCE PILOT WORKLOAD, ADDITIONAL AVIONICS, NAVIGATION, AND AIRCRAFT SURVIVABILITY EQUIPMENT.
UH-60L	BLACK HAWK	T700-GE-701C	ARMY	MODIFIED UH-60A WITH IDGB
UH-60P	BLACK HAWK		ROK ARMY	MODIFIED UH-60A - FINAL CONFIGURATION TBD

T701C parts are 85% interchangeable. The engines present few external differences, but the T701C provides a 10-20% increase in maximum shaft horsepower which is dependent on temperature and pressure altitude. To use this new engine fully, the PMO incorporated other Engineering Change Proposals (ECPs) to field a fully-integrated package, the UH-60L.

The L model also incorporates a derivative of the SH-60B's Improved Durability Gear Box (IDGB). The T701C engine and IDGB restore high density altitude capability which declined as aircraft empty weight grew over the past decade. An extended Time Between Overhaul (TBO) on the gearbox and mast decreases mandatory maintenance actions. The airframe configuration baseline requires minor changes to the bleed-air system, the installation of additional sensors for the Transient Droop Improvement (TDI) features, and modification of the Vertical Instrument Display System (VIDS) to accommodate operating limitations of the new powerplants.

The BLACK HAWK PMO developed the UH-60L under an extremely compressed acquisition program. First flight occurred on 22 March 1989. The L model completed all contractor and Government testing (including Electro-Magnetic Vulnerability testing at the Naval Warfare Surface Center) before a Department of the Army (DA) review in the fall. DA approved the UH-60L type-classification standard in September. Production acceptance followed in October, and first delivery to a field unit occurred in November, 1989. Although there are no plans to convert UH-60As to UH-60L, the PMO will continue to upgrade the Army's 985 UH-60A's and the planned 1268 UH-60L's to fulfill mission requirements.

Another scheduled UH-60L enhancement will be the Global Positioning System (GPS), providing greatly improved navigation capabilities. GPS will enable crews to fly routes with pinpoint accuracy at any location worldwide. GPS relies on aircraft radio waves linked to an extensive orbiting satellite system. GPS receives the aircraft transmission, triangulates the aircraft location, and sends location information to the on-board GPS receiver. The system provides instantaneous navigation and time data with three dimensions to a 15 meter accuracy. The system integrates fully with the Doppler Navigation to provide accurate navigation information under adverse operating and environmental conditions. GPS will substantially advance navigational precision, leading to increased mission capability and survivability. Ten 9th Infantry Division BLACK HAWKs are now receiving necessary GPS changes. Fort Lewis aviators are currently flying and evaluating the system. GPS fielding may occur as early as July 1991 if both testing and funding support a production decision. Depot teams will install the GPS avionics kit on fielded aircraft as a modification once production line configuration changes are complete.

ENHANCED BLACK HAWK

Depot support played an essential role in the highly successful ENHANCED BLACK HAWK project. Corpus Christi Army Depot (CCAD) modified 15 production aircraft, delivering five in January, five in May, and five in August 1989. Intense CCAD participation assured completion of this DA approved program in only two years from concept development to final delivery.

The essence of the ENHANCED BLACK HAWK is its special Mission Equipment Package (MEP). The MEP consists of an OMEGA Navigation System, Satellite Communications (SATCOM), High Frequency (HF) radio, radar warning system, internal Robertson Auxiliary Fuel System, 7.62mm M-134 miniguns, external rescue hoist and the FAST Rope system. For additional systems description, see the June 1989 ARMY AVIATION article "Fielding the 'ENHANCED' BLACK HAWK", by LTC Chester L. Rees, Jr.

The ENHANCED BLACK HAWK unit successfully completed their ARTEP in November 1989. MEP performance has proven highly reliable, surpassing established readiness standards. Fully Mission Capable (FMC) rates for ENHANCED BLACK HAWK consistently

-701C ENGINE

- 85% COMMON PARTS TO -700
- INCREASED POWER
  - BETTER HIGH/HOT DAY PERFORMANCE
  - GREATER SINGLE ENGINE CAPABILITY
- ENHANCED CORROSION PROTECTION
- DIGITAL ELECTRONIC CONTROL (DEC)
  - TRANSIENT DROOP IMPROVEMENT (TDI)
  - ENGINE DIAGNOSTICS
  - AUTO OVERSPEED RELIGHT

T-701C INTEGRATION PROGRAM DESCRIPTION

- AN INTEGRATION OF:
  - UH-60A AIRFRAME (MY III PROD. CONTRACT)
  - T700-GE-701C ENGINE (FIVE-YEAR PROD. CONTRACT)
- NDI TESTING LIMITED TO THAT REQUIRED TO:
  - QUALIFY ENGINE INSTALLATION IN AIRFRAME
  - SATISFY USER ACCEPTABILITY
  - VERIFY SAFE OPERATION
- IMPROVED DURABILITY GEAR BOX (IDGB) MAIN TRANSMISSION ASSOCIATED

exceeded 90% in 1989. Another depot, Lexington Bluegrass Army Depot (LBAD), provides supply and maintenance support for the MEP. Depot support directly contributed to the unit readiness and mission successes.

"EMBASSY" HAWK

Depot field teams played an essential role in altering UH-60A's to a new configuration unofficially referred to as the "EMBASSY" HAWK. The "EMBASSY" HAWK is a DA directed QUICK REACTION Program with satellite communications and navigation equipment to fulfill specific mission requirements in USAREUR. Like the ENHANCED BLACK HAWK, two-levels of maintenance support the "EMBASSY" HAWK's special systems. The owning units perform AVUM maintenance and a Government Owned-Contractor Operated (GOCO) facility at LBAD provide all support above AVUM. The BLACK HAWK PMO has provided funding, manuals, depot modification team, and New Equipment Training Team (NETT) in support of this requirement. Four full-up aircraft will fly with internal Robertson Auxiliary Fuel Systems, and standard avionics configuration modified for the LST-5B(SATCOM) and the AN/ARN-148 OMEGA navigation systems.

The AN/ARN-148 OMEGA navigation Set is an advanced technology OMEGA/VHF Navigation system. The set combines microprocessor technology with a digital receiver design. The Control Display Unit (CDU) uses a full up alpha numeric keyboard and color CRT display. This OMEGA Navigational set provides the operator with a display of aircraft present position and flight plan update information. The LST-5B SATCOM system is an AM/FM, UHF transceiver radio system used for half-duplex voice or data communications. The system uses either a 25 KHz or 5 KHz band width channel for line-of-sight or satellite operations. Using the built-in modem, the system provides data transmission rates of 1200 or 2400 bits per second (BPS). The LST-5B can operate with the TSEC/KY-58 COMSEC equipment to provide voice secure transmission. These systems provide the most accurate navigation capability available on any H-60

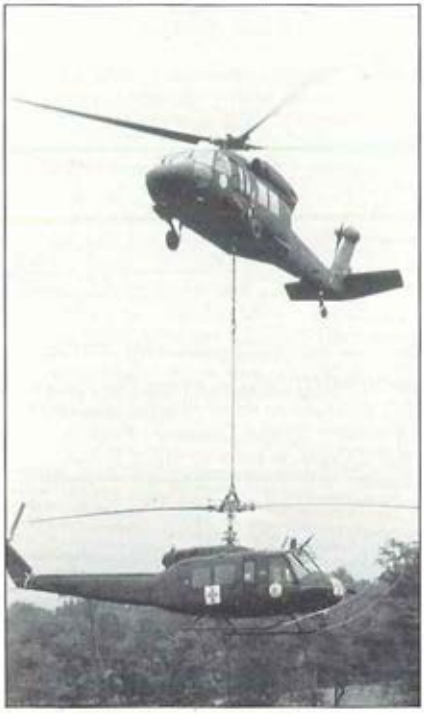
EMBASSY HAWK Center Console

STORE JETT	MISC SWITCH	COMPASS CNTL C-8021
AN/ARN-89	AN/ASN-128 DOPPLER (FUTURE GPS)	AN/ARC-164 UHF-AM
		AN/ARC-186 VHF
OMEGA CDU AN/ARN-148		INTERCOM C-6533
INTERCOM C-6544	STAB-AFCS	LSRU-100 SATCOM
AN/ARN-123		PTRA-200 SATCOM P/A
STOW-PLATE FOR #3 AN/ARC-186	AN/APX-100	
AN/ARC-186 VHF-AM		SATCOM ANT. RELAY SW.
	RETRANSMIT CONTROL	XM-130 CHAFF DISP.
	FUEL BOOST	APR-39

configuration. Both avionics systems are standard DOD items which have undergone extensive Electromagnetic Vulnerability (EMV) testing.

EME Protection

The EME program insures BLACK HAWK survivability in all foreseen electromagnetic environments. From the peacetime radio, television, and radar transmitters to the threat systems of a hostile environment, BLACK HAWK electronic systems must not show evidence of susceptibility. This program involves system protection to the 200 volts per meter (RMS) standard recently adopted for Army Aviation and for the shipboard environment. The EME program tests all environments, develops appropriate hardening, implements required changes in production items, and retrofits the fielded fleet through kit application by on-site OLR teams. The EME program addresses flight critical components in the first phase, and all other items in the second phase.



The first phase, providing EME hardening for the hydraulic system logic modules, completed all development and testing in 1988. Production aircraft received the improved module starting in October 1988. OLR teams completed 80% fleet retrofit in 1989. The second phase proceeded on track in 1989 as well. EME testing for the Automatic Flight Control System (AFCS) and stabilator, VIDS, Caution/Advisory System, Command Instrument System (CIS), Horizontal Situation Indicator (HSI), cargo hook, tail wheel lock, fire detectors, AC/DC power sources, blade de-ice rate meter and test panel, blade de-ice controller and distributor and Doppler system ended in the fall. The prototype system test at Dahlgren ended in December 1988. The production line will receive EME hardened components in June 1990, and fleet retrofit will occur from October 1990 through 1992.

Meeting the Threats

EME hardening and GPS developments expand BLACK HAWK mission effectiveness. The UH-60L, the ENHANCED BLACK HAWK, and the "EMBASSY" HAWK meet real-time threats. These programs intensify commanders' responses to shifts in the Army Aviation mission. On the line, in flight, and in battle, BLACK HAWK passes in review. IIIII

Army Aviation in Panama: Operation JUST CAUSE

In a textbook example of a modern night assault, U.S. Army Aviation assets played an important role in operation JUST CAUSE. In all, U.S. Army Aviation assets flew 4,500 combat hours in 1,200 separate missions. Missions included Attack, Recon, Assault, and Resupply.

In addition to the 1st Battalion, 228th Aviation Regiment stationed in the Canal Zone, assets from the 7th ID (L) Aviation Brigade from Ft. Ord, CA; UH-1 and CH-47 crews from the 18th Aviation Brigade, Ft. Bragg, NC; and the 160th Special Operation Aviation Group (SOAG) from Ft. Campbell, KY assisted in the effort.

Aviation assets were organized under **Task Force Aviation,** commanded by COL Douglas R. Terrell, commander of the 7th ID (L)'s Aviation Brigade, and his XO, LTC William L. Webb, III. Elements included:

TF WOLF: made up of the APACHEs of the 1st Battalion, 82nd Airborne Division, and later augmented by COBRAs from the 1/17th Cavalry. Combat for TF WOLF included attacks within Panama City, as well as Noriega's beach house at Rio Hato. TF WOLF was commanded by LTC Donald E. Vinson.

TF HAWK: made up of BLACK HAWKs of the 3rd Battalion, 123d Aviation Regiment, as well as Attack Helicopter Companies from the 1/123d and the 2/9 Cavalry of the 7th ID. TF HAWK initiated the assault on Ft. Amador, then moved on to Panama Viejo (Old Panama), Tinajita and Ft. Cimarron. TF HAWK was commanded by LTC Benton H. (Howard) Borum.

TF 1-228: made up of assets of the 1st Battalion, 228th Aviation Regiment, based in Panama, it was augmented by assets from Ft. Bragg to bring the 1/228 up to 100%. TF 1-228 was made up mostly of BLACK HAWKs, UH-1 HUEYs, OH-58s, and CH-47 CHINOOKs, and was commanded by LTC Douglas I. (D.I.) Smith. TF 1-228 was involved in the liberation of Gamboa prison and Cerro Tigre.

160th SOAG: Special Operations Forces (SOF) deployed to Panama were supported by the 160th Special Operation Aviation Group (SOAG). A wide variety of H-Hour missions were conducted by the 160th, utilizing their special operations capabilities. Airborne members parachuted in with the Rangers at both Rio Hato and the Torrijos Airport to establish initial refuel and rearm points. MH-6 and AH-6 gunships provided support for the Rangers and the 82nd Airborne, as well as other SOF during the initial assault. Most of the Group's specially modified UH-60s were deployed and

Although JUST CAUSE was a remarkable success, three aviators and 20 other military personnel paid the ultimate price for the victory. The three aviators are: **1LT John Russell Hunter, CW3 Wilson Black (Sonny) Owens,** and **WO1 Andrew Paul Porter**.

Both Hunter and Owens were Night Stalkers in B Company, 160th Special Operations Aviation Group (Airborne), Ft. Campbell, KY, and were together in their AH-6 when it crashed after receiving ground fire. They were reportedly in combat on Telfers Island (a prison complex), 20 December 1989, during the initial phase of the operation.

Born 28 January 1959 in Libby, MT, **Lieutenant Hunter** spent 13 years in the military. A former Chief Warrant Officer, he graduated from Officer Candidate School in 1987 and was promoted to First Lieutenant in June of 1989. His former Commanding Officer, MAJ Tom Matthews is quoted to have said, "John was a quiet professional who left nothing to chance. He was truly a hero, in every sense of the word."

Lt. Hunter is survived by his parents, Ray and Jean Hunter of Havasu City, AZ, a fiancee, Julie Michaud of Clarksville, TN; and three sisters.

Fellow Night Stalker, **CW3 Wilson Black (Sonny) Owens**, was born in North Myrtle Beach, SC, on April 25, 1960. In December 1978, after graduation from high school, he enlisted in the Navy. After his hitch in the Navy, his interest in aviation brought him to the Army and he graduated from the Warrant Officer Rotary Wing Course in June 1983. In October 1985, he was accepted into Task Force 160. After completing mission training, he was assigned to Bravo Compnay, advancing to fully-mission qualified AH-6 Instructor Pilot.

Asked once how he'd like to be remembered, Sonny said, "I guess I would want them to say there goes a guy who lived hard, travelled all over, and worked hard. He loved his country and his family."

Friends may contribute to the Night Stalker Memorial Fund, c/o Commander, 160th Special Operations Aviation Group, Ft. Campbell, KY 42223.

WO1 Andrew Paul Porter of St. Clair, MI, was killed 23 December while flying a solo reconnaissance mission in support of the 7th Infantry Division (Light). His OH-58 crashed after being hit by groundfire.

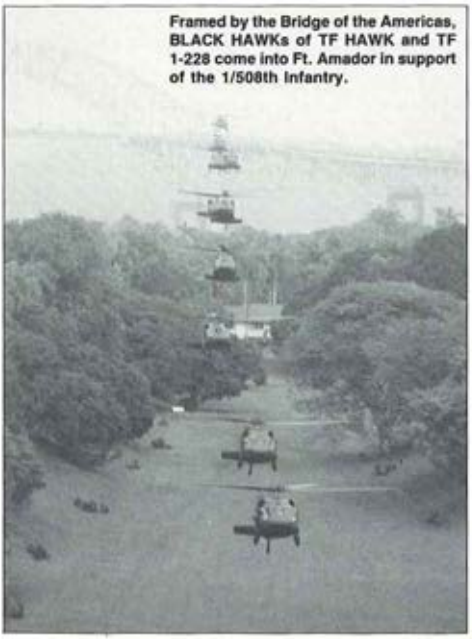
Porter, 25, was serving with B Company, 1st Battalion, 123d Aviation Regiment, Ft. Ord, CA. He had been stationed at Ft. Ord since March 1988. He is survived by his wife, Hye.

MAJ Larry R. Santure, Executive Officer of the 1-228th examines battle damage at Gamboa.

BLACK HAWKs from the 1-228th flying a mission off the island of Taboga, which is eight miles off the coast of Panama.

CW2 Albrook of A Company, 1-228th entertaining a Panamanian child.

THANKS! ARMY AVIATION MAGAZINE would like to extend a special thank you to MAJ Larry R. Santure and Sp4 Rex A. Crouch of the 1-228th, for all their help in the compilation of this report and for the photos from Panama.



Framed by the Bridge of the Americas, BLACK HAWKs of TF HAWK and TF 1-228 come into Ft. Amador in support of the 1/508th Infantry.

heavily committed throughout the operation. Three MH-47 CHINOOKs were self-deployed from Ft. Campbell direct to Panama, using two enroute aerial refueling link-ups with USAF tankers. The Night Stalkers of the 160th were involved in fierce combat action during the inital assault and immediate follow-on missions. Most missions flown by the 160th were joint operations with USAF SOF aviation forces. For a limited period, APACHEs from the 82nd Airborne were incorporated into missions flown by the 160th.

The entire TF Aviation was assisted in flight following by an airborne TAC Team from **B Co 1/58th ATC Battalion**, Ft. Bragg, and the **195th ATC Platoon.**

Pilots and crewmen of TF Aviation conducted night air insertion operations into some of the fiercest fighting. While APACHEs "lit up" the Panama Defense Force's (PDF)*Comandancia* nearby, BLACK HAWKs, COBRAs, and OH-58s combat assaulted infantry units into Ft. Amador on the outskirts of Panama City. The pilots, using ANVIS-6 Night Vision Goggles, were all but invisible to the PDF.

"Without the aid of night vision goggles, the operations wouldn't have gone so smoothly," said LTC D.I. Smith of the 1/228th. "The contrast between the night and the day missions points out how efficient air assault operations can be when conducted at night."

During night operations, no 1/228th aircraft were damaged. At night, pilots could not only see the Landing Zone, but could also see the tracer rounds and avoid the line of fire. The enemy, on the other hand, could only fire at the sound, which usually was not where the aircraft was. During daylight missions, however, aircraft were damaged by enemy small arms fire.

Maintenance Teams

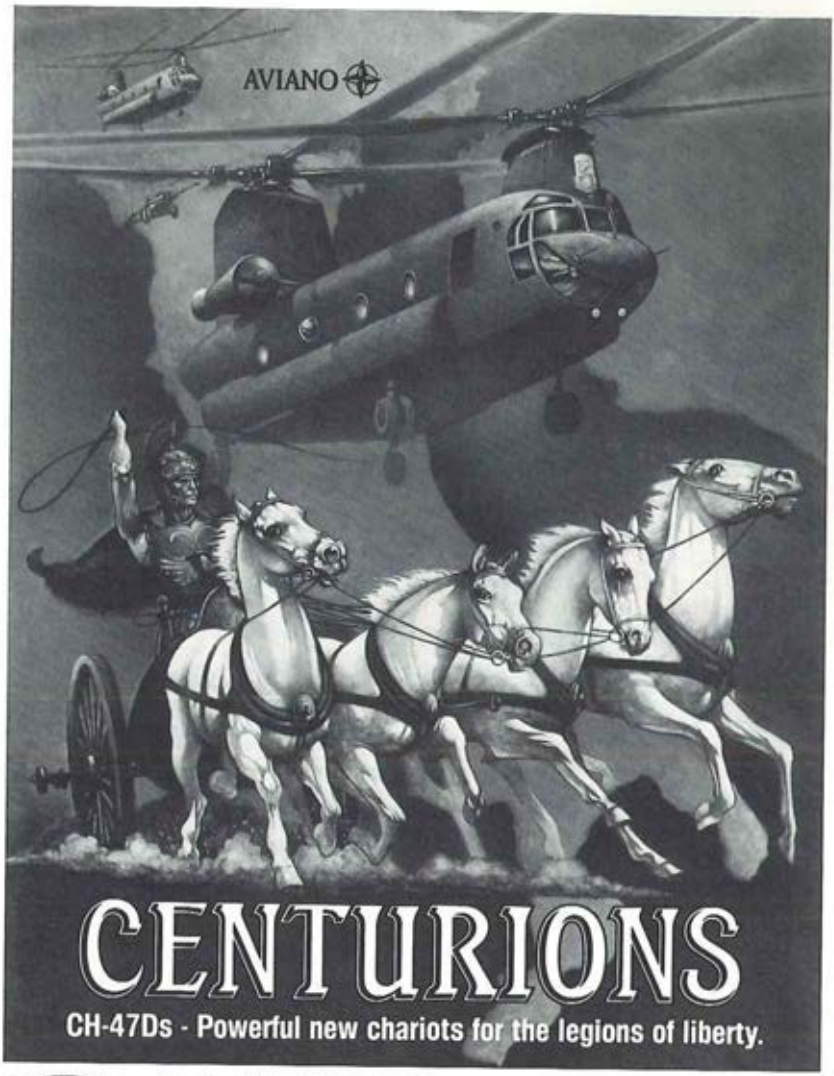
Maintenance also played an important role in the operations. Helicopters damaged during the initail assault were repaired and back in the air within hours. Aviation maintenance teams worked throughout the day patching bullet-riddled aircraft. Most patches were of small arms fire, however one aircraft was hit in the engine, requiring replacement.

While most of the Aviation action was over within the first week, the most significant aviation mission came sometime later. On the night of 3 January, a UH-60 BLACK HAWK ferried ex-dictator Manuel Noriega from the Vatican Embassy to a waiting plane at nearby Howard AFB. IIIII

PANAMA DAMAGE ASSESSMENT

Aircraft Type	Damaged	Ret'd to Service	Lost
BLACK HAWKs	25	24	0
UH-1 HUEYs	1	1	0
AH-1 COBRAs	5	5	0
OH-58 KIOWAs	4	3	1
AH-64A APACHEs	3	3	0
Special Opns Aircraft	7	4	3
TOTAL	**45**	**40**	**4**

- All damaged aircraft were flying again in 24 hours or less.
- All lost aircraft were of the Scout or Scout/Attack variety.
- At the peak of the action, 167 helicopters were being utilized.
- Majority of RW damage was due to small arms fire.
- The one damaged aircraft still under repair was the result of a hard landing due to sustained damage.



SETAF

U.S. Army SETAF

Support mobility of the Southern European Task Force (SETAF) is enhanced with the delivery of advanced Chinook helicopters to Company E of the 502d Aviation Regiment. Besides adverse weather and nighttime capability, the Centurion's new CH-47Ds bring with them dramatic opportunities for training and peacetime support of (SETAF) and their Italian allies.

This is the fourteenth U.S. Army unit to receive the modernized Boeing CH-47D.

BOEING

CENTURIONS
E Co 502D AVN

502d Avn Regiment E. Co.

Technical Publications: The Possibilities

By Warren J. Schnell

What was left of the sun was now disappearing over the horizon. Snow was falling heavily and the familiar trees and hills were fading into a grey nothingness. It almost seemed that the weather had started to fail when

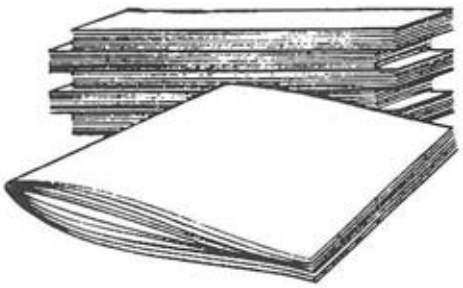
news of enemy forces crossing the frontier was received.

The pilot of the small Army gunship had just climbed into the cockpit. He initiated the start up procedure. He was a veteran of many rotary wing hours but was barely qualified in the new gunship. Quickly he ran through the automated checklist integrated in the ship's computer. Each step appeared at the top of the CRT and was reinforced by voice command. In his haste he omitted a vital step and the computer refused to start the engine until the step was completed. The aircraft quickly departed.

Mr. Schnell is Chief, Technical Publ. Branch, Dir. for Maintenance, AVSCOM, St. Louis, MO.

Just hours before, the aircraft had been down with electronic systems problems. Gone were the days when automatic trouble shooting resulted in giving a mechanic a cryptic code which then had to be deciphered by going through hundreds of pages of manuals. It was now only necessary to walk over to the side of the aircraft, plug in the trouble shooting aide and system failures, and the proposed corrective actions, including illustrations, immediately appeared. Once the trouble shooting was completed, the mechanic plugged the aide into the field computer and the parts and consumables were automatically ordered.

The maintenance manuals themselves had also undergone a tremendous change. The data was no longer organized by page or even existed in the sense of a conventional manual. All procedures now resided in a relational data base. Instead of plowing through page after page, the mechanic merely defined a symptom, a part number, or a noun name. The



computer then generated the maintenance task for that specific request. Total access time was down to under 30 seconds with even faster response promised. The mechanic then had the choice of a hard copy printout or to down load the text and illustrations to a small hand held aide.

Computerized Publications

Computer technology, both at the manufacturer's site and in the Army, has already started to revolutionize the pre-press preparation of technical manuals. We are preparing for the day when the original text and art for all publications is digitized and resides in a computer memory bank. The practical result of the equipment expenditures and staff reorganizations is to decrease all phases of the publication leadtime and to provide improved responsiveness in both support of equipment fielding and in field inquiries.

The creation of a digitized set of manuals at the major subordinate command is a forerunner to the "paperless" manual. It is already possible to transmit an encyclopedia from one fixed site to another in a very short time. However, combat conditions are far different. We cannot become dependent upon a data delivery media which cannot be deployed. To train on a system that cannot be used in combat negates its desirability. In spite of the age of the technology, paper manuals set certain standards which must be met if paperless manuals are to be an asset.

- Once the manuals are delivered and posted they require no further maintenance. Deployment of an advanced system which results in an increase on the unit's already strained maintenance resources, or places a demand on the logistics command for parts or batteries is not the ultimate solution.
- Paper manuals are immune from indirect enemy action. The database cannot be changed or destroyed by an electromagnetic burst, power interruption or jamming. This is an essential characteristic.
- The organization and use of paper manuals is self evident, and does not require training for the access to the database. Its organization is readily understood at a relatively low reading level. Any replacement system cannot impose increased training or reading levels.
- Paper manuals are expensive. While duplication of electronic files is not very expensive, the cost of equipment, maintenance, and equipment replacement is. The total life cost of the system in this day of limited defense budgets must be competitive with existing expenses.

Important Questions

All of the above methods of data dissemination and access are now or will be technically plausible by the mid or late 90s. But many questions remain as to whether the possibilities provided by technology are desirable or fiscally achievable. The sole purpose of technical manuals is to permit the Army to achieve its mission in combat. It still has to be determined where the line is drawn between an impressive technological demonstration, which may result in both tactical and logistics problems for a mobile unit, and a system in which the presentation of data, either on paper or on a CRT, is a combat multiplier, not a liability in the mud.

AVSCOM Technical Publications is dedicated to working with you, the user, in the application of technology to make your job easier, now and in the future. IIIII

AH-1F TOW COBRA Hot Mock Ups

By Staff Sergeant Jose O. Davila and Sergeant First Class Edwin R. Boscanna

"Train them well, train them to win the war." These may have been the words of our first Commander in Chief, George Washington to Baron Von Steuben, the Army's first recognized trainer, upon Baron Von Steuben's initial assignment in the Continental Army. Today, this tradition continues at the U.S. Army Aviation Logistics School (USAALS).

Ever mindful of its mission, the school has added to those words "effectively, efficiently and economically." These terms are prompted by sound training logic, budget constraints and a rapidly changing world. To continue these training mandates, the school is continually searching for ways and means to reduce training costs. At the same time, the school is increasing realistic and meaningful hands-on training. For example, in the past to train the 68J-series MOS Aircraft Armament Fire Control Repairer, actual end items of equipment were used as training aids.

SSG Davila is an Instructor, Dept. of Avn Trades Training, USAALS, Ft. Eustis, VA.

Not only is this method expensive, (fly-away cost of an AH-1F is approximately $5.3M), it removes flyable aircraft, TMDE, and other major end items from the inventory. Since fielding of the AH-1Q TOW COBRA in the 1975 to 1976 time frame, aircraft armament Subject Matter Experts (SME) found that, on the average, the cost of maintenance hardware training devices was one-third the cost of the actual end item. Also in support of this fielding, another training media was introduced to armament training — the maintenance training panel. These devices more than satisfied armament training needs for the AH-1Q and AH-1S TOW COBRAs.

Fielding of the AH-1F Fully Modernized (FM)

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TOW COBRA posed additional training challenges. Even though maintenance hardware trainers and training panels were upgraded to the FM configuration, and were more than adequate for systems and subsystems instruction, a major training void was recognized. The addition of the Fire Control Computer (FCC), Air Data Subsystem (ADS), Rocket Management System (RMS), Heads Up Display Subsystem (HUDS), redesigned Helmet Sight Subsystem (HSS), and the Universal Turret System (UTS), and their total integration with the aircraft's main weapon system, dictated that interface troubleshooting of these armament subsystems and the TOW Missile Subsystem (TMS) become an integral part of USAALS aircraft armament training programs.

There followed countless months of querying industry, sister services, and the materiel development community for means to adequately train this required interface troubleshooting. It was found that AMCCOM had built mock-ups for their proponent subsystems: one at Rock Island Arsenal and one at Red River Army Depot. While adequate for their subsystems, they didn't meet the need for complete end-to-end training. The school, after further investigation, found that Corpus Christi Army Depot (CCAD) had a complete and comprehensive AH-1F hot mock up. Technicians were using it to troubleshoot, test and repair armament components and subsystems.

Training CCAD

In 1985 USAALS SMEs on a training assistance mission used the hot mock-ups to train newly hired CCAD technicians. Recent AH-1 readiness issues pointed out that increased interface troubleshooting of armament subsystems is required. Funding, developmental, and logistical issues were addressed and resolved between AH-1 COBRA PM, CCAD, and USAALS. With the help of Mr. Juan De La Cruz, Division Chief Airframe Shop; Mr. Jose Garcia, Chief Aircraft Armament Section and their outstanding workforce at CCAD, the school anticipates delivery of two mock-ups in early 1990. Four others will be delivered later. The hot mock-ups consist of four individual stands.

- Main stand consists of the LRUs, switches, and controls to operate the armament subsystems.
- Second stand is a working platform for the UTS.
- Third stand is the working platform of the TMS telescopic sight unit.
- Fourth stand is for wing stores, either rocket or TOW missile launchers.

Each stand can be used independently to check subsystems. They can also interconnect to allow for complete end-to-end troubleshooting. This versatility can only improve the depth and quality of USAALS troubleshooting training. As an added benefit delivery of the mock-ups will return valuable AH-1F COBRA aircraft to the inventory. This is in keeping with USAALS' goal to provide the Army field units high caliber, cost effective maintenance instruction.

Just the Facts: Aviation Career Incentive Pay

By Captain Kelly J. Thomas

How would you feel if you did not receive your Aviation Career Incentive Pay (ACIP) this month? Your youngest child is just starting college and you are paying the bill! Many of you will be fortunate enough to enjoy the privilege until 25 years of Total Federal Officer Service (TFOS). However, after only a few months in the Aviation Plans/Programs Office, I have found that many officers must reluctantly pay back money after we discover a discrepancy in their Total Operational Flying Duty Credit (TOFDC). The Aviation Career Improvement Act of 1989 incorporates new "gate" requirements and new pay scale that all of us need to understand. On 1 October 1991, all Army aviators will fall into only one of the following categories.

12 Year gate (1st gate): Army aviators qualified for aviation service are entitled to continuous ACIP for 12 years following Aviation Service Entry Date (ASED) so long as you stay qualified (complete a flight physical).

- Those officers with less than six years of aviation service as of 1 October 1991 (ASEDs of 911001 through 850930) will be required to accumulate 108 months of TOFDC by the end of 12 years following aviation service. They may then be entitled to continuous ACIP through 18 years of aviation service if they remain qualified.
- Those officers with six or more years aviation service and who have accumulated 72 months TOFDC as of 1 October 1991, will be entitled to continuous ACIP through the 18th year of aviation service †.
- Those officers with 6-12 years of aviation service as of 1 October 1991 (ASED between 791001 through 851001) who have not accumulated 72 months TOFDC as of 1 October 1991, but who accumulate 72 months TOFDC by their 12th year of aviation service, are entitled to continuous ACIP through the 15th year of aviation service. At the 15th year, they must have 108 months TOFDC to draw continuous ACIP through the 18th year †.

CPT Thomas is an Aviation Mgmt Officer, Aviation Plans/Programs Section, Total Army Personnel Command, Alexandria, VA.

† All officers with 6-12 years of aviation service will have an audit after 1 October 1991 to determine in which category they fall.

- Those officers with more than 12 years of aviation service as of 1 October 1991 (ASEDs before 791001), will continue to be managed throughout their careers under the "old gate" criteria.
- If you fail to make the 12 or 15 year gate, you will only receive ACIP while serving in a position coded for operational flying and when performing flight duties. You may still be able to make your next gate.

18 year gate (2nd gate):

- Those officers with ASEDs prior to 791001, who accumulate at least 108 but less than 132 months of TOFDC by the end of 18 years of aviation service, may continue ACIP through 22 years of TFOS if they remain qualified. ††
- Those officers with ASEDs prior to 791001, who accumulate at least 132 or more months of TOFDC by the end of 18 years following ASED, may continue ACIP through 25 years of TFOS if they remain qualified. ††

†† This is no change from the previous gate system.

- Those officers with ASEDs of 791001 or later, who accumulate at least 120 but less than 144 months of TOFDC by the end of 18 years of aviation service, may receive continuous ACIP through 22 years of TFOS if they remain qualified.
- Those officers with ASEDs of 791001 or later, who accumulate 144 or more months of TOFDC by the end of 18 years of aviation service, may receive continuous ACIP through 25 years TFOS if they remain qualified.
- After 18 years of aviation service, there is not another gate. Additionally, there is no way to recoup TOFDC after the 18 year gate. Your TOFDC at your 18th year of aviation service will determine your entitlements for continuous to 22 or 25 years TFOS. Remember that TFOS and ASED are not the same dates for commissioned officers.
- For the needs of the service, the Secretary of the Army may waive the gate criteria, on a case-by-case basis, for officers who do not qualify for continuous ACIP. This policy has not been defined as to how it will be implemented.

Army aviators not entitled to continuous ACIP (those who failed their 12, 15 or 18 year gate) may receive monthly ACIP only while serving in an operational flying position IAW AR 570-1. Your local military personnel office and servicing finance office can assist you in starting your monthly entitlements. Conversely, your servicing military personnel office must notify your finance and accounting office when you depart the operational flying position so your monthly ACIP will stop. If this does not happen, you need to get involved to ensure it does stop. Otherwise, you'll pay back the overpayment, perhaps with interest.

The new pay scale is as follows:

Warrant and Commissioned Officers

Years of Avn Service	Revised Monthly Rate
2 or less	$125
Over 2	$156
Over 3	$188
Over 4	$206
Over 6	$650

Commissioned Officers only
(This does not apply to Warrant Officers)

Years of Officer Service	Revised Monthly Rate
Over 18	$585
Over 20	$495
Over 22	$385
Over 25	$250

Don't be a loser of your ACIP if you are entitled. Your TOFDC is automatically updated when you arrive or depart an operational flying duty position via SIDPERS transaction. An indepth audit will also be accomplished at your 12th, 15th and 18th year gate. If you would like an audit at any other time, you must go through your local personnel office to request an audit of your TOFDC. Any further questions can be answered by contacting:

CPT Kelly J. Thomas,
AV 221-8156/Com'l (202) 325-8156,
or write to:
U.S. Total Army Personnel Command,
ATTN: TAPC-OPD-D, (Mrs. Bell),
200 Stovall Street,
Alexandria, VA 22332-0413. IIIII

The OH-58A/D Team: Aeroscout Tactics

by 1st Lieutenant Michael Gajewski and
1st Lieutenant George Kyle

The aeroscouts of Task Force Phoenix, 4th Brigade, 1st Armored Division continue to be on the cutting edge of training in USAREUR. During recent training exercises at the Combined Arms Training Center, Hohenfels, the OH-58D and OH-58A platoons implemented new and innovative tactics using an OH-58A/D aircraft mix. The tactics are designed to enhance the employment of the OH-58D on the battlefield and allow the ground commanders maximum use of the Division's aeroscout assets.

The main purpose of the OH-58A/D mix is to allow the maximum use of the OH-58D throughout the entire Division area. 1st Armored Division currently possesses only six OH-58Ds to accomplish this mission. Since the aircraft are deployed in teams of two, the entire Division area cannot be covered with the assets on hand. The Division also has a Command and Control platoon consisting of six OH-58As. The mission of this platoon is to provide command and control aircraft for the Division command group and to provide additional reconnaissance aircraft to the Division as needed. With the OH-58A/D mix, an OH-58D is teamed with an OH-58A, thus providing six aeroscout teams to cover the Division area.

The key to success in OH-58A/D operations is rooted in the fundamentals followed by all aeroscouts. In order to demonstrate the utilization of the OH-58A/D team, we applied the fundamentals of reconnaissance and security operations.

The fundamentals of reconnaissance, as stated in FM 1-116, are:

- orient on the location or movement of the reconnaissance objective,
- report all information rapidly and accurately,
- retain freedom to maneuver,
- gain and maintain enemy contact,
- ensure maximum reconnaissance

1LT Gajewski is Platoon Leader, OH-58A, & 1LT Kyle is Platoon Leader, OH-58D, Task Force Phoenix, 4th Brigade, 1st Armored Division, APO New York.

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forces forward, and

- develop the situation rapidly.

These six fundamentals provide the foundation for all OH-58A/D reconnaissance missions.

Orient on the Location or Movement of the Reconnaissance Objective. Due to the rapidly changing battlefield, the objective of a reconnaissance is rarely a single, well defined task. With the A/D team, the OH-58D is used to recon the primary objective, while the OH-58A is used to cover secondary objectives in close proximity to its sister ship, or to provide local security while the OH-58D concentrates on the primary objective. The flexible use of the OH-58A allows the OH-58D to remain oriented on the primary recon objective. True, this could also be done using two OH-58Ds, but often, the flank security mission does not require the extensive use of the OH-58D's optics. Thus, by teaming the OH-58A with the OH-58D, the second OH-58D is freed to conduct another mission. The use of the OH-58A/D mix allows maximum dispersal of the OH-58Ds to cover the entire Division front and a wider range of missions.

Report all Information Rapidly and Accurately. The OH-58A/D team exercises this fundamental through aerial retransmission. Often, the OH-58D will be located in an observation position that blocks radio transmissions to the ground commander. In this situation, the OH-58D may not be able to relocate to a better position due to the tactical situation. A solution is to move the OH-58A so it can either perform aerial retransmission or simply pass all spot reports received from the OH-58D to the ground force commander.

Retain Freedom to Maneuver. With regards to maneuver, the OH-58A enhances employment of the OH-58D in two areas: close-in security and air-to-air security. When the OH-58D occupies an Observation Post (OP), the OH-58A can be used to cover the area behind the OH-58D, thus ensuring his maneuver space. The OH-58A can also provide air security by keeping constant watch for enemy aircraft. This lessens the OH-58D's workload, allowing it to concentrate on observation of enemy forces. The OH-58A can be deployed far forward to cover dead space or flank areas that cannot be observed by the OH-58D due to terrain, vegetation, or any other visual obstacles. Before the OH-58A moves forward, the OH-58D occupies an overwatch position and clears the OH-58A's route forward. This increases the OH-58A's survivability and enables the team to put a pair of eyes as far forward as possible.

Gain and Maintain Enemy Contact. This is by far the strongest advantage of the OH-58A/D team. Once an enemy force is located, the scout team must maintain contact in order to keep the ground commander informed or to call fires on the enemy. However, the ground commander will often require the aeroscouts to look for follow-on units or enemy flanking movements after the main body has been located. Using the OH-58A/D team, one aircraft is always left in contact with the known enemy force while the other is released to comply with the ground commander's orders. The decision to keep the OH-58A or OH-58D in contact is dependent on the situation.

As a rule of thumb, the OH-58D is used to maintain contact with the main enemy effort while the OH-58A moves to the alternate mission. For example, if the aeroscout team gains contact with an enemy recon element, the OH-58A maintains contact with the recon element while the OH-58D looks for the main body. On the other hand, if the aeroscout team establishes contact with a large enemy force and is then ordered by the ground commander to find other enemy units, the OH-58D is left in contact with the main effort while the OH-58A is broken off to find the remaining threat. This is just a rule of thumb, and is highly dependent upon the factors of METT-T (Mission, Enemy, Troops available, Terrain, and Time). The Air Mission Commander (AMC) makes the decision as to which aircraft to move, ensuring maximum utilization of the OH-58D and its optics to give the ground force commander the best information available.

Ensure Maximum Reconnaissance Forces Forward. Due to the optics of the OH-58D, it can cover areas well beyond the Forward Line of Own Troops (FLOT) while positioned behind friendly forces. However, the OH-58D cannot cover dead space masked by terrain. Due to the limited number of OH-58Ds available, and the extensive capabilities of each aircraft, it would be unwise to use this valuable asset just to cover this dead space. In order to preserve the OH-58D, it is kept back in a good observation position where it can observe across the FLOT using its optics, while the OH-58A moves forward to cover the dead space in front of the OH-58D. In conjunction with the other fundamentals, the OH-58D provides security while the OH-58A moves forward. The result is maximum recon force forward and increased survivability of the scout team.

Develop the Situation Rapidly. Once contact is established with an enemy force, the OH-58D develops the situation by calling for artillery fires using digital communication whenever possible. The OH-58A can use voice capability to call for fires, but its greatest asset is as an aeroscout looking for gaps or follow on forces while the OH-58D brings artillery fires on the known enemy. The team is also capable of employing available Close Air Support (CAS). This is enhanced by the addition of an Air Force Forward Air Controller (FAC) in the front of an OH-58A to direct the CAS.

The most common mission conducted by the OH-58A/D team is the security mission. The fundamentals of security, according to FM 1-116 are:

- orient on the main body,
- perform continuous reconnaissance,
- provide early and accurate warning,
- provide reaction time and maneuver space, and
- maintain enemy contact.

Many of these fundamentals were previously highlighted in our discussion of the fundamentals of reconnaissance, so we will elaborate only as needed.

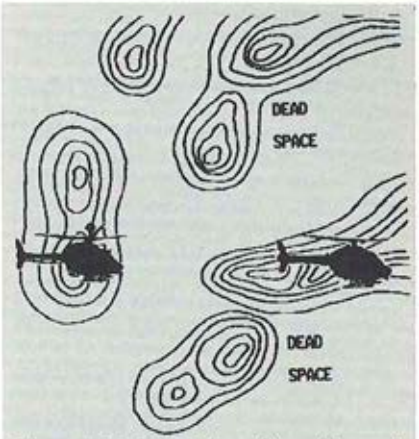


Figure 1. The OH-58A is positioned forward to cover the dead space that the OH-58D cannot observe.

Provide early and accurate warning. During security operations, the OH-58A and OH-58D work more independently in order to cover multiple avenues of approach. Placement of aircraft is based upon the factors of METT-T. Usually, the OH-58D is placed where it can cover the greatest area or the most likely avenue of approach of the enemy's main effort. The OH-58A covers the avenues of approach in terrain that does not lend itself to the OH-58D optics. This includes terrain that restricts observation and does not allow the OH-58D to use its standoff capability. This placement ensures the ground commander with the earliest possible warning of the enemy main thrust, flanking movements, and feints. As the situation develops the AMC moves the aircraft to cover the enemy advance.

Perform continuous reconnaissance. The OH-58A/D team is deployed using two teams, each with one OH-58A and one OH-58D. As the battle progresses, the teams perform a "relief on station" in order to refuel while providing constant reconnaissance.

The pairing of the OH-58A with the OH-58D enables the AMC to always have an OH-58D on station to provide continuous information to the ground force commander.

These fundamentals are utilized by the OH-58A/D team in order to conduct four general mission types: movement to contact, deliberate attack, deliberate defense, and the Joint Air Attack Team.

The movement to contact mission is the most difficult for the OH-58A/D team. Usually the ground commander's intent for the aeroscouts was to look beyond the forward edge on the friendly units' movement to provide early warning of the enemy. As a follow-on mission, the aeroscouts may be tasked to provide flank security for the movement of friendly forces. In the movement to contact phase the OH-58A is normally kept in close proximity to the OH-58D. The OH-58A provides security for the OH-58D while he covers the main movement of friendly forces. As the battle develops and enemy contact is gained, the OH-58A is released to screen the flanks as needed. After the initial enemy disposition is discovered, and ground forces make contact, the OH-58A/D team focuses on locating reinforcements and follow on forces. This mission is by far the highest risk for the team, as it often requires the team to work in front of friendly forces. During a movement to contact, the air mission commander has to protect his OH-58Ds through proper use of standoff, terrain, and security provided by the OH-58A.

The Deliberate Attack

The deliberate attack provides the OH-58A/D team with greater advantages than the movement to contact. Usually, in the deliberate attack, the enemy is relatively static, but often more difficult to detect due to their camouflaged and hull down positions. Once again, the OH-58D is the key player in this situation. The OH-58D's Thermal Imaging System (TIS) can easily detect vehicles even when they are well camouflaged or masked. The OH-58D concentrates on the friendly axis of advance, providing early warning of the enemy and calling for artillery on enemy defensive positions. The OH-58A takes on many roles during the attack. The most basic is to provide close in security for the OH-58D, watching for both air and ground threats. Depending on the distance to the objective and the terrain in which the OH-58D is working, the OH-58A may have to move to a location to relay spot reports from the OH-58D to the ground force commander. As the ground forces make contact with the enemy, the aeroscout team concentrates on locating possible counter attack forces.

The Deliberate Defense

Perhaps the best use of the OH-58A/D team is during the deliberate defense. The general concept is to put as many aeroscouts on the battlefield as possible. The OH-58A and OH-58D do not work as close together in order to cover multiple avenues of approach. The AMC needs to know what the ground commander considers the primary and secondary avenues into his sector. Usually, the OH-58Ds cover the primary avenues while the OH-58As cover flanks or secondary

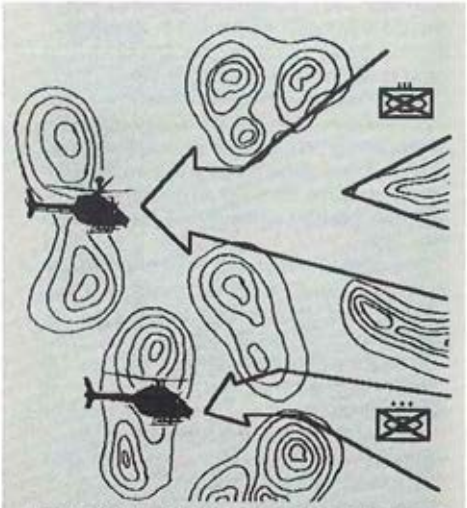


Figure 2. The OH-58D covers the main enemy avenue of approach, while the OH-58A covers the secondary avenues.

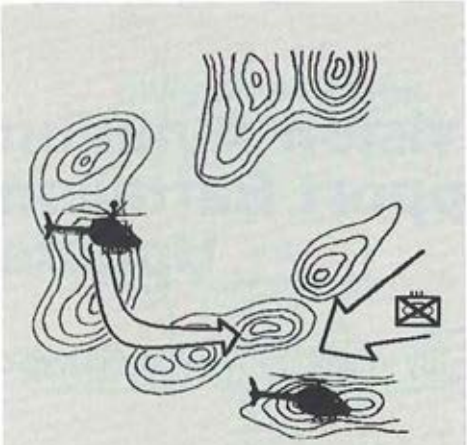


Figure 3. The OH-58A contacts a large enemy force and hands it off to the OH-58D.

avenues. The factors of METT-T are applied by the AMC in determining the placement of his aircraft. As contact is made, the air mission commander shifts his aircraft to cover the situation. If the OH-58A finds a large unit on a secondary avenue of approach, the air mission commander can move an OH-58D into position to get a better look at the enemy. If the OH-58D locates recon forces, it hands them off to an OH-58A who keeps contact and calls for interdiction fires. This prevents the small force from disrupting the friendly rear area. The OH-58D is then freed to scout for the main effort of the enemy. This concept of the "observation handoff" is the key to a successful OH-58A/D team and it should be trained as a battle drill to ensure a good handoff of enemy forces.

JAAT

The OH-58A/D team also provides a unique twist to the Joint Air Attack Team (JAAT). The OH-58D's Aerial Fire Support Officer (AFSO) provides the artillery coordination using digital communications and guidance for the Air Force aircraft with its laser designator. The OH-58A carries the Air Force FAC who issues the FAC-to-pilot brief and provides guidance to the Air Force aircraft as needed. Either the pilot of the OH-58A or the OH-58D controls the attack helicopters during the JAAT. In order for this concept to work, the Air Battle Captain must give a thorough brief to ensure that every player knows his role in the JAAT. This concept has been tested during live fire JAATs at the Army Training Center at Grafenwohr using A-10s, OH-58As, OH-58Ds, and AH-1s. The concept was even tested using OH-58As from 1AD and OH-58Ds from 3ID working together to run the JAAT. The introduction of the Air Force FAC as an aerial player provides an additional degree of control that allows the JAAT to be run with little or no prior planning.

The OH-58A/D team was tested successfully in 1AD combined arms maneuver exercise IRONSTAR 89B and is scheduled for its biggest test during REFORGER 90. The introduction of the A/D mix has enhanced the 4th "Iron Eagle" Brigade's warfighting ability and it will continue to progress in the future.

SCOUTS OUT! IIIII

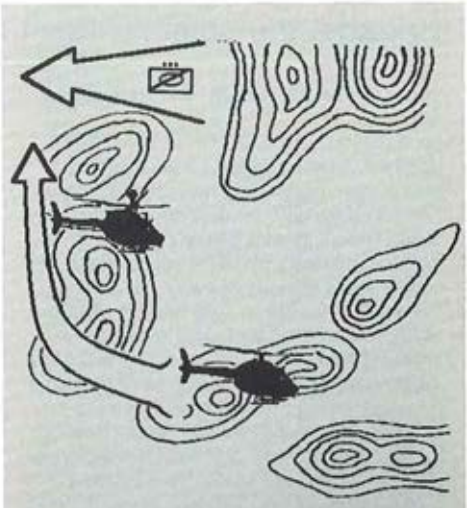


Figure 4. The OH-58D contacts a small enemy force and hands it off to the OH-58A.

Division Aviation Support Battalion Update

By Major M. Wayne Converse

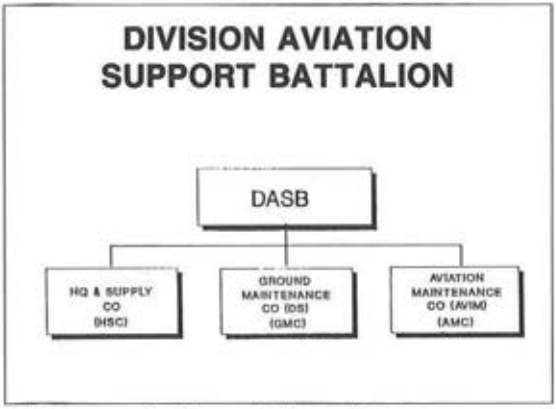
At the recent Aviation Logistics and Maintenance Commanders' Conference held at Ft. Rucker, a topic of great interest and concern surfaced regarding sustainment of the Aviation Brigade: the establishment of the Division Aviation Support Battalion (DASB). This concept, which has been approved, will soon undergo evaluation in USAREUR. I would like to update the field on what has happened and what is happening with the DASB.

In October 1987, an Aviation Logistics Study Group was formed to determine logistics initiatives which would enhance the warfighting capability of Army Aviation. Currently, the aviation commander has no dedicated support base and receives logistical sustainment on an area support basis. This ad hoc arrangement requires the commander and his staff to coordinate directly with several agencies, including the Divisional Aviation Intermediate Maintenance Company (AVIM), the Main Support Battalion (MSB), the Materiel Management Center (HHC/MMC), the Forward Support Battalion (FSB) in the brigade sectors in which he will operate, and the COSCOM (Corps Support Command) for throughput of such supplies as Class III and V. The ground commander, on the other hand, generally receives all his support from the dedicated FSB located in the brigade sector.

MAJ Converse is Chief, Organization & Personnel Systems Div, Dir. for Combat Developments, USAALS, Ft. Eustis, VA.

To correct these deficiencies, the Study Group recommended to the Army Chief of Staff (CSA) the development of the DASB. The concept was simple, an organization that would provide the aviation commander:

- A single point of contact for logistics support capable of planning, coordinating and executing all maintenance and supply operations.
- A proactive support base, able to



anticipate needs with no priority conflicts.

• A habitual support relationship, following common SOPs and providing immediate and direct response.

The DASB will consist of three companies: a Headquarters and Supply Company (HSC), a Ground Maintenance Company (GMC), and an Aircraft Maintenance Company (AMC) (AVIM).

The HSC will provide the command and control for the battalion. Additionally, it will provide for Class I, II, III, IV, & VII; coordination and movement of Class V; and consolidated mess. It will operate a JP-4 refueling site for the Command and Assault Companies, and take fuel forward to the brigade support areas to service FARP tankers. The support operations section will provide staff supervision of the Direct Support (DS) supply, DS ground maintenance and AVIM. It will coordinate with other Division and Corps elements to ensure that the logistical requirements of the Aviation Brigade are met.

Unit Maintenance

The GMC will provide consolidated unit maintenance on DASB vehicles and equipment and maintain a ground PLL (Prescribed Load List), QSS (Quick Supply Store) and TAMMS (Theatre Area Maintenance Management System) for the battalion. It will provide the Cavalry Support Team for contract maintenance on track and wheel vehicles and tank turret and armament systems. Further, it will perform DS ground vehicle maintenance for both the Aviation Brigade and the DASB. The Class IX platoon will manage the repair parts and all Class IX ground and air Authorized Stockage List (ASL) assets for the DASB.

The AMC mission remains the same as it is today, to provide AVIM on airframes, components, armament and avionics; backup recovery and retrograde of repairable equipment; backup Aviation Unit Maintenance (AVUM) support; and to provide forward support teams for repair and recovery operations forward. The basic change in AVIM structure is the transfer of the technical supply platoon and the service platoon to the GMC.

Aviation logisticians realize the current support structure for the Aviation Brigade needs fixing, and are excited about the formation of a Division Aviation Support Battalion. The major concerns to date have centered around Class III & V, Communications, and who will pay the bill to field a new battalion.

Interim Operational Concept

So where are we heading? The revised Interim Operational Concept was approved by the CG of the Logistics Center in October 1989. The TRADOC Independent Evaluation Directorate is preparing issues and criteria for the Independent Evaluation Plan, and will brief the CSA in January 1990.

The DASB is scheduled for a one year test to be conducted in USAREUR beginning in August 1990. Following this evaluation, the CSA will be briefed and a final decision made whether to field the DASB in all heavy divisions throughout the Army.

We at the U.S. Army Aviation Logistics School are staunch supporters of the Division Aviation Support Battalion concept and see it as the best way to focus the logistical support required to sustain the most mobile and lethal brigade within the division. IIIII

Army Aviation Medicine

By Colonel N. Bruce Chase

The mission of Army Aviation Medicine has always been to assist the aviation unit commander in optimal utilization of personnel while preserving flight safety.

The responsibility to help the commander protect his people, equipment, and combat capability is not taken lightly by the aviation medicine community, but the loss of experienced pilots from the cockpit due to medical disqualifications is felt by all.

The responsibility to "see inside" the aircrewmember, to look for heart disease, mental problems, and medical conditions which could threaten aviation safety (cause an accident) is one for which only the flight surgeon is trained. Other physicians, line personnel, and those untrained in Aviation Medicine commonly make serious errors in judgement when it comes to who is or is not medically fit to fly.

COL Chase is Commander, U.S. Army Aeromedical Center, Ft. Rucker, AL.

Since 1974, the recommendation to the U.S. Army Personnel Command (PERSCOM) for final determination of medical fitness for flying duty has been centralized at the U.S. Army Aeromedical Center (USAAMC) at Fort Rucker, AL. This process, along with the continual revision of the medical fitness standards for flying duty, as published in AR 40-501, has undergone major evolution over the years. From a cumbersome, manual, individual review/disposition process, the U.S. Army Aeromedical Activity (USAAMA), responsible for the daily processing of Flying Duty Medical Examinations (FDMEs) and waiver/suspense actions, has developed a highly accurate automated process.

At the USAAMA, a team of highly trained and experienced experts in Aviation Medicine reviews over 40,000 FDMEs per year. The majority are found qualified for entry into or continuance of aviation duties. Approximately 1,200 Class 2 physicals per year are medically disqualified for

continued aviation service. If all of these were permanently disqualified from aviation service, this would, of course, represent an enormous loss of experienced and expensive personnel. Fortunately, complete evaluation of these disqualified aircrew leads to an aeromedical recommendation for waiver in the majority of cases. Thus, the loss is limited to those with serious conditions, such as severe coronary artery disease, heart attacks, strokes, and psychiatric disorders. In FY89, there were 1,350 aircrew disqualified, of which 88% were actually recommended for waiver. With the exception of a few isolated cases, PERSCOM granted these waivers, thus retaining valuable aviation personnel and experience.

Another major accomplishment in conserving aviation manpower has been delegation of authority to the local level for granting temporary clearance for flying duty pending final PERSCOM waiver action. Nearly all medically disqualified aircrew who are expected to eventually be granted a waiver may be given temporary clearance for flying duty by the local flight surgeon, while those not expected to be waived, such as heart attacks and strokes, must remain suspended from flying duties unless the Commander of the U.S. Army Aeromedical Center recommends and PERSCOM grants a waiver. While the loss of these experienced personnel is regrettable, there is no alternative if flight safety is to be preserved. Accidents in other agencies which were directly and immediately due to incapacitating medical emergencies, with resultant loss of life and aircraft, clearly show that good medical standards are essential to flight safety.

A major problem in Army Aviation Medicine today is that due to budget restraints, student flight surgeons are not receiving any flight training whatsoever in the flight surgeons primary course. Thus, the graduates are leaving Fort Rucker without the requisite experience for sound aeromedical decision making. They have, at best, only a passenger's perspective on flying and do not have an understanding of the stresses encountered in the cockpit environment. While we at Fort Rucker work to re-establish flight training for flight surgeons, it is all the more important for aviation unit commanders in the field to ensure that their flight surgeon receives "stick time" so as to have some understanding of the real stress of flying. IIIII

What It Takes To Get a Soldier Trained

By Dickie Cline

The Aviation Soldier in today's Army is required not only to effectively and efficiently operate the most highly sophisticated and technically advanced weapons in the world, but to maintain them as well. In order for the soldier to receive full advantage of technological advances and attain maximum utilization from each piece of new equipment, he must be trained. Training development begins with the concept of the new equipment, before it gets to the drawing board. In order for new equipment to be supportable, an analysis is performed that considers the capabilities of the field soldier. His physical and mental capabilities, along with time and stress factors associated with mission accomplishment, must be considered. If these factors are not considered, only a small percentage of available personnel will be able to operate and/or maintain the equipment due to physical or mental aptitude. The constraints of personnel capabilities must be considered in the design of new equipment so that it can be supported by properly trained soldiers.

Mr. Cline is with the New Equipment Training Div., U.S. Army AVSCOM, St. Louis, MO.

Training is an integral part of the materiel acquisition process. It takes more than five years of development and a lot of teamwork to ensure the new equipment can survive battlefield conditions. The materiel acquisition process is a sequence of events and decisions leading to effective fielding of fully supportable weapons systems that are responsive to validated Army requirements. The process is initiated with the identification of a need and extended through successful completion of the development, production, and deployment of the system. A concept of what the Army must do on the battlefield determines future Army requirements. The approval of these requirements is based upon future Army needs, resolving present deficiencies in

battlefield capabilities, current and future mission requirements, current and projected worldwide threat, historical experiences, and technological forecasts. The Army goal is a balance among readiness, modernization, sustainability, and force design. A viable, quality training program is one of the primary methods of achieving this goal. Without properly trained personnel, the unit readiness rate will be low and sustainment of the new equipment will be nonexistent. The AVSCOM Directorate for Maintenance, New Equipment Training (NET) Division's mission is to provide ample high quality training for the initial transfer of knowledge from the designer/producer to qualified tester, trainer, and user personnel.

Genesis of Training

When the concept evolves into a workable prototype, the Army tests the new equipment to determine if it meets all the required operating capabilities. Before testing can begin, the test player personnel must be trained. The AVSCOM NET personnel, teaming with contractor personnel, develop the best training program possible working within mandated constraints of budget, resources, and manpower.

A course to train personnel in the operation and maintenance of the prototype is the start of most Army testing programs. Hardware testing is usually two fold; it tests the hardware and the training program. When deficiencies are noted, the question must be asked, did it fail due to hardware failure or from a training failure due to lack of proper instructions in maintenance and/or operation of the equipment?

When all deficiencies are eliminated, the equipment then transitions into the production/deployment phase of the life cycle. In the production/deployment phase, a production contract for the new equipment is awarded and prototype training is upgraded to the production configuration by the contractor.

All changes and improvements made to the new equipment as a result of testing are incorporated into the training package and prepared for use by TRADOC resident schools and New Equipment Training Teams (NETT). Prior to delivery of the first production item, the contractor finalizes the training package and presents the course to key personnel and instructors. The personnel attending this training are TRADOC resident school instructors and NETT instructors. A worldwide distribution plan is prepared based upon the quantity produced and unit priority. As the new equipment rolls off the assembly line, the NETT is deployed with the equipment to train the receiving units. The NETT trains Army users until TRADOC resident schools can produce enough qualified personnel to effectively and efficiently operate and maintain the new equipment. The Army's goal for NETT deployment is one year. However, due to the complexity of new weapons systems, NETTs are deployed until TRADOC can produce enough school trained soldiers to fill the basic needs of the receiving unit, typically for two+ years.

New Methods

Due to the technically advanced, highly complicated equipment being procured, new innovative methods of instruction and training aids/devices are required. A wide variety of electronic training devices are being developed to aid in the maintenance and operating instructions for new equipment which include power plants, power trains, electrical, pneumatic, and hydraulic systems. These training devices range from panel trainers that show fluid flow in a hydraulic system to full motion flight simulators. The state-of-the-art device, which is being developed and procured today, is the interactive video system. With this system, students sit in front of a dual video screen system where they see and hear instruction on one screen and touch a component on a schematic diagram or picture of the equipment on the other to record their response.

The NET personnel are aware of training problems in the field environment and are up to date in the latest technical advances in instruction methods and training devices available. They strive to provide the Army with the highest quality, dynamic training

(Soldier — continued on page 63)

The Aviator's and Mechanic's Engine

By Lt. Colonel Arnold E. (Sandy) Weand, Jr.

The previous T800 article I wrote took you through the final source selection of LHTEC as the winner for the Army's premier Light Helicopter Program engine competition. LHTEC is the acronym for the Light Helicopter Turbine Engine Company, comprised of Garrett Turbine Engine Division of Allied Signal Aerospace Company and Allison Gas Turbine Division of General Motors. LHTEC was selected by the Army after three years of intense competition, because of their aggressive and successful test program during the Preliminary Flight Rating (PFR) phase, and their extensive commitments and guarantees for the remaining portion of the T800 program.

The LHTEC T800 engine meets or exceeds all of the Army requirements.

LTC Weand is Asst. Program Manager, T800 Engine, LHX-PMO, St. Louis, MO.

Engine performance can best be characterized by power ratings, fuel consumption and acceleration time. The T800 engine exceeds Army goals for contingency, maximum, and intermediate power ratings at sea level standard days. Specific fuel consumption is less than the Army's maximum allowable. Also, the T800 meets the acceleration requirement of three seconds from no load to maximum power. Figure 1 shows the power requirements for the T800 engine.

The engine is designed for maintainability. Its modular design and line replaceable units ensure all user tasks (repair by remove and replace) can be accomplished with six common hand tools in well under the 15 minutes required. The average time to repair over 90 percent of the 51 line replaceable units is less than five minutes. The four core modules can be removed and replaced in less than 60 minutes.

Two maintainability demonstrations verified acceptable repair times under worst case conditions, MOPP and Arctic clothing. Figure 2 shows the influence of MANPRINT

FIGURE 1: T800 POWER RATINGS

RATING	SHAFT HORSEPOWER	LIMIT	NOTES
EMERGENCY	1552		NOT AN ACTUAL RATING, BUT A CAPABILITY. IF THERE IS ROTOR DROOP WHILE PULLING CONTINGENCY POWER, THE ENGINE WILL AUTOMATICALLY OVERIDE THE TEMPERATURE LIMITER THUS ALLOWING EMERGENCY POWER. WE THROW THE ENGINE AWAY AFTER THIS ONE.
CONTINGENCY	1382	2.5 MINUTES	FOR USE IN CRITICAL ONE-ENGINE-OUT (OEI) SITUATIONS SUCH AS AT MAX GROSS WEIGHT, DURING NOE FLIGHT.
MAXIMUM	1322	10 MINUTES	FOR USE IN EXTREME COMBAT SITUATIONS OR COMBAT TRAINING SITUATIONS WHERE EXTRA POWER IS NEEDED FOR MANEUVERING.
INTERMEDIATE	1233	30 MINUTES	FOR USE IN COMBAT OR SIMULATED COMBAT SITUATIONS.
MAXIMUM CONTINUOUS	1027	NO LIMIT	SUFFICIENT POWER FOR ALL FLIGHT CONDITIONS. THE RATING NORMALLY USED TO INGRESS TO OR EGRESS FROM THE MAIN BATTLE AREA, COVERING FORCE AREA OR DURING DEEP ATTACKS.
75% MAX CON	770	NO LIMIT	SUFFICIENT POWER FOR MOST FLIGHT CONDITIONS AND AIRCRAFT MISSION GROSS WEIGHTS. THIS RATING IS SLIGHTLY ABOVE THE BEST FUEL CONSUMPTION RATING.

on the design of the T800 engine.

Producibility is insured by a minimum of two sources for all parts, the extensive use of standard military hardware, and the transfer of technology within the team. Additionally, LHTEC will underwrite all facilitization and tooling at no cost to the Government. These actions ensure the T800 can be produced for many years to come at a stable and affordable cost.

Cost can be broken into two main categories, procurement, and Operation and Support (O&S). The T800 engine average Design To Cost (DTC) is Not To Exceed (NTE) $245,000 (in fiscal year 85 dollars) for the 5000 engine buy. Additionally, each lot (one year's buy) has a NTE guaranteed DTC. The contract contains mechanics for extending the benefits of commercial and other non LHX sales to the Army during the initial two lots (traditionally the most expensive). O&S costs are guaranteed NTE an average of

(T800 — continued on page 63)

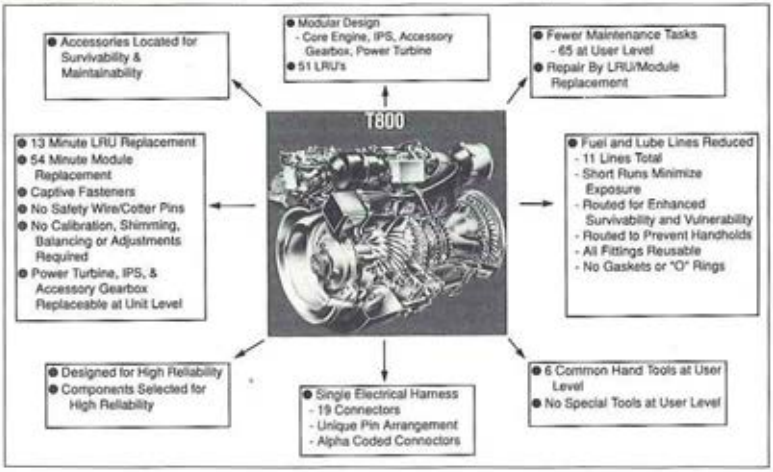


FIGURE 2: LHX♦T800 DESIGNED FOR MAINTAINABILITY

Army Aviation and the War on Drugs

By Colonel Michael H. Abbott

If your unit has been told to begin planning for potential aviation support of counterdrug operations, you may be one of a growing number of units already developing plans or currently providing active support in this arena. Army Aviation has been involved in counterdrug operations since 1985 when UH-60 BLACK HAWKs began conducting interdiction/interception missions in the Caribbean from bases in the Bahamas. These missions were primarily oriented against general aviation aircraft transporting illegal drugs through the Caribbean into the southeastern U.S. Known as "Hat Trick," this mission continues today.

In 1986, six UH-60s from Panama deployed to Bolivia under what was called "Operation Blast Furnace." For a four-month period, these BLACK HAWKs transported special Bolivian police forces and U.S. Drug Enforcement Agency agents to suspected cocaine production laboratories to search, seize, apprehend, and destroy the means of producing cocaine.

COL Abbott is Director, Dir. of Evaluation and Standardization, USAAVNC, Ft. Rucker, AL.

Today, at least two-thirds of our states have contingency missions developed for their National Guard aviation assets to support various law enforcement agencies (DEA, U.S. Customs & Immigrations, FBI, and local police forces) in counterdrug operations. Many of these states are currently conducting such operations.

Varied Missions

Missions are varied, but generally fall into one of the following categories.

- Interdiction/interception of drug traffickers and/or their illegal cargo while being transported to or within U.S. borders.
- Insertion of police forces into suspected or known locations used or occupied by drug traffickers.
- Observation/surveillance of activities or

locations.

• Reconnaissance of vast areas in search of marijuana fields.

Most of the missions are closely aligned with similar combat mission capabilities of TO&E aviation units. As such, the Aircrew Training Manuals (ATMs) currently available to units appear to provide adequate tasks, conditions, and standards to meet most mission requirements. In some units, tasks are being performed which are not in an ATM, and units have developed their own 3000-series tasks as provided for in the "Commander's Guide," TC 1-210. In still

OPERATION *"BLAST FURNACE"*

UH-60A BLACK HAWKs from the 210th Aviation Battalion begin their mission to find and destroy a cocaine factory in the lowlands of Bolivia.

Troops disembark at the site of the factory, north of the Bolivian town of Trinidad.

American troops from the 210th, having found the factory recently deserted, discuss the disposition of the seized drug paraphenalia.

The inside of the Bolivian drug factory. Note the 55-gallon drums holding chemicals (ether and acetone) that are used in the distillation of the coca plant into pure cocaine.

ARNG and the War on Drugs

Drug enforcement operations by assets of the Army National Guard (ARNG) increased dramatically during the Eighties. In 1983, only four states utilized ARNG assets for a total of four missions.

Drug operation statistics for FY89 show the depth of involvement by the ARNG. There were 53 states/territories conducting operations with the ARNG, up from 32 states in FY 88. A total of 1,811 missions were flown, representing 107,348 man-days performed by over 1,000 ARNG members.

ARNG support missions now center on interdiction of illicit drugs entering the U.S. and the eradication of domestically grown marijuana. This support is accomplished through observation and reporting, air/ground transportation, loans of specialized equipment, radar support, aerial imaging and commercial cargo inspection.

As a result of joint DEA/ARNG efforts, a total of 727,000 marijuana plants and 77 tons of processed marijuana were confiscated. The estimated street value of this marijuana was $1,250,000,000. Cocaine seizures totalled 2,270 pounds, valued at over $50,000,000. The accumulated total drugs seized were valued at $1.3 *billion* dollars!

Examples of Missions During FY89

Cargo Inspection	**21 States**
Rotary Aviation Support	**48 States**
Aerial Reconnaissance	
Aerial Surveillance	
Transportation of Law Officers/Seized Contraband	
Ground Support Operations	**20 States**
Reconnaissance for Marijuana	
Surveillance of Entry Points	
Transportation of Law Officers/Seized Contraband	
Imagery Recon and Analysis	**10 States**
OV-1D Flights	
RF-4C Flights	
Radar Operations	**13 States**
Drug Operations Training	**53 States**

other instances, the tasks being performed are described in an appropriate ATM, but the conditions under which they are performed are different.

Any aviation unit involved in any type of counterdrug support operations is encouraged to write to USAAVNC and to let us know how we can assist. We are particularly interested in feedback concerning 3000-series tasks which you may have developed so that they might be reviewed for possible inclusion in future ATM updates as 2000-series tasks. The proponent for ATM's is the Aviation Training Brigade (ATZQ-ATB-O). Operational feedback is also important to the Department of Combined Arms Tactics (ATZQ-CAT-DD) so that it might be reviewed for consideration during the development of doctrinal publications.

The success of any aviation mission is highly dependent upon the detail and thoroughness of the planning that precedes its execution as well as the establishment and use of standardized procedures. This is particularly important for Army Aviation units supporting counterdrug operations because they usually involve working with personnel who may have little or no experience with Army personnel or Army helicopters and their capabilities. A clear understanding of each other's organization, personnel, equipment, capabilities, and purpose is an essential first step prior to even beginning the planning for any joint venture in this arena. IIIII

AIR TRAFFIC CONTROL:

AIRSPACE MANAGEMENT

BY COLONEL MELVIN J. McLEMORE

FORT RUCKER, AL — You may have heard the terms "airspace management", "flight following", and "procedural control" bantered about lately. The discussion is typically about planning for the management of airspace.

Why a plan? The Chief of Staff of the Army directed commanders to institute essential control measures and procedures to effectively and safely synchronize the users in the airspace. To comply with this directive army wide, the Department of Army, Deputy Chief of Staff for Operations, outlined the basic requirements in DA message dated 4 August 1989, subject: Airspace Management in Cantonment Areas, Training Areas, and Ranges. The U.S. Army Air Traffic Control Activity, in coordination with the Major Army Commands (MACOMs) and installations developed a generic plan to reduce the potential for conflict among airspace users. This plan also established the procedures and measures required to resolve or minimize the potential for such conflicts.

The basic concept for airspace management in the aforementioned areas incorporates the principles outlined in Field Manual 100-103, Army Airspace Command and Control in a Combat Zone. Bear in mind, the procedures within this plan are not intended as an extension of any host country procedures or Federal Aviation Administration (FAA) system in the National Airspace System (NAS). It is emphasized, aviators must still comply with all FAA or host country regulations and participation in their local airspace management plan does not relieve the aviator of his see and avoid responsibility.

The installation's airspace management plan should be specific, addressing unique needs. It may be accomplished by implementing a formal Army Flight Following Service (AFFS), or utilizing stringent procedural control measures or a combination of both. It is imperative the installation develop an Air Route System (ARS) to move the aircraft safely from base (cantonment) to training areas and back. Additionally, ranges and training areas must be subdivided and scheduled for particular events just like the old rifle and pistol ranges we are familiar with. In this case, we may be talking about night vision operations in multi-ship formation or Joint Air Attack Team (JAAT) operations with A-10s, helicopters, and ground forces. This requires detailed coordination, planning, and scheduling. It may necessitate the establishment of an Army Airspace Command and Control type cell. At a minimum, the installation's G3 or Directorate of Plans and Training, Air Traffic and Airspace (AT&A) officer, air traffic control, and using units should be key players in this planning cell.

COL McLemore is the Director of the U.S. Army Air Traffic Control Activity, Ft. Rucker, AL.

In addition to actions previously mentioned, other detailed functions include the establishment of flight corridors, routes, and "free play" training areas for realistic mission training. These free play training areas should be numbered, lettered or named and depicted on installation and aviator maps. They should be scheduled in advance for specific unit training requirements. The installation's plan is an active system and commanders at all levels must ensure active participation by all aviators. Those participating at their discretion create a serious potential for conflict.

The airspace management measures at each installation are approved by their respective MACOM and reviewed during scheduled major command Aviation Resource Management Surveys (ARMS) evaluations. (The feedback thus far: installations are enthusiastically developing their plans, implementing where possible and are seeking ways to improve their systems.)

In summary, a detailed airspace concept/plan and procedures with a centralized local Army Airspace Command and Control cell with published guidance will provide a safe and effective training area. It will allow using units and commanders to conduct realistic training in the airspace, regardless of its size or complexity. Air Assault. IIIII

TEST & EVALUATION:

LHX: A NEW TESTING APPROACH

BY CHARLES A. BLOCK

FORT RUCKER, AL — As 1990 dawns, the personnel at the U.S. Army Aviation Development Test Activity (USAAVNDTA) are turning their full attention to the LHX. In 1989 we were actively involved in the test planning phase for LHX but were looking forward to seeing breadboard, brassboard, and full-scale mockups of the two competitive designs, being produced during the Demonstration/Validation phase (DEM/VAL). The DEM/VAL phase of LHX will culminate in a one-week assessment of each development team's full-mission simulation. The two contractor teams involved are identified as the First Team, consisting of Boeing and Sikorsky, and the Super Team, composed of McDonnell Douglas and Bell. The data we collect during a one-week assessment should prove invaluable to not only the Program Manager but also to the Source Selection Evaluation Board, Army Materiel Systems Analysis Agency, and Operational Test and Evaluation Agency.

SAT

In March of 1989, the Program Manager for LHX approved a charter for a Simulation Assessment Team (SAT) whose purpose is to provide a management structure under which technical and operational members will conduct a coordinated assessment of each contractor's full-mission simulation. On the technical side, the USAAVNDTA was designated as a primary member and assigned two of the 11 technical issues that will be addressed during this phase of the program. Our two issues relate to human factors/safety and systems integration. This does not sound significantly different from what we have done on other systems such as the AH-64, UH-60, and OH-58D, but it is. For those systems, we had flying prototypes to assess. For this phase of LHX development, we will have a simulator, mockups, and brassboard models instead of actual aircraft. Our challenge is to make sense out of what we see as it relates to three questions:

- Does the system being demonstrated in full-mission simulation represent the system being proposed for Full-Scale Development (FSD)?
- Does the system being demonstrated in full-mission simulation display the performance characteristics that have been demonstrated in mockup or brassboard demonstrations?
- If the simulation does not represent the FSD proposed system and/or what has been demonstrated during mockups or brass-board demonstrations, is it a reasonable replica of what technology of the early 1990's is capable of producing?

Mr. Block is the LHX Test Coordinator, U.S. Army Aviation Development Test Activity, Ft. Rucker, AL.

The answer to these questions will go a long way in identifying strengths and weaknesses in each team's proposal. The techniques we will use are not new to the test community. They are the same as is any test (observe, record, and analyze the results). The difference is that we do not have a specification against which we can assess nor do we have hardware that can be exercised.

The Assessment

We will begin the assessment by witnessing demonstrations and mockups. We will record the results of these demonstrations for future reference. The next step is to ascertain what models will be used in computations that represent system performance. These models will be compared to the results of the demonstrations and assessed to see if the simulation model correlates with the demonstration. The results of these comparisons will also be recorded. We will then review the FSD proposals to determine what is being claimed for the full-scale systems and see if the models and demonstration results agree with the proposal data. The final determination will be to assign a technical rating to the item being assessed as it relates to simulator fidelity, modeling, and FSD representation. The resultant ratings will be applied to sensors, targeting, weapons controls and displays, handling qualities, survivability equipment, threat per-

(Testing — cont. on page 63)

AIR TRAFFIC CONTROL:

THE NATIONAL AIRSPACE SYSTEM

BY COLONEL WILLIAM F. DISMUKES

ALEXANDRIA, VA — The National Airspace System Plan, as developed by the FAA, has grown in such magnitude that the current Administrator directed a name change to that of *"The Federal Aviation Administration's (FAA) Capital Investment Program."* Department of Defense (DoD) will take out its portion of the current NAS plan and fully integrate its separate chapter into the various chapters within this new plan, thus completing the full integration of DoD into the modernization efforts. The FAA and DoD have long recognized the need to provide modernized air traffic control facilities that support military as well as civilian aircraft. These facilities must remain transparent to all users and, yet, provide unique services to military aircraft.

An Acquisition Decision Memorandum signed by the Under Secretary of Defense for Acquisition on 11 October 1989 directed the services to conduct cost benefit analyses and tradeoff studies and to develop initial specifications. This includes continued definition of the Military Airspace Management System (MAMS) to assure the future interoperability of DoD systems in the NAS.

The Secretary of Defense for acquisition designated the U.S. Air Force as the lead military service overseeing the NAS, and they will establish a Joint Procurement Office at Hanscom Air Force Base with a liaison office in the Washington D.C. area. The Air Force will fund for all NAS R&D efforts after FY91. Each separate service will be required to fund their proportionate share of the equipment procurement beginning in FY94. All services are currently redefining and submitting funding documents to support this modernization. The program will compete for critical dollars during "shrinking" budget years, possibly resulting in scaled down systems. In this light, all three services could experience funding difficulties.

The vital need for the U.S. Army to maintain interoperability with the FAA is evident, as the FAA continues to modernize air traffic control facilities. As the Army continues to train the fighting force, advances in avionics will require us to update our navigation and landing systems with the state-of-the-art devices planned for the future such as digital systems. These systems are emerging daily and old analog systems will have to be replaced. As such, DoD has developed its policy to replace ILS/PAR precision systems with GPS and MLS architecture. When new systems become fully operational, DoD will decommission current systems such as VOR/DME, LORAN-C, OMEGA, TACAN and NDB's.

COL Dismukes is Director, U.S. Army Aeronautical Services Office, Cameron Station, Alexandria, VA.

Another critical aspect of this modernization effort is the protection of the Special Use Airspace (SUA) in which we do considerable training and testing of future weapon systems. The Military Airspace Management System, a computer based system under design, will insure interoperability with the FAA and allow for better scheduling and utilization of airspace. In the past, DoD has taken some undeserved criticism for our utilization of Special Use Airspace. As MAMS becomes operational, all DoD agencies will provide data on scheduling time of this critical asset, and (during unscheduled times) allow for the return of airspace to FAA-controlling agencies for civil use. Full cooperation in this effort will reap rewards for all civil and military users.

The USA Air Traffic Control Activity is in the final stages of defining the Army's portion of the modernization effort — the activity will present this effort to the Deputy Chief of Staff for Operations for validation. The Director of Combat Developments at Ft. Rucker has the responsibility to outline the avionics GPS/MLS requirements. Once validated, financing this effort begins and will continue into the next decade. The U.S. Army cannot afford for this modernization effort to pass us. We must have the capability to interoperate within the system if we expect to train for worldwide deployment. IIIII

MAINTENANCE:

CCAD: A LEADER IN AVIATION REPAIR

BY COLONEL EDWARD A. SHANNON

CORPUS CHRISTI, TX — Since its inception in 1961, the Corpus Christi Army Depot has played a significant role in the overhaul and repair of rotary wing aircraft. During its 28-year history, the depot has returned in like-new condition more than 12,000 aircraft, 66,000 engines, and 1.2 million components to its thousands of customers worldwide. Besides keeping the active Army's aeronautical fleet combat ready, the depot has provided maintenance support to the Air Force, Navy, and Marine units, as well as most of the friendly foreign governments that use U.S. built rotary wing aircraft.

Providing Quick Response

An important part of the depot's maintenance and service support mission is to dispatch quick response maintenance and product assurance teams to on-site field locations. These teams are tailored to fit the service to be performed and have included aircraft crash investigations, natural disaster emergencies, assembly of new aircraft, maintenance and repair, new equipment training, to name just a few of the services. Last year alone, the depot made over 150 field trips to over 20 countries which netted the government over $25 million in cost avoidance, not to mention the improved readiness posture of the units in the field.

In recent months, the world has focused its attention on the unprecedented democratization in Eastern Europe with associated implications for troop and other military support reductions. While Eastern Europe is tearing down barriers, the China mainland, Central America and other Third World Countries appear to be solidifying their philosophical differences with the West.

Fleet Maintenance

The threat may shift, but the need to maintain a viable helicopter fleet in all the services remains evident. Therefore, the Corpus Christi Army Depot is fully committed to providing the quality workmanship and services in the future that have been its trademark in the past. The depot 10-year master plan calls for modernizing its facilities and equipment in an effort to keep pace with new modern aircraft systems like the APACHE and LHX and the upgrade of others, like the OH-58D and CH-47D models.

Training the Trainers

To maintain the competitive edge in providing quality service at the lowest price, the depot maintains a comprehensive training program to allow the work force to keep current on new systems. In addition, our highly skilled work force trains over 2,000 National Guardsmen, reservists, and active duty personnel annually. This type of training is essential to maintain a well-trained reserve base in the event mobilization becomes necessary. The depot currently operates at approximately 55% of its total war-time capacity to rebuild 700 aircraft, 6,000 engines, and 100,000 components annually. Therefore, the depot has the industrial base in place to expand to an around-the-clock, seven days a week operation if the need arises.

COL Shannon is Depot Commander, Corpus Christi Army Depot, Corpus Christi, TX.

Commitment to Excellence

The 4,300 depot employees are fully committed to providing the best maintenance support possible in terms of quality products and services, reaction response time and technical assistance. The depot continually seeks innovative ways to achieve Total Quality Management (TQM) throughout the work force. The success of the TQM program is measured largely as a result of direct feedback from the customers that use our products and services around the world. All suggestions are carefully reviewed and many are implemented.

New Operating Hours

Starting 16 January 1990, the depot initiated a one-year test program that requires its employees to work 10 hours a day from 0645-1715 hours, four

days a week (Monday through Thursday). Total productivity is expected to increase with fewer distractions, less sick leave usage, improved morale, and more actual quality time on the job. Weekends and holidays will be handled in the same manner as in the past with on-call personnel.

Studies show that the depot should reduce its overall operating budget by $1.2 million annually. Quality service and assistance to our customers will continue to be our highest priority.

Conclusions

The threat to our national security may be changing faces, but it is a long way from being eliminated. Just ask the drug lords in Colombia, Ortega in Nicaragua, Castro in Cuba, terrorist leaders in the Middle East, the communist rebels in the Philippines, El Salvador or the Marxists in China. They will tell us the threat is alive and well. This is a strong indication that U.S. Army Aviation must keep pace with this threat and be ready to respond. It is also a clear indication that the demand for U.S. helicopters from foreign governments will continue through the 1990s.

If these indicators prove true, then the only active Army depot dedicated to the maintenance and repair of helicopters stands ready to meet the challenge. The depot maintains a solid industrial base with manufacturing capability and with our focus on the future, we will be able to handle a wide range of missions well into the 21st Century.

Corpus Christi Army Depot: Our Products Reflect Our Pride.

Corpus Christi Army Depot

TEST & EVALUATION:

USAAVNDTA UPDATE

BY COLONEL TROY E. BURROW

FORT RUCKER, AL — During 1989 the U.S. Army Aviation Development Test Activity continued a high tempo of test operations. Our technical test mission remains unchanged. We are the U.S. Army Test and Evaluation Command's (TECOM) test center responsible for technical aviation testing. We are colocated with the Army Aviation Center at Fort Rucker which enhances our ability to conduct complex tests at a minimum cost. Our testing includes everything from product improvements on existing helicopters to tests of entirely new aircraft such as the LHX.

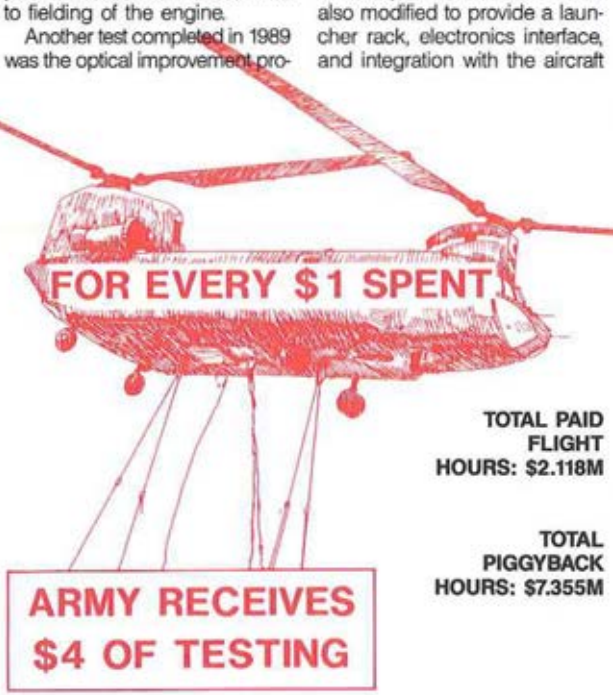
In 1989 we continued our lead-the-fleet program on the AH-64A, UH-60A, AH-1F, and CH-47D helicopters. This program provides for accelerated flying hours at approximately four times the fleet rate on these aircraft to allow early problem identification and confirm attendant fixes. In addition, the lead-the-fleet program provides paid flying hours for other tests. This results in $4 of flight testing for every $1 spent.

Our testing focuses on not only new aviation equipment, but also modernization of existing aircraft. One of these tests was the recent first article test of the T700-GE-701C engine for the UH-60 BLACK HAWK Helicopter. The installation of this engine results in the change in designation of the helicopter from UH-60A to UH-60L. Our testing focused on safety, human factors, logistics supportability, system performance, and training. The positive results from the test led to fielding of the engine.

Another test completed in 1989 was the optical improvement program in the AH-64A APACHE Helicopter. This product improvement provides upgrades to TADS direct-view optics, day television sensor, and forward-looking infrared sensor. The testing consisted of HFE, safety, and a series of detection and recognition trials. The results of the detection/recognition trials were compared to baseline system performance. The results were positive.

This test center also is involved in weapons testing. An example is the Air-to-Air STINGER test that was accomplished during the past year. The system under test was a basic shoulder-fired STINGER missile that has been modified to allow launching from a helicopter. The APACHE was also modified to provide a launcher rack, electronics interface, and integration with the aircraft

COL Burrow is Commander, U.S. Army Aviation Development Test Activity Ft. Rucker, AL.



symbology. In this test we look specifically at the effect of the addition of the weapon on the aircraft performance. The test was a success in that the anomalies identified led to solutions that can be incorporated into the production system.

AGES II

The further diversity of our testing is exemplified in the ongoing test involvement with the Air-Ground Engagement Simulation (AGES II) system. This training device is an addition to the AGES air defense system. It is used in conjunction with the Multiple Integrated Laser Engagement System (MILES) and provides for realistic offensive and defensive training by Army Aviation. Our current effort consists of testing the new kits for the UH-60A, CH-47D, OH-58D, and AH-64A. To date we have completed tests on the UH-60A and CH-47D. We are now testing the OH-58D and expect to test the AH-64 installation in 1990.

"Grisly Hunter"

Another, somewhat unusual, test effort we have been involved in is the "Grisly Hunter" program which is sponsored by the Program Executive Officer, Intelligence and Electronic Warfare. Our effort includes testing off-the-shelf infrared sensor packages installed in commercially available aircraft. This effort is in direct support of the President's war on drugs.

The high level of technical expertise, dedication to quality, and our colocation with the Army Aviation Center will allow us to continue the high pace of operation into the 1990's. Our goal is to ensure that Army Aviation is equipped with the very best in aviation systems.IIIII

OPERATIONS:

'WINGS OF THE MARNE'

BY COLONEL ALBERT J. FERREA

APO NEW YORK — The "Wings of the Marne" Brigade of the 3d Infantry Division closes Fiscal Year 90 safely with solid accomplishments in training. The Brigade flew 19,807 accident free hours. Gunnery and maneuver training were completed at Grafenwohr Training Area (GTA) and Hohenfels (Combat Maneuver Training Center - CMTC) respectively. The Brigade completed two successful gunnerys at Grafenwohr. Crews and companies received a demanding qualification test. Tables established under the guidelines of FM 1-140 and the 7th Army Training Command were scored to exacting standards by a Brigade team.

CMTC

At CMTC, the Brigade employed Attack Helicopter Companies and Air Cavalry Troops individually under the control of the squadron/battalion. Attack Helicopter Companies were employed in a three-five mix and maneuvered to fight with the ground Brigade. For the first time at CMTC, the Cavalry Squadron conducted reconnaissance forward of the task force undergoing training. The Air Cavalry Troops were required to move in predawn hours with night vision goggles to gain advantageous positions for the morning operations. Experiences have reinforced the requirement to strip away all OPFOR reconnaissance before it makes contact with the main body. Because of the possibility of friendly ground fire, effective airspace control measures are required across the Division area. The OH-58Ds were employed at CMTC with great success. Their ability to acquire targets and conduct reconnaissance, regardless of ambient light is a tremendous asset to the Brigade. Additionally during the past year, the Brigade received a number of external readiness tests.

Fiscal Year 90 brings changes and challenges to the Brigade. New equipment is scheduled for fielding throughout the year. The Brigade returns twice to both the GTA and the CMTC at Hohenfels. Additionally, the Brigade continues the push to create a recognized TOE unit from the General Support and Combat Support Companies. This Aviation Task Force operates as a battalion.

REFORGER dominates the 2d quarter calendar. The Brigade is involved from all perspectives. The "Wings of the Marne" Brigade is the sponsor to the 10th Mountain Division. Most of the aviation support for the Joint Visitor Bureau will be performed by Brigade aircraft. Also the 4th Brigade along with other Brigades of the Marne Division provides umpire support for REFORGER 90. Additionally in the 2d Quarter, the 3d Squadron 4th Cavalry returns to the International German Border (IGB) for duty.

COL Ferrea is Commander of the 4th Aviation Brigade, 3d Infantry Division, APO New York.

The 3d Quarter leads the Brigade back to Grafenwohr and CMTC. At CMTC, one Attack Battalion, the Task Force and the Cavalry Squadron will undergo an external evaluation. At GTA gunnery, the Brigade will fire crew and company gunnery tables as well as combined live fire exercises on Range 301.

New Equipment Training

In the 4th Quarter, the Brigade receives and undergoes New Equipment Training (NET) for Air-to-Air STINGERs and returns to GTA for gunnery. Toward the close of the fiscal year, the Brigade deactivates one AH-1 COBRA equipped battalion and prepares to receive its AH-64 APACHE battalion replacement.

The "Wings of the Marne" Brigade continues to strive for excellence and remain above the best. Training opportunities exist with REFORGER, GTA, CMTC, and the new equipment fielding of the AH-64s and the Air-to-Air STINGERs. Training, maintaining, refitting and the caring for our soldiers rounds out the schedule for the year.

The Brigade continues to prepare for reconnaissance, security, and our primary mission to "Kill Tanks". IIIII

PEO
(continued from page 13)

and fly more aggressive maneuvers? Have we been designing too close to the margins? Does it make sense to put so much emphasis on aircraft performance (lightweight) to the detriment of maintainability, reliability, and cost? Where should we be going with our future aircraft designs?

We should take into consideration our experiences with the 1970's design vintage aircraft such as UH-60, AH-64, CH-47D, AH-1, and the AHIP. We should learn that weight is a critical parameter to be considered all the way through a program, from inception to retirement. Lighter is not necessarily cheaper. It costs to use exotic materials and to lighten structure. If your cost is fixed, your power available fixed, your aircraft performance fixed, your size driven by other factors, why control weight? Maybe we should design a little heavier so we can yield a longer life more durable aircraft for the long haul. We should plan adequate testing up-front and stick to that plan to test the durability of the product. We should not trade off the critical testing when the PM runs low on money. This all leads me to say, "let's not do it again; let's consider durability and reliability when we trade-off weight". The future of Army Aviation over the next few years of reduced budgets will mean that we have to be smarter with less and we will succeed. IIIII

T800
(continued from page 51)

$70.50 per engine operating hour for the life of the engine fleet. It is a solid guarantee, with predetermined mechanics which provide for easy administration and payment terms which preclude complex after the fact reconciliation. To ensure operational availability, LHTEC has committed to redesign, re-test, and requalify, any part not meeting RAM guarantees, and to retrofit all engines and replace all spares at no cost to the Government.

In summary, even the casual observer can see the benefits of the T800 program and acquisition approach. Through competition and a hands-off approach to development, the Army was able to attain unprecedented engine guarantees and commitments. The T800 engine will go down in history as one of the best bargains procured for the American taxpayer, certainly a user friendly and easily maintainable engine, and a proven performer. IIIII

Soldier
(continued from page 49)

programs available anywhere in the world. Proper training for our soldiers is essential to their survival and to the mission accomplishment. Our soldiers need the best training we can provide to enable them to effectively and efficiently fight with complex, highly sophisticated weapons systems. Training may be highly complex and expensive, however, the end result is a piece of equipment that if operated and maintained properly, is supportable and can counter any offensive, on any battlefield, at any time. IIIII

Testing
(continued from page 56)

formance, communications, navigation, and pilot vehicle interface. The end result will be a realistic assessment of demonstrated (not claimed) performance. The ratings assigned by USAAVNDTA and other technical group members will also be applied to operational Measures of Performance (MOP). This will provide OTEA with operational insights that would otherwise be unavailable. For the technical community, the simulation assessment also provides an early look at what they can expect to see during FSD.

We will provide the foundation for future LHX testing. The spirit of cooperation and sharing of data will continue into FSD and should ease the task of conducting a follow-on coordinated technical/user test.

The approach being taken with LHX is obviously not "business as usual." The USAAVNDTA is proud to be a principal member of the LHX team. IIIII

AAMP
(continued from page 7)

equipped with ATAS and provisioned for ATG weapons during production. The remainder of the 207 will begin a retrofit program in FY92. Congress added language and resources to the FY90 budget line to procure 36 more OH-58Ds. This will bring the total number of OH-58Ds to 243. In December 1989 the Secretary of the Army made the decision that all OH-58Ds would be armed and that the armed OH-58Ds will be fielded in cavalry and contingency roles in lieu of the Field Artillery Aerial Observation (FAAO) role. The AHIP will be named "WARRIOR" or "KIOWA - WARRIOR".

The CH-47D

The last major procurement program is the CH-47D CHINOOK modification. A three year Multiyear Procurement (MYP) contract was signed for 144 CH-47Ds to complete the modification of the fleet at a total of 472. The FY92 budget is to be the last year of modifications. With this total buy, all the CH-54s will be retired. Special Operations will get 51 CHINOOKs modified at the factory as MH-47Es.

Intelligence and electronic warfare requirements are met by Special Electronic Mission Aircraft (SEMA). The SEMA aircraft are few in numbers, but are high value systems. The overall plan increases survivability with upgraded mission equipment packages and selected modifications. The SEMA fleet consists of a variety of aerial platforms that provide an Intelligence and Electronic Warfare (IEW) and communications relay capability to corps and divisions. The current SEMA fleet includes the OV-1, RV-1D, RU-21, RC-12, EH-1, and EH-60 aircraft. In the future, Advanced SEMA (ASEMA) is planned to replace the fixed wing SEMA fleet with a single more capable airframe. The current SEMA fleet inventory consists of 237 fixed and rotary wing platforms. The ASEMA conceptual planning is ongoing with a planned non-developmental item program in 1998 and procurement potentially beginning in 2001.

Safety concerns and maintaining readiness and operational capabilities remain important guideposts to the development of any new strategy. Aviation life support equipment and Night Vision Goggles (NVG), along with cockpit NVG compatibility, receive the highest level of support. Repair parts, spares, and the flying hour program are treated like major programs to ensure they receive required visibility. Other programs such as aircraft survivability equipment, aviation ground support equipment, flight training simulators, and ATC, are also important support programs, and continue in good shape.

Meeting the Future

Using the AAMP as a guide, we will meet future Army Aviation requirements through modernization of the fleet with an affordable mix of continuing current procurement, selective modifications, new aircraft and retirement of selected systems in the fleet in accordance with the aviation fleet age management policy. Budget pressures in addition to the reality of the changing world are causing a continuous re-look of our aviation modernization plans and programs. The priority is to protect RDTE basic technology efforts; complete current procurements; and then focus on procurement of the LHX. Army Aviation will continue to figure heavily in near and mid term requirements as we address the problems of low intensity conflicts, drug cartels, and terrorism. There will be a continuing emphasis on technology base efforts which will insure that the Army with Aviation's help will also be postured strategically and tactically in the mid to far term if mid to high intensity threats become a major problem again. The AAMP, as it is now being worked, calls for some patience on everyone's part. With the advent of CFE on top of constrained budgets, the Army (including Aviation) must continue to adjust the modernization plans as living documents as we stand by to continue to provide deterrence or if called upon to exercise our capabilities as a team player in the Total Army. IIIII

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KILLEEN, TX 76543
HOLMES, CHRISTOPHER
2502 NEW BACON RANCH RD
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3377 DURRETT DR, NO. 23
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OSBORNE, SCOTT M.
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D COMPANY
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APO NEW YORK 09039
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CLARKSVILLE, TN 37042
SAWYER, WILLIAM T.
11280 PEBBLE HILLS DRIVE
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EL PASO, TX 79936
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WRIGHT, WILLIAM R.
215 N GLADYS ST., APT. 603
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ZUSCHLAG, ERIC W.
10910 EASTWOOD DRIVE
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CW4'S

AHL, ARCHIE L.
114 HAMAN LANE WEST
TACOMA, WA 98467
ALLEN, CARLSON E.
390 SYCAMORE LANE
CHESHIRE, CT 06410
ALLMER, JOHN C.
7923 25TH AVENUE S.E.
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EISENSTAEDT, FRANK A.
933 HANCOCK STREET
SALINAS, CA 93906
GINALICK, MATTHEW, JR.
13650 JACOBS ROAD
MOUNT AIRY, MD 21771
KINGSLEY, ERNEST D.
ROUTE 2, 210 WOODLAND
NEWTOWN, AL 36352
McMILLAN, CORNELIUS
B CO., 70TH TRANS BN (AVIM)
APO NEW YORK 09028
POULIN, BERNARD J.
605 STILLWOOD DRIVE
WOODSTOCK, GA 30188
SPECKMAN, JOHN G.
506 JASON DRIVE
HARKER HEIGHTS, TX 76543
TRAVERS, JOHN M.
1413-A SKYVIEW CIRCLE
HARRISBURG, PA 17110
VALENTINE, THOMAS M.
2807 BERMUDA
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CW3'S

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DICKSON, RICHARD E.
113 SMOKEHOUSE LANE
WILLIAMSBURG, VA 23185
HERNANDEZ, ANTHONY A.
94-665 NOHEAIKI PLACE
WAIPAHU, HI 96797
MOORE, DON R.
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OBURN, ROBERT P.
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APO NEW YORK 09165

CW2'S

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G CO, 1ST AVN REGT, BOX 2448
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2032-B WERNER PARK
FORT CAMPBELL, KY 42223
HARRIS, JEFFREY W.
491 RIDGEVIEW AVENUE
MARINA, CA 93933
PENICK, EDWARD S.
O TROOP, 4/11 ACR
APO NEW YORK 09146
STROUD, DALE E.
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FORT HOOD, TX 76544
WILCHER, DALE R., SR.
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FORT CAMPBELL, KY 42223

WO1'S

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ANDERSON, DARIN M.
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3709 B CHAROLAIS DRIVE
KILLEEN, TX 76542
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BYRNE, BRIAN M.
3703-C PORTER LOOP
WAHIAWA, HI 96786
CALHOUN, JAMES R.
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302 E. LOCUST ST., APT. 2
ROME, NY 13440
CRAIN, DAVID H.
4160 PEBBLE RIDGE CIRCLE
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COLORADO SPGS, CO 80906
DANIELS, JOHN R.
G CO., 4TH AVIATION REGT
APO NEW YORK 09111
GRASSO, NICOLA
1808-4 TRYON DRIVE
FAYETTEVILLE, NC 28303
GRIFFIN, CHRISTINE A.
6509 83RD ST. COURT SW
APT. 402
TACOMA, WA 98498
HELGREN, KENNETH S.
3677 E. SQUIRE AVE., APT. 2
CUDAHY, WI 53110
HENDRICKSMEYER, VINCENT P.
2412 RIDGELEA STREET
KILLEEN, TX 76541
HUBER, RICHARD W.
G CO., 211TH AVN, BOX 91
APO NEW YORK 09165
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1910½ SOUTH RIVERSIDE
AMES, IA 50010

LICKLITER, TIMOTHY A.
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1725 UNIVERSITY, APT. D-26
FAIRBANKS, AK 99709
MEYERS, JOHN C.
3142 OAK CREEK DRIVE-EAST
COLORADO SPGS, CO 80906
MILLER, MARK E.
2825 EAST BUNO ROAD
MILFROD, MI 48042
MONROE, SCOTT E.
C TROOP, 3/7TH CAVALRY
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NEWMAN, JACK S.
236 MEDICAL CO., BOX 55
APO NEW YORK 09180
NUSS, DAVID A.
3-227TH AHB, BOX 6
APO NEW YORK 09165
OLMER, STUART A.
C COMPANY
7/101ST AVIATION REGIMENT
FORT CAMPBELL, KY 42223
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384 MANOR STONE LANE
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SAVANNAH, GA 31406
SEMPER, LUTHER R.
HHT 1-9 CAVALRY
FORT LEWIS, WA 98433
SORENSON, MARK A.
11469 DAVID CARRASCO
EL PASO, TX 79936
STARR, RICKY V.
6104 RUSSELL DRIVE
CLARKSVILLE, TN 37040
STELLA, VINCENT J.
109 COLONEL AVENUE
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STEWART, MARK B.
1810 SHOEMAKER DRIVE
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6813-9 WILLOWBROOK DRIVE
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VONHILSHEIMER, GEORGE E.
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WOC's

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Enlisted

ARP, MICHAEL A. 1SG
APACHE TRAINING BRIGADE
5TH BATTALION, 6TH CAV
FORT HOOD, TX 76544
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12 WATER STREET, APT. 403
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PARR, WILLIAM D. MR.
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CAINE, ALAN
10505 E. SHANGRI LA ROAD
SCOTTSDALE, AZ 85259
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FULLER, WILLIAM L.
2031/2 EAST GRAND
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LEE, THOMAS M.
6412 GREENGATE HILL ROAD
FAYETTEVILLE, NC 28303
LEFF, MARTIN J.
2325 HUNTINGTON PT. RD. W.
MINNETONKA BCH, MN 55391
McCOLLUM, LESTER W.
16121 CASTLEREA BLVD
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PRICE, BURTON
41 LAURELWOOD DRIVE
COLTS NECK, NJ 07722
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ITT EOPD
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PRES. EMERITUS, SCH. FDN.
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O'FALLON, IL 62269
KONKLE, THOMAS E. LTC
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SINGAPORE 1128
REPUBLIC OF SINGAPORE
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2119 ELM STREET, APT. 112
DUNEDIN, FL 34698
NASCHE, JOHN MAJ
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FORT WORTH, TX 76180
OWENS, BOBBY L. LTC
415 TALLOKAS ROAD
CRESTVIEW, FL 32536
PALASTRA, JOSEPH T., GEN
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302 ARROWHEAD DRIVE
ENTERPRISE, AL 36330
ROBISON, PAUL B. COL
1232-C CLUB DRIVE WEST
DELRAY BEACH, FL 33445
SINGLAUB, JOHN K. MG
108-A SOUTH COLUMBUS ST.
ALEXANDRIA, VA 22314
STEELE, RICHARD S. MR.
13 FORT WALKER DRIVE
HILTON HD ISLAND, SC 29926
SWEENEY, EDWARD J., JR. LTC
7912-F HARRIS HILL LANE
CHARLOTTE, NC 28213
TURNER, DAN D. MAJ
51 THIRD STREET, SUITE 9
SHALIMAR, FL 32579

BRIEFINGS

Wearing gray/green U.S. Marine Corps camouflage, a **Bell Boeing V-22 Osprey** lifted off the ground 21 December 1989 from Boeing Helicopters flight test center at the Greater Wilmington, DE Municipal Airport. This flight marks the beginning of V-22 flight test activities at Boeing's facilities in the Delaware Valley. The first V-22s currently are being flown at Bell Helicopter Textron's Flight Research Center located in Arlington, TX.

The **Army Otter-Caribou Association Inc.** will be holding their **5th annual reunion** in Dallas, TX 16-19 August 1990. Former members of either Aviation unit who are not already affiliated with this Association please contact Bill Hooks, at P.O. Box 6091, Columbus, GA 31907-0073, (404) 324-1596 for info.

The **Eleventh Annual Army Operation Aeromedical Problems Course** will be held 26-30 March 1990 at Ft. Rucker, AL. Info: Operations Division, U.S. Army School of Aviation Medicine, Ft. Rucker, AL 36362-5377 or call (205 255-7460/7464.

Eight full-time aviators, from the **PA ARNG Aviation Support Facility**, Ft. Indiantown Gap, were recently awarded safe flying certificates from McDonnell Douglas and Bell Helicopter Companies. They are pictured above: **Front row, l. to r.:** CW4 Robert Horton, LTC Charles Martin, COL Thomas Jacoby (State Avn Ofcr), CW3 Robert Oburn. **Back row, l. to r.:** LTC Cecil Hengeveld, CW3 James Laufenberg, CW3 James Chandler, and CW4 Reed Zellers.

AWARDS AND HONORS

The following information is provided by the U.S. Army Aviation Center at Ft. Rucker, AL:

Initial Entry Rotary Wing Aviator Course:

Class 89-12 UH-1 Track (12/15/89): 2LT Blakely L. Ross, Distinguished Graduate; 2LTs Manley R. Alford and Richard L. Goldenberg, Honor Graduates.

Class 89-12 UH-1 Track (12/15/89): WO Robert E. Weaver, Distinguished Graduate and Leadership Award; WO David W. Archer, Honor Graduate.

Class 89-12 OH-58 Track (12-15-89): 1LT Damon K. Hofstrand, Distinguished Graduate; 2LT Edward J. Sanches and 1LT Frank H. Millerd, II, Honor Graduates.

Class 89-12 OH-58 Track (12/15/89): WO Bradley C. Childress, Distinguished Graduate.

Class 89-11 UH-60 Track (12/15/89): 2LT Michael J. Hughes, Honor Graduate.

Class 89-11 UH-60 Track (12/15/89): WO Trevor C. Brown, Distinguished Graduate.

Class 89-10 AH-1 Track (12/15/89): WO David J. Vaughan, Distinguished Graduate; WO Shawn M. Hayes, Honor Graduate.

Avionic Maintenance Supervisor Advanced Noncommissioned Officer Course Class 90-01 (12/15/89): SSG Paul D. Jones, Distinguished Graduate.

Air Traffic Controller Systems, Subsystems, & Equipment Repairer Supervisor Advanced Noncommissioned Officer Course Class 90-01 (12/15/89): SSG Bernard McAdams, Distinguished Graduate.

Air Traffic Control Operator Basic Noncommissioned Officer Course Class 90-02 (12/15/89): SSG William S. Martin, Distinguished Graduate.

The **McDonnell Douglas MD 530N helicopter**, equipped with the company's NOTAR™ anti-torque system, flew for the first time at McDonnell Douglas Helicopter Co's facilities on 29 December 1989. The aircraft is the first conventional, single main-rotor helicopter without a tail rotor for anti-torque and directional control. NOTAR-equipped helicopters, which will be available in both MD 530N and MD 520N configurations, are the latest versions of the MD 500, which first flew in 1963. Selection of engines between the Allison 250-C20R-2 or 250-C30 powerplants determines the aircraft designation. The C20R is installed in the MD 520N while the C30 is installed in the MD 530N.

The **National Aeronautic Association**, the national aero club of the United States, has certified that a group of students at California Polytechnic State University at San Luis Obispo, CA achieved **human-powered helicopter flight** on Sunday evening, 10 December 1989. The flight — technically described as a "hover" — lasted 6.8 seconds. The team hopes eventually to build an even more efficient vehicle with the goal of claiming the American Helicopter Society's Igor I. Sikorsky Award. The award is a standing offer of $20,000 to the first team who builds a human-powered helicopter that can fly for 60 seconds and rise three meters.

1st SOCOM becomes a MACOM. The 1st Special Operations Command at Ft. Bragg, NC, is receiving a phased transfer of remaining functions from the headquarters of the Forces Command at Ft. McPherson, GA. Once the transfer is completed, the reorganized 1st SOCOM will have become the sole major Army command charged with commanding assigned or attached Army special operations forces. The Army's 16th major Army command was activated in December concurrent with Senate approval of LTG Gary E. Luck's nomination to head it. The new command will bear the title **U.S. Army Special Operations Command.** Headquarters will remain at Bragg.

Boeing Helicopters unveiled its **MH-47E CHINOOK** special operations helicopter 6 December 1989. MH-47E flight-testing is expected to begin in early 1990, with first delivery to the 160th Special Operations Aviation Group (Airborne), Ft. Campbell, KY, scheduled for November. Deliveries of production MH-47Es are planned to take place between 1992 and 1994.

Air Force is the top **ROTC-program preference** of 1990 high school seniors in an annual nationwide survey. The other branches of the Armed Forces were selected in this order: Army (19.1%), Navy (14.5%), Marines (14.3%), Coast Guard (8.4%), and Merchant Marines (1%). A total of 42.7% of the 754,000 seniors surveyed by the National Research Center for College and University Admissions (NRCCUA) selected Air Force. The survey asks students to indicate which type of ROTC program they would be likely to join if they needed financial help in college.

Twin LHTEC (Light Helicopter Turbine Engine Company) **T800 engines** are to be installed in a **Westland Helicopters Battlefield Lynx.** The T800-powered Lynx is scheduled for first flight in mid-1991. The joint program has Westland providing the test aircraft, design integration, and flight demonstration program, while LHTEC will supply engines, speed reduction gearboxes and support for what will represent a production configuration for the aircraft. LHTEC is a partnership of Allison Gas Turbine Division of General Motors and the Garrett Engine Division of Allied-Signal Aerospace Company.

— Correction —

December's Branch Chief Update contained an incorrect date. The first flight for LHX is now set for August 1993. Full rate production will run from 1995 through 2007. ARMY AVIATION MAGAZINE regrets this error.

NEW MEMBERS

AIR ASSAULT CHAPTER FORT CAMPBELL, KY

CPT Jon E. Kosmider
CW2 David W. Poole
CW3 Johnnie D. Shaver

ALOHA CHAPTER HONOLULU, HI

SGT Jeffrey M. Ancheta
SGT Keith C. Belski
SGM Donald R. Bruce
CPT Barton G. Combs
SGT Terry E. Conyers, Jr.
SGT Connell Gardner
1LT William T. Goforth
SGT Matt R. Harris
CW3 Rodger A. Johnson
CPT Kenneth D. Payne
SFC Joel L. Prince
CW3 Daniel R. Samsel
CW4 Larry L. Thornton
1LT John R. Watwood

ARIZONA CHAPTER MESA, AZ

Mr. Roger J. Hunthausen
CPT Michael K. Stiff
Mr. Ronald E. Warden

ARMADILLO CHAPTER CONROE, TX

SPC Aaron L. Bernstein
Mr. Robert Wolff

ARMY AVN CENTER CHAPTER FORT RUCKER, AL

WOC Stephen J. Atkinson
WOC Keith L. Belanger
CW3 William R. Bellflower, Jr.
WOC Eric T. Benton
WOC David G. Bixby
2LT Lawrence J. Borkowski
SGT Stephen R. Boyd
WOC Abraham C. Bronn
WOC Thomas J. Capello
CPT Clayton A. Ching
WOC Darren L. Clayton
WO1 Charles A. Cunningham
2LT Willis N. Dabbs, Jr.
2LT Timothy S. Davis
1LT Joseph E. Deer
WOC Todd A. Dembowske
LTC Diego Di Santo
CPT Robert A. Donahue
CW2 Timothy O. Driggers
WOC John B. English
2LT Timothy S. Farrell
2LT Joseph E. Fluet, III
2LT Alfred E. Francis
Mr. Curtis Frazier
2LT Joanna E. Gale
2LT Omar C. Gobourne
CPT Jonathan C. Gold
WOC David M. Hosea
WOC Randy L. Huff
WOC Ray A. Hull
WOC Jeffrey J. Knowles
2LT Timothy D. Kramer
Mr. Gerard J. Leavis
CPT John H. Lehman
Mr. Wilbert K. Maschmeier
WOC Clifford K. Mead
CPT Joseph P. Mudd
2LT Anne Marie Parades
WOC Brian E. Peterson
CW4 Daniel T. Peterson
WOC Theodore J. Picou
WOC David G. Plasch
CPT Lowell C. Preskitt
WOC Raymond S. Ramsey
2LT Pascal C. Reid
WOC Angel L. Reyes, Jr.
2LT Robert R. Rornbough
WOC Jill G. Russo
WOC John M. Signorino
1LT Jed C. Steinke
WOC Thomas Venable
WOC Marvin J. Winn

CENTRAL FLORIDA ORLANDO, FL

Mr. Thomas J. Atkinson
Mr. Jack L. Conlan
Mr. James B. Conyers, Jr.
Mr. Patrick M. Donohue
Mr. James M. Ferguson
Mr. George L. Frye, Jr.
Mr. John Gale
CPT John P. Laumeyer
Mr. John A. Maphet
Mr. Jerry Pogorzelski
Mr. David P. Teichman

CHECKPOINT CHARLIE CHAP BERLIN, GERMANY

Ms. Catherine A. Beck
Mr. Kurt Behrendt
Mr. Thomas F. Clark
SFC Steven G. Sims
PV2 Bill L. Williams

CHESAPEAKE BAY CHAPTER FORT MEADE, MD

Ms. Tara L. Affeldt
CW4 Lawrence R. Burbank
MSG Michael C. Constable
COL Raymond D. Engstrand
Mr. James Fielder
SGT John R. Kemp
MAJ Gilbert Medina

CITADEL CHAPTER CHARLESTON, SC

CDT Kenneth A. Anderson
CDT Donald S. Corry
CDT William E. Gore, III
CDT Wendell M. Hardwick, Jr.
CDT Verne H. Speirs

COASTAL EMPIRE CHAPTER FT STEWART/HUNTER AAF, GA

CW3 Guy P. Blevins
Mr. Ben Buhay

COLONIAL VIRGINIA CHAPTER FORT EUSTIS, VA

MW4 Dale M. Berg
SSG Robert R. Best
CW3 Alan D. Dobrowolski
CW4 Jimmy Husband
CW3 Elden E. Ross
SSG Kevin L. Sanders
CPT Joseph E. Schmaltz

CONNECTICUT CHAPTER STRATFORD, CT

Mr. Robert B. Clark
CPT Bruce W. Dawson

CORPUS CHRISTI CHAPTER CORPUS CHRISTI, TX

Ms. Geraldine T. Allen
Ms. Timon A. Athey
Mr. Edward C. Ballesteros
Mr. Casimiro Barrera
SFC Riley M. Booz
Ms. Deanne Burtts
Mr. Dennis J. Elles
Mr. Ralph C. Elliott
Mr. Luz Cantu Escamilla
Mr. James O. Fitts, II
Mr. James A. Fulton
Mr. Thomas E. Gallagher
Mr. George L. Gomez
Mr. Amando Gonzalez
Mr. Paul Haynes
Ms. Mary E. Horn
Mr. Jimmy B. Johnston
CW3 W. Hayden Jones, Ret.
SGT Steven L. Klatt
Mr. Alec Michael Martin
Ms. Angela E. Miller
Mr. James A. Morgan
Mr. Richard D. Pointer
Mr. Emil Polansky
Mr. Gerald W. Sohn
Mr. John R. Taylor
Mr. Ricky D. Temple
Ms. Donna Gail Torres
Mr. Clarence L. Tripp
Mr. Diego Vega, Jr.

DELAWARE VALLEY CHAPTER PHILADELPHIA, PA

Mr. Michael A. Jumper
Mr. Mark F. Mosser
Mr. Robert Specht

FORT BLISS CHAPTER FORT BLISS, TX

CPT Douglas P. Habel
CW2(P) Roy W. Murdock
CSM Dalton F. Southern

FORT BRAGG CHAPTER FORT BRAGG, NC

2LT Jason R. Horne
LTC R.A. Waterbury, Ret.
CW2 Richard R. Wilson

GR. CHICAGO AREA CHAP. CHICAGO, IL

PFC Thomas J. Billingham
WO1 Robert W. Olivero
PFC John R. Stanfield

GREATER-ATLANTA CHAPTER ATLANTA, GA

CPT Dennis T. Brown
CW2 Artemas K. Darby, III
LTC William A. Deblois, Jr.
SPC Dayna J. Esposito
CPT Arnold A. Ferrando
Mr. Gary L. Groom
CW4 Malcolm L. Hackney
CPT Harold E. Kerkhoff
CW3 Thomas J. McNamara
CPT Charles R. Miller
SGT Kevin A. Owens
CW4 Robert R. Rogers
LTC Michael L. Seely

INDIANTOWN GAP CHAPTER INDIANTOWN GAP, PA

SFC David E. Holden
LTC John T. Kelly

JACK H. DIBRELL (ALAMO) FORT SAM HOUSTON, TX

COL John R. Dickson
CPT Paul E. Malcolm
MAJ Augustin C. Montemayor
LT Dante Paganucci, II

LINDBERGH CHAPTER ST. LOUIS, MO

Mr. Richard Adamick
CPT Robert R. Allen, Ret.
Mr. Robert Brackett
Mr. Caesar Crognale
Mr. Norm Huston
Mr. Roland P. Mayer, Jr.
Ms. Elizabeth C. Ropp
Ms. Bonnie L. Stokes
Mr. Harold P. Strickfaden

MAINZ CHAPTER MAINZ, GERMANY

CW2 Robert R. Loveland
1LT Denise E. Natali

MID-AMERICA CHAPTER FORT RILEY, KS

CW2 Arthur M. Blakemore
CW3 Mark A. Koenig

MONMOUTH CHAPTER FORT MONMOUTH, NJ

Mr. Louis D. Bennett, Jr.

MORNING CALM CHAPTER SEOUL, KOREA

PFC Charles Abel
SPC William Aguirre
Mr. Hae Chong Ahn
SPC Kelley L. Allstock
MAJ David Alley
PVT Keith Ambers
Mr. Byung Ae An
Mr. Rin So An
SPC William Anstett
PFC Daniel P. Anteniom
SPC Derrick M. Applegate
PV2 Gustavo Artavia
SGT Jason Ashley
SGT Leroy Astwood
SPC Jeffrey S. Austin
SGT Joe Avant
PV2 Michael Badach
Mr. Il Nam Baek
SSG Felix B. Baerga
SPC Thomas R. Bair
SSG Will Baker
SPC Michael D. Ball
SGT Rudy Barlan
CW2 Steven B. Barrier
PV2 Frank Bastian

SPC Noah Bertrand
SPC Shannon Bitzer
SPC Thomas Blindauer
SPC Eric Booker
SGT Brian W. Bowser
SSG Robert Bressler
PVT Richard Brigman
SGT James A. Buckingham
1LT John P. Budd
SPC Pamela D. Burden
PFC Edward Cabreria
SPC Roy O. Caffey
PV2 Allyn Camp
SPC Donald R. Capritta
SPC James Carder
PFC Francis Carr
SSG Charlie Carter
SPC Timothy D. Carter
SPC Pedro Castaneda
SPC Craig Chandler
PFC Florence Chandler
SGT Michael Chang
Mr. James H. Cheatham, Jr.
Mr. Chang Hyun Cho
Mr. Jae Yun Cho
Mr. Myung Ku Cho
Mr. Sae Dong Cho
Mr. Soo Hyun Cho
Mr. Bang Bae Choi
Mr. Jong Wook Choi
Mr. Kwang Woo Choi
Mr. Young Hee Choi
Mr. Nung Chon
Spc Yun Chong
Mr. Chul Ryong Chung
SGT Alfred Clay
SSG Dale Clay
SGT Norman Coggins
PFC Brian Cole
SPC Edward D. Connell
SPC Johnny D. Connor
PVT Mike Cornett
SFC Calvin Covey
SPC Daniel T. Cox
SGT Chester M. Coy
SPC Brice Crawford
SGT Michael Crawford
SPC Christopher Custer
SPC Alford Danzy
SGT Elli Davis
SSG Kenneth R. Denton
SFC Harvey Dinton
SGT Conrad Dobson
2LT Michael T. Duffy
SPC James C. Edlen
PFC Heath Elmer
SPC Terry Emmons
SPC Gabriel Eneh
SFC Burnis Engram
PFC Tommy P. Exley
SPC David M. Fishel
CPL Gary A. Fletcher
SPC Karl Fletcher
SPC Walter E. Floyd
SPC Neal Forthenberry
SGT Michael A. Gager
SPC Thomas Gannon
SPC John George
SGT Nathaniel Gerald
SPC Steven H. Gettman
SFC Michael Gibbs
SPC Matthew S. Gilbert
SPC Anthony Goode
SGT Ernesto Gregorio, Jr.
SFC Carol L. Guthrie
Mr. Song Tae Ha
PVT David Hale
SGT Garlind Hall
PFC Terry L. Hamrick
Mr. Dong Soo Han
SGT Bernard Hardiman
PFC Tony D. Hardison
SPC Henry E. Heidecker
SPC Carolyn M. Heinen

SPC Jeffrey Hickman
SPC Karen Hill
PFC Jonathan Houston
SSG Dale Howard
COL Charles R. Huggins
SGT David Humphrey
PFC Curtis E. Jackson
SSG Dunkin A. James
SPC Fredrick S. James
Mr. Tae Sun Jang
SSG Lonny Jenkerson
SPC Denoris Jenkins
Mr. Jung Hyun Ji
Mr. Jun Koo Jin
Mr. Hang Ja Jo
SGT Darin Johnson
SGT Ernest E. Johnson
SFC Van Johnson
SGT Geret J. Johston
SFC Michael A. Jones
SSG Daniel Kaawa
Mr. Bong Chun Kang
Mr. Soo Hee Kang
Mr. Yun Sung Kang
PFC Phoungin Keo
SPC Stephon Kestin
SPC Stephen L. Ketchem
Mr. Bum Su Kim
Mr. Chang Hee Kim
Mr. Du Bong Kim
Mr. Han Su Kin
Mr. Hyun Bae Kim
Mr. Jong Han Kim
Mr. Jun Ho Kim
Mr. Kyung Hoe Kim
Mr. Ryong So Kim
Mr. Su Koom Kim
Mr. Yeon Kyu Kim
Mr. Young Chul Kim
SPC John K. Knott
SPC Saunya Knox
SPC Amy Knutosn
Mr. Chang Bum Koh
SPC Bertrand Ladlier
SPC Roger Lange
SGT Mark Larabee
PV2 Isidor Lararomero
SPC Keith Ledford
Mr. Bong Hee Lee
Mr. Byung Jin Lee
Mr. Choong Ho Lee
Mr. Dong Young Lee
Mr. Hei Sup Lee
Mr. Hwang Eui Lee
Mr. Jae Young Lee
SPC Jung Lee
Mr. Kei Yoon Lee
Mr. Nak Soo Lee
Mr. Sang Yeol Lee
Mr. Sang Jin Lee
Mr. Yong Kyu Lee
Mr. Yong Dok Lee
Mr. Yong Won Lee
Mr. Young Jin Lee
Mr. Young Ran Lee
SFC Daniel Lehman
SPC Terry L. Lindsey
SGT Jeffery A. Lipford
SGT Troy W. Lord
PVT Maureen Luagnex
SPC Andrew C. Lucio
SPC Bernard Maize
SSG Gregory A. Manatan
SGT Darren K. Mann
PFC Gregory Mapp
SPC Lewis Marcos
SPC Curtis L. Martin
SGT Martin Matzen
SPC Curtis J. Maxe
SGT Emmanuel Maxwell
SPC James Maxwell
SPC Rodney B. Maynor
PVT Jeffery McAtee
SPC Ernest McClenton

PFC Dwayne B. McKinney
2LT Michael S. McMullen
SPC Daniel E. Meader
SSG Brent Meiers
SGT Allen Michael
PFC Eyler E. Michael
SPC Heidem Michels
CPL Keith Milka
SFC Dwight C. Mojay
SPC Jackquline Montgomery
SPC Tracey Moore
SGT Remay Munib
SPC Erma L. Murphy
SGT Poland Murphy
SSG Andrew W. Nemcheck
Mr. Jin Ku Oh
Mr. Myung Hyun Oh
CPT Van T. Oxer
1SG James M. Paige
SPC Seok K. Paik
Mr. Dong Hwa Park
Mr. Hyong Bae Park
Mr. Nam Choon Park
Mr. Noong Chul Park
Mr. Sang Ho Park
SPC Angelia Y. Parker
SSG Daniel Parks
SPC Lynn Parrish
CPL Anthony Patenaude
SPC Jason E. Paxton
CW3 Donald H. Perrymore, Ret.
SFC Hugo Perz
SPC Franz J. Philippe
SGT Karl Pierce
CPL Jesse Pinner
PVT Lawrence Plants
SPC Michael K. Polston
PFC Graciela Ponning
SFC David Pope
SSG Jonathan Primm
SGT Demones Racker
SPC Troy D. Rafteseth
SPC Ronald Rakowoski
SPC Jerry N. Rayfield
SPC Richard N. Reed
SFC Ronald Reynolds
SPC John Rice
PVT Kevin Ridings
SSG Alfred R. Riopel
SSG Abel I. Rios
SPC Louis R. Rios
SGT Randell Rockrolls
SGT Adrian Rodriquez
SPC James S. Rogers
SPC Douglas D. Rossicoe
SGT Michael L. Rumble
SPC Scott Schuld
SGT Leon D. Sharp
Mr. Jong Ok Shim
SGT Brian T. Shiwe
SGT Ricky Simileton
SPC Mark Simpkins
SPC Asoic Singh
SGT Christopher Smith
SGT George Smith
SFC Kyong Yoo Sok
SSG Paul Solberg
Mr. Do Un Son
Mr. Kyung Shik Son
Mr. Sok Suk Son
Mr. You Ree Son
SPC Rose M. Spears
PVT Aretha Spraggens
SPC Mathew Stavros
SPC James E. Steinbach
PFC Van Taff
SPC Linda M. Taylor
SPC Terence W. Thompson
SGT James H. Thomson
SPC Patrick C. Thurs
SFC Jerold L. Tompkins
SGT David A. Tulluck
Mr. Ki Bock Uhm
PFC Barry Ungles

CPL Charles A. Vazquez
SSG Charles D. Wallace
SPC Darren W. Waterberry
SGT Samuel B. Watts
SSG Timothy Westbrook
SGT Garry S. Westrate
SPC Elizabeth Whipple
SPC Caren Wiget
SFC K. Wijrtuna
SGT Michael A. Williams
SPC Perry Williams
SPC Tyrone P. Williams
SPC Kenneth Willmore
SSG Herman L. Witherspoon
Mr. Koo Yeon Won
Mr. Woo Shik Won
Mr. Kwang Yol Yi
Mr. Sok Pal Yi
SPC Sang Yin Yoo
Mr. Kyu Chan Yoon
Mr. Chung Young Yu

MOUNT RAINIER CHAPTER FORT LEWIS, WA

CPT Kevin J. Manix
CPT Hansel B. Millican, III
CW3 Peter A. Rademacher
CPT Michael T. Shifflett

NORTH COUNTRY CHAPTER FORT DRUM, NY

MAJ Steven Falck
WOC Arnold J. Grayson
CW2 Kevin R. Hayes
CW4 Joseph D. Stevens

NORTH TEXAS CHAPTER DALLAS/FORT WORTH

Mr. Kerry K. Arnold
Mr. David C. Grass
LTC Kim K. Judd, Ret.
CW2 Thomas I. Knedler
CSM Jerry D. McGee
LTC Herschel E. Reynolds, Ret.
Ms. Elva Jene Roy

OLD IRONSIDES CHAPTER ANSBACH, GERMANY

WO1 Dean R. Katch
CPT Wayne A. Sauer
CW3 Robert V. Weichmann

PHANTOM CORPS CHAPTER FORT HOOD, TX

WOC John Berezoski, III
Mr. Craig D. Cairns
SGM John D. Graves
WO1 Scott G. Lisk
CW3 Norman R. Noble
CW3 Randall C. Sullivan

PIKES PEAK CHAPTER FORT CARSON, CO

MAJ Thomas R. Burnett
1SG Ramon H. Garcia
1LT David A. Thelen

RHINE VALLEY CHAPTER MANNHEIM, GERMANY

CPT Michele M. Tabor

SAN JACINTO CHAPTER ELLINGTON FLD, HOUSTON, TX

CW2 George T. Gohmert
CSM Robert E. Smith
SFC Robert M. Weinberg

S. CALIFORNIA CHAPTER LOS ANGELES, CA

Mr. George Ottiniano

STUTTGART CHAPTER STUTTGART, GERMANY

WO1 Robert W. Brittner
LT George J. Hart

AAAA NEWS

New Members Cont'd

SGT Diana L. Heft
PFC Steven C. Matthews
SPC Lisa M. Toth

TALON CHAPTER ILLESHEIM, GERMANY

CW2 Melvin T. Dixon
CW3 Mitchell G. Thompson
CW2 Stephen W. Young

TAUNUS CHAPTER WIESBADEN, GERMANY

CW3 Gregory D. Bonneau
CW2 Clayton B. Santini
SPC Michael B. Yost

WASHINGTON D.C. CHAPTER WASHINGTON, D.C.

1LT Edward P. Joseph
PFC Ian J. Morgenstein
Mr. Edgar F. Raines, Jr.

WINGS OF THE DEVIL CHAP FORT POLK, LA

1LT Steven L. Ochu
WO1 Ruben D. Pacheco

WINGS OF THE MARNE CHAP GIEBELSTADT, GERMANY

CW2 Crisanto Armington
PFC Hopeanne M. Doedyns
CPT Todd A. Overby

MEMBERS WITHOUT CHAPTER AFFILIATION

Mr. Alan Bandes
Mr. Stephen L. Crowell
Mr. Peter K. Doenges
Mr. Mark Goodman
LTC Charles W. Goodson
Mr. Luther Hilty
Mr. James M. Hudson
WOC Derrick Hull
WOC David P. Johnson
LTC Evander S. Jones
Mr. Dana Kerrick
WOC Kevin M. Lang
2LT Tracy E. McLaughlin
MAJ Gary D. Messano
Mr. Gary Mohr
SSG Stephen P. Moulton
Mr. Terrence O'Hanlon
CPT Robert E. Payne
BG Robert W. Pointer, Jr, Ret.
MAJ Wesley D. Reese, Ret.
MAJ Michael D. Shain
CPT Roy D. Steed
MAJ John R. Stevens
Mr. Louwane Van Soolen

New AAAA Chapter Officers

AIR ASSAULT:

COL William D. Loftin, (Pres); COL Stuart W. Gerald, (VP); CSM Fredy Finch, Jr., (VP Enlisted Affairs).

CHECKPOINT CHARLIE:

CPT Dianne E. Welch, (Treas.)

AAAA BOARD MINUTES

AAAA's National Executive Board (NEB) conducted its winter meeting at the Lake Lodge in Ft. Rucker, AL, 8 December 1989. Among the items discussed were:

By-Laws & Legal. AAAA By-Laws section 4.8 Region and Chapter Annual Reports was amended as follows: (new language is noted in **bold**)

4.81 — An Annual Chapter Financial Statement showing total Chapter receipts and disbursements, shall be prepared by the Chapter Treasurer, countersigned by the Chapter President, and forwarded to the National Office as soon after each December 31 as is practicable.

4.82 — An Annual Region Financial Statement showing total Region receipts and disbursements, shall be prepared by the Region Treasurer, countersigned by the Region President, and forwarded to the National Office as soon after each December 31 as is practicable.

4.83 — The National Office shall provide each Region and Chapter activity with suitable forms so as to standardize the submission of Region and Chapter fiscal data.

AAAA By-Laws section 3.31 was amended as follows: (new language is noted in **bold**)

3.31 — National Executive Board: The National Executive Board of the Association shall consist of the following: 1) The President, 2) The Senior Vice President, 3) The Secretary-Treasurer, 4) Seven Vice Presidents, 5) The National Past Presidents, 6) The Past Executive Vice President, 7) The Executive Director who is appointed by the President with the concurrence of the National Executive Board to serve as an officer of the Association without vote, 8) Five to **twenty** members to be appointed at the discretion of the President, and to be known as "National Members-at-Large", 9) Presidents of Regions constituted, and 10) Presidents of those Chapters representative of 150 or more members.

Fiscal. The NEB approved the fiscal recommendations submitted by COL J.J. Stanko, Ret., AAAA Secretary-Treasurer. Among the approved 1990 allocations are: 1) $65,250 to the AAAA Scholarship Foundation; 2) $10,000 underwrite to the AAAA Hall of Fame; 3) $2,500 to the U.S. Army Aviation Museum for underwriting of AAAA Award Trophies and Hall of Fame Portraits; 3) $3,000 for the printing and distribution of the AAAA INFO FILE to assist National and Chapter officers in their duties; 4) $3,000 toward the development of an AAAA Archives Program under the leadership of AAAA Past Executive Vice President Arthur H. Kesten.

Membership. MG Drenz, Senior VP and VP Membership, advised the NEB that although membership increased 1,500 members, compared to 1 November 1988 and 1989 statistics, gains were largely student membership, which have a renewal rate of 32%

MINUTES Cont'd

Nominations. MG Story C. Stevens, Ret., Chairman of the Nominations Committee, reported that the Committee recommended two individuals for elective office on the National Executive Board for the period 1990-92. They are LTG Ellis D. Parker and MG Carl H. McNair, Jr., Ret.

Policy & Plans. AAAA President BG James M. Hesson, Ret., advised the NEB that the Aviation Career Improvement Act was awaiting President Bush's signature and that an explanatory article would appear in the February ARMY AVIATION MAGAZINE. (AAAA supported the passing of the act and specifically equalization the flight pay among the services. The act has now been signed and implemented. See page 36 of this issue for details.)

On another Policy & Plans issue, whether Aviation Warrant Officers should be allowed to wear the Branch Insignia, BG Hesson referred the NEB to the article by NEB member CW4 Harry P. Arthur and the AAAA Membership Survey published in the 31 December 1989 ARMY AVIATION MAGAZINE. BG Hesson commended CW4 Harry W. Sweezey for bringing this issue before the NEB and for his efforts in arousing the Army Aviation community, but advised the NEB that in order for the AAAA to prepare an official position, the AAAA membership would have to be surveyed.

BG Hesson noted that the response to the Survey would be open to all AAAA members and that the results would be tabulated by the member's affiliation, rank, age, geographic location, and length of AAAA membership. BG Hesson advised the NEB that the survey results would be presented at the April NEB meeting.

AAAA NEB NOMINATIONS

In accordance with the AAAA By-Laws, notice is hereby given that in addition to the nominations recommended by the National Nominations Committee for those National Board offices in which vacancies occur at the time of the annual election, floor nominations may be made at the general membership business meeting held at the Annual Meeting, provided that the name of the floor nominees appear on nomination petitions signed by twenty-five (25) members of the Association and said petitions are provided to the Chairman of the National Nominations Committee at the AAAA National Office at least thirty (30) days prior to the conduct of the Annual Meeting of the Association.

New Officers Cont'd

CORPUS CHRISTI:
Billy Quintanilla, (VP Activ.); Linda Dixon (VP Memb. Enroll.); Terry Burgess, (VP Publ.); Nancy Lichtenberger, (VP, Promotional Materials); Nancy Alexander, (Historian); LTC James R. Boren, (Military Liaison Officer).

EDWIN A. LINK:
Peter F. Bauman, (Pres.)

FORT BRAGG:
MAJ C. Phil Grassmuck, III, (Sec.)

JACK H. DIBRELL (ALAMO):
LTC Lincoln D. Fretwell, (Sec.)

MONTEREY BAY:
LTC John T. Plant, Jr., (Sr. VP)

MORNING CALM:
COL James M. Pulliam, (Sr. VP)

MOUNT RAINIER:
COL Gerald L. Crews, (Pres.); CW4 Lawrence M. McGlamery, (Sec.); CPT David L. Molinelli, (Treas.); CPT Michael T. Shifflett, (VP Memb.); LTC David D. McDougall, (VP Res. Affairs); CPT Craig H. Bird, (VP Spec. Projects).

WASHINGTON D.C.:
LTC Phillip D. Pittman, (Sr. VP)

Aces

The following members have been declared Aces in recognition of their signing up of five new members each.

CW4 Alford L.D. Aston
CSM Jackie Lee Beal

AAAA NEWS

Aces Cont'd

CPT Donald L. Benton
2LT Charles E. Braffett
Lois Contreras
CPT Calvin C. DeWitt
CPT(P) John C. Donahue
CW4 Charles N. Gibson
LTC Paul Hinote
Roger P. Hoffman
CW2 Neil W. Johnson
CPT John F. Kendall
Ronald V. Kurowsky
CPT William J. Leary, III
COL Robert D. Mabey
CPT Cory W. Mahanna
CW2 Kirk A. O'Donnell
LTC John Papier
CDT Jerry W. Reaves
Debra T. Reid
LTC Allan Ricketts
LTC John H. Sydow
LTC Douglas E. Warne

New Industry Members

Sermatech Int'l, Inc.
Limerick, PA
U.E. Systems, Incorporated
Elmsford, NY

New Sustaining Member

Mr. J & Sons Construction, Inc.
Corpus Christi, TX

Obituary

CW3 Lester G. Baggett, Jr., 35, of Copperas Cove, TX, died in West Germany on 17 October 1989, while flying on a routine mission. CW3 Baggett is survived by his wife Sonja Baggett, his daughter Ryan and his son Casey Baggett, all of Copperas Cove, TX.

MSG Bae CY89 "TOP GUN"

MG Charles F. Drenz, Ret., AAAA Senior Vice President and Vice President Membership, has announced that MSG John H. Bae, Vice President Sustaining Membership, Morning Calm Chapter, ROK, has won the Calendar Year 1989 "Top Gun" award. This award is given annually to the member who sponsors the greatest number of new members during the contest year ending 31 December.

MSG Bae, who placed ninth last year with 39 new members, personally sponsored an astounding 337 new members in 1989! MSG Bae wins an expense paid trip to the AAAA Annual Convention, Orlando, FL, including airfare, hotel accommodations, registration, tickets to all social functions and a $300 cash award. He will receive a plaque at the AAAA Membership Luncheon, 12 April 1990.

CW3(P) Bernard R. Lusk, Army Aviation Center Chapter, placed second with a 150 member effort; CW2 John W. Martin edged out CW3 Leslie W. Holt for third with a 103 member effort to Holt's 102. Both are members of Aviation Center Chapter. In a tight race for fifth, Ms. Terry E. Cunningham, Lindbergh Chapter Treas. beat CW4 Robert P. Giffin, Aviation Center Chapter, 68 to 67. Runners up included: CW2 William C. Roberts, 63; CPT Ralph Perez, 56; (Aviation Center Chapter); Susan E. Barnes, 46, Lindbergh Chapter; and COL Clinton B. Boyd, 44, Greater Atlanta Chapter Pres.

1989 Chapter Membership Contest

Two close contests and a last minute surge marked the 1989 "Chapter Membership Enrollment Competition".

"AAAA Chapter" category (25-114 members): The Wings of the Devil Chapter, Ft. Polk, LA, won this category with a net gain of 40 members. The Mid-America Chapter, Ft. Riley, KS, came from behind in the last month with a net gain of 32, dropping the Pikes Peak Chapter, Ft. Carson, CO, to third with a gain of 31.

"Senior Chapter" category (115-230 members): In the closest contest, the Greater-Atlanta Chapter, Atlanta, GA, came up from third in the last month to post a net gain of 66 members and secure the victory. Ft. Bragg Chapter, Ft. Bragg, NC, and Hanau Chapter, Hanau, FRG, tied for second with a substantial net gain of 64.

"Master Chapter" category (231 or more): Army Aviation Chapter did it again with a net gain of 400 members. Morning Calm Chapter, Seoul, ROK, reflecting the outstanding effort of "Top Gun" MSG Bae, came in second, with a 315 net member gain. Third place went to the Washington D.C. Chapter, posting a 152 net member gain.

The Presidents of the three winning chapters will receive plaques at the 12 April 1990 Membership Luncheon at the Annual Convention, Orlando, Florida.

AAAA Scholarship Foundation announces new, expanded 1990 program!

$80,000 of Scholarship grants and loans available to members, their spouses, siblings and children!

BACKGROUND:

The AAAA Scholarship Foundation, a separate non-profit, tax-exempt corporation created to render financial assistance to selected members of the Army Aviation Association of America, Inc. (AAAA) and selected spouses, unmarried siblings, and unmarried children of current and deceased AAAA members, announces the availability of $80,000 in assistance funds for the 1990 college-entry year.

SCHOLARSHIP GRANTS AND LOANS:

A minimum of thirty scholarships will be presented — One $12,000 four year grant ($3,000 a year); other grants ranging from $1,000 to $5,000 given out as one, two or four year scholarships; and five $4,000 interest-free loans ($1,000 a year).

For the first time in 1990, a $2,000 scholarship ($1,000 a year) will be awarded to an eligible applicant pursuing a two-year associate degree in an aeronautical-related science. Also, a $4,000 scholarship ($1,000 a year) is available to those pursuing a four-year B.S. degree in an aeronautical-related science. There is also a $2,000 scholarship ($1,000 a year) available to students planning to attend St. Louis University.

AWARD PHILOSOPHY:

The AAAA National Scholarships are awarded primarily on the basis of academic merit and personal achievement.

APPLICATION PROCEDURE:

To apply, please request a Scholarship Grant/Loan Application and return it to the AAAA Scholarship Foundation, 49 Richmondville Avenue, Westport, CT 06880-2000 on or before May 1, 1990 (postmark will govern). On our receipt of the completed application, you will be mailed further instructions and assigned an AAAA interviewer. All forms, together with other supporting data, must be returned to the Foundation on or before June 15, 1990 for consideration by the AAAA Awards Committee (postmark will govern).

ELIGIBILITY CRITERIA:

An applicant must be a citizen of the United States who has been admitted to an accredited college or university for Fall 1990 entry as a freshman. The AAAA member to which the applicant is related must have an effective date of membership on or before March 31, 1989. All eligible applicants shall first be considered for scholarship grants and then, if requested by the applicants, considered for the loan program.

SELECTION AND NOTIFICATION:

Selection of winners will be made by the AAAA National Awards Committee during mid-July with each applicant to receive a list of the winners not later than August 1, 1990.

TERRY COAKLEY
Executive Director
AAAA

The Annual Convention is quickly approaching (11-15 April 1990) in Orlando, FL.

The HON Michael P.W. Stone, Secretary of the Army will deliver the Keynote Address on Thursday, 12 April. GEN John W. Foss will speak at the Awards Luncheon, Friday, 13 April, and GEN Carl E. Vuono, Chief of Staff, has been invited to speak during the Awards Banquet, 14 April.

The Exhibit Hall promises to have over 150,000 square feet of contractor booths and the static display of helicopters from U.S.A. ATDA and AVRADA. As a bonus, the Mississippi National Guard will bring in a CH-54!

The theme of the Professional Program is "Army Aviation in a Changing World" with presentations by representatives from UK, France, FRG, Italy, ROK, and Japan.

Other opportunities include reviewing your career path with PERSCOM representatives, and interacting professionally and socially with members and friends who support you.

Last Note: The Central Florida Chapter (our host) will sponsor a Golf Tournament on 11 April. Fore!

Join us!

LTC(P) Michael D. Dallas, Aviation Branch Chief, TAPC, and MAJ Frank L. Prindle, Majors Assignments Officer, were guests of the Black Knights Chapter at the Annual Tailgate on 30 September 1989. After watching the Army football team crush Harvard U., members gathered to celebrate and compete for door prizes. Cadet Leslie Bechtel, (shown above), took the grand prize — she guessed that the helicopter model was filled with 534 M&M's!

Black Knights Chapter officers and guests pose after the tailgate. They are (below L to R); MAJ Robert J. Schuett (Secretary); MAJ John Adams (VP Prog); MAJ Joseph G. (Greg) Kaufmann, Jr. (Pres); LTC(P) Dallas; CPT Brian W. Magerkurth (VP, Membership); CPT Matthew Herholtz, Aviation Branch Representative to USMA; and MAJ Prindle.

The **Connecticut Chapter** welcomed COL(P) John N. Dailey, (above left), Commander, 160th Special Operations Aviation Regiment (Provisional), to the 16 November 1989 Professional Dinner Meeting. After COL(P) Dailey's presentation on the Night Stalkers of Task Force 160, he was presented with a model of Igor Sikorsky's first successful helicopter, the VS-300, by Connecticut Chapter President William W. Stuck, (above right).

The **San Jacinto Chapter,** AAAA's newest chapter, held its activation meeting at Ellington Field, Houston, TX, 29 October 1989. The Chapter's name was chosen by the membership to reflect the location of the chapter and the area's significance in Texas history. The following Chapter officers were elected by the general membership: MAJ Jan Drabczuk, (President); MSG James Holder, (Senior Vice President); CPT Robert Corbin, (Secretary); 1LT Charles Spangler, (Treasurer); CW4 Charles Gibson, (VP, Membership); MAJ John Braun, (VP, Programming).

The Basic Chapter Goals are: Foster a public understanding of Army National Guard Aviation in the Greater Houston, TX area; Promote employer support of Army National Guard Aviation personnel in their activities; Encourage family support of Army National Guard Aviation personnel and increase their understanding of military related activities; Disseminate information pertinent to members through public media; Stimulate good fellowship between Chapter members and others associated with Army Aviation; Motivate Chapter personnel to increase their knowledge, techniques, and skills; and Support and promote the goals and purposes of the Army Aviation Association of America.

CHAMPUS SUPPLEMENT AVAILABLE

As a AAAA member, you may now apply for CommandCare, the superior CHAMPUS health supplement, which offers 100% coverage to retired military personnel and their dependents, as well as to the dependents of active duty personnel.

The program will be administered by Membership Services, Inc., 1304 Vincent Place, McLean, VA 22101, a company specializing in providing services to leading associations.

To receive more details about this new benefit, call Membership Services toll free 1-800-234-1304 (or, in the Washington, D.C. metro area, 821-0555) and ask for CommandCare information.

AAAA ARMY AVIATION ELECTRONICS SYMPOSIUM

Sponsored by the AAAA Monmouth Chapter, the Symposium will be held 11-13 September 1990 at The Berkeley-Carteret Hotel, Ocean Avenue, Asbury Park, NJ. "Integration and Automation Impact on Army Aviation" will be the theme. Call for Papers POC is: Dr. John Niemela, Program Chairman, (201) 544-4635. Address written communications to: 1990 Symposium, AVRADA, Bldg. 2525, ATTN: SAVAA-P (PAONE), Ft. Monmouth, NJ 07703-5000.

AAAA CALENDAR

A listing of recent AAAA Chapter Events and upcoming National dates.

January, 1990

✓ **Jan. 20.** Tarheel Chapter. AAAA Meeting and Dinner. Old Salem Holiday Inn. Guest Speaker: Elton Gordon.

✓ **Jan. 22.** Greater Chicago Area Chapter. Members Only General Memb. Meeting. EM Club, Bldg. 29, NAS Glenview. Guest Speaker: Kevin Mason.

✓ **Jan. 24.** Washington D.C. Chapter. Professional-Social Meeting. Sosa Recreation Center, Ft. Belvoir. Guest Speaker: BG Robert L. Stewart.

✓ **Jan. 27.** Lindbergh Chapter. Hockey Game. St. Louis Blues vs. Winnipeg Jets. St. Louis Arena.

February, 1990

✓ **Feb. 5.** AAAA Nat'l Awards Committee Meeting to select CY89 Nat'l Award Winners.

✓ **Feb. 14-16.** 16th Annual Joseph P. Cribbins Product Support Symposium sponsored by AAAA Lindbergh Chap. Stouffer Concourse Hotel, St. Louis, MO.

✓ **Feb. 15.** AAAA Outstanding Aviation Logistics Support Unit of the Year Award Presentation & AAAA Industry Award Presentations, Stouffer Concourse Hotel, St. Louis, MO.

✓ **Feb 15.** 1st Annual AAAA Scholarship Foundation Banquet, Stouffer Concourse Hotel, St. Louis, MO.

April, 1990

✓ **April 11-15.** AAAA Annual Convention, Orange County Convention Center, Orlando, FL.

✓ **April 11.** AAAA NEB Meeting, Orange County Convention Center, Orlando, FL.

July, 1990

✓ **July 14.** AAAA Nat'l Awards Committee Mtg. to select CY90 Nat'l Scholarship winners.

September, 1990

✓ **Sept. 11-13.** AAAA Army Aviation Electronics Symposium. Sponsored by AAAA Monmouth Chapter. Berkeley Carteret Hotel, Asbury Park, NJ.

DON'T GET SHUT-OUT OF THE 1990 ORLANDO AAAA CONVENTION EASTER WEEK, APRIL 11-15

Delta has been selected as the designated carrier for the AAAA Annual Convention in Orlando.

The reduced fares to and from Orlando will be 40% off Coach Class or 5% off the lowest Super Saver. These apply to advance purchase requirements of the applicable fare.

To make your seat reservations ($100,000 free insurance, convention mileage, seat assignments, boarding passes), call **Westport Travel**, our official agency. The Group Department toll free number is available to all convention attendees.

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The system uses any MIL-STD-1553B or ARINC 429 transceiver to resolve target location and exchange target information between force elements. It's totally transparent to the system architecture.

ATHS provides data for such HUD symbols as target I.D., range and steerpoint.

Now flying on U.S. Army OH-58D and AH-64s, the 10 lb. Collins ATHS can be easily integrated into aircraft and ground vehicles. And it's interoperable with TACFIRE and the Battery Computer System.

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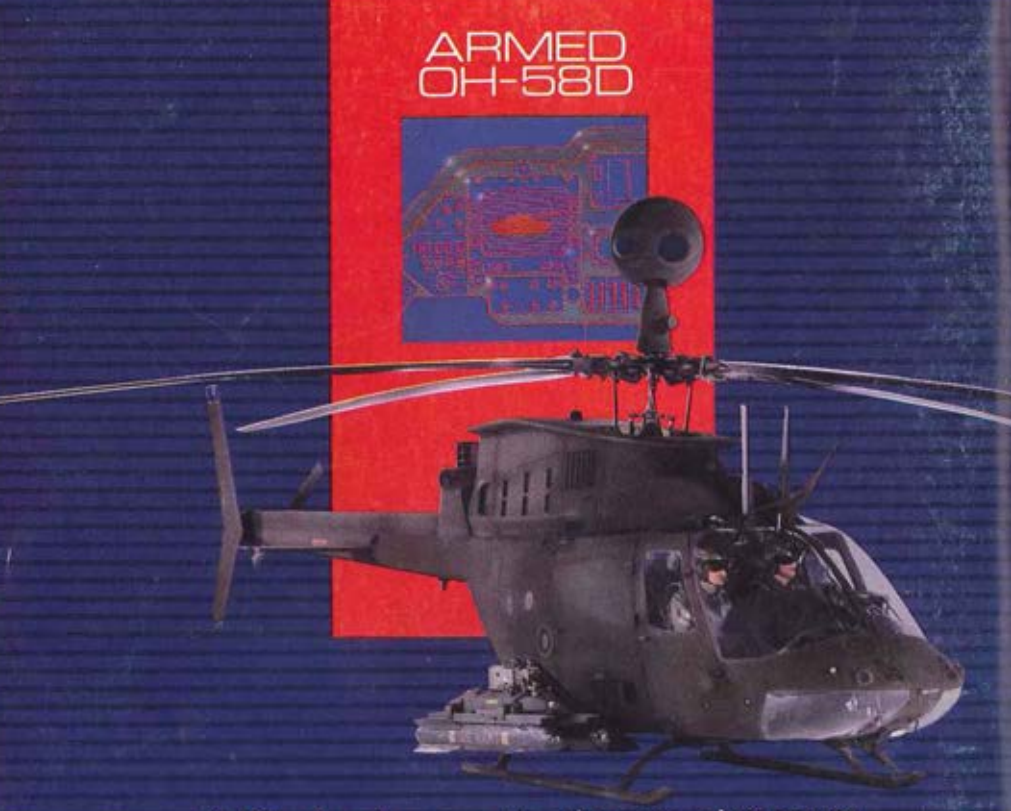

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