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Paid Advertisement. Chinooks from Companies B and C/159th Aviation Regiment and Company B/101st Aviation Regiment completed a four-month deployment in Central America, flying mercy missions after Hurricane Mitch. Chinooks carrying food and medicine saved thousands of hurricane victims facing starvation and death from disease in Honduras, Nicaragua and Guatemala. *Caption provided by advertiser.*

briefings

Attention **Army Aviators Class 53C-L** (San Marcos AFB and Fort Sill, Okla.). We are seeking members for a possible reunion in the fall of 1999. Contact Ed Preisendorfer, 701 Shadow Hills Drive, Grants Pass, OR. 97526, (541) 955-1064 or Bill McPherson, 1029 Park Dr. #29, Indian Harbor Beach, FL 32937, (407) 773-2578.

Two Army aviators assigned to the 2nd Infantry Division's 2nd Battalion, 2nd Aviation Regiment, died Feb. 4 when their UH-60A crashed near the Twin Bridges Training Area, some 20 miles north of Seoul. Killed were pilot in command **CWO Robert L. Brown** and co-pilot **CWO David L. Hopkins**. Their crew chief, **PFC Rocki R. Hernandez**, was injured. Also injured in the crash were **Brig. Gen. Raymond D. Barrett Jr.**, the 2nd ID's assistant division commander for support, and his aide de camp, **1st Lt. Michael B. Siegl**. The soldiers were on a routine training mission in support of the division's WARSTEED winter training cycle when the accident occurred. The cause of the crash is under investigation by a team from the U.S. Army Safety Center at Fort Rucker, Ala.

The **Raytheon Co.** has been awarded a Department of Defense contract for the qualification and production of the Miniature Airborne Global Positioning Receiver 2000, which will provide precision GPS navigation for most U.S. military airborne platforms. The firm fixed-price, indefinite delivery/indefinite quantity contract has an initial value of $8.7 million and a potential long-term value of $167 million.

John D. Cosgrove, president of Rockwell Collins since 1996, retired on Jan. 1. He was succeeded by **Clayton M. Jones**, the firm's executive vice president, who will report to Rockwell's chairman and CEO, **Don H. Davis**.

Boeing Co. ordnance engineers at the firm's Mesa, Ariz., AH-64D production facility have developed a more effective loading system for the Apache's M-230 30mm cannon. The "Sideloader" system enables one soldier to load 1,075 rounds into an Apache Longbow in less than 15 minutes.

Rolls-Royce Plc, the aerospace, defense and energy company, has named **Richard Lewis** its president for North America defense operations. A former director of Army research and technology operations and onetime technical director for U.S. Army Aviation Systems Command, Lewis was most recently corporate vice president of ITT Corp.

The ALTUS II remotely operated aircraft built by San Diego-based **General Atomics Aeronautical Systems, Inc.**, (GA-ASI) recently reached a density altitude of more than 45,000 feet. The feat — the highest altitude reached by any of GA-ASI's family of unmanned aircraft — occurred during a 4.5-hour flight over Edwards Air Force Base, Calif., in early January.

Following extensive operational tests, the Air Force and Navy have adopted for service the SEE/RESCUE SAR passive signaling device developed by Hawaii-based **Rescue Technologies Corp.** The SAR is a compact, high-strength fluorescent orange polyethylene streamer that remains afloat and extended to maximum width at all times to provide a large, continuous visual target to airborne and seaborne rescuers. Available in a range of sizes, the device requires no power sources, no chemicals and no electronics to work, and can be used at sea, on land and in snow.

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ARMY AVIATION is the official journal of the Army Aviation Association of America (AAAA). The views expressed in this publication are those of the individual authors, not the Department of Defense or its elements. The content does not necessarily reflect the official U.S. Army position nor the position of the AAAA or the staff of Army Aviation Publications, Inc., (AAPI). Title reg® in U.S. Patent office. Registration Number 1,533,053. SUBSCRIPTION DATA: ARMY AVIATION (ISSN 0004-248X) is published monthly, except April and September by AAPI, 49 Richmondville Avenue, Westport, CT 06880-2000. Tel: (203) 226-8184, FAX: (203) 222-9863, E-Mail: aaaa@quad-a.org. Army Aviation Magazine E-Mail: magazine@quad-a.org. Website: http://www.quad-a.org. Subscription rates for non-AAAA members: $30, one year; $58, two years; add $10 per year for foreign addresses other than military APOs. Single copy price: $3.00. ADVERTISING: Display and classified advertising rates are listed in SRDS Business Publications, Classification 90. POSTMASTER: Periodicals postage paid at Westport, CT and other offices. Send address changes to AAPI, 49 Richmondville Ave., Westport, CT 06880-2000.

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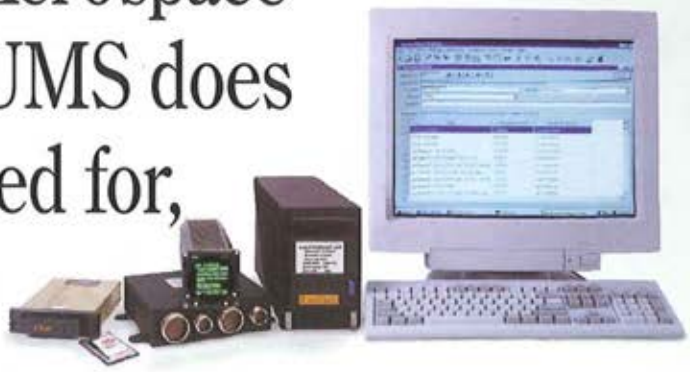

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This year's Aviation Leaders' Training Conference (ALTC) was held the first week of February at the U. S. Army Aviation Center and Fort Rucker. ALTC brought active and reserve component brigade commanders, command sergeants major, active and retired general officers and key military leaders together to discuss the "State of Army Aviation."

The State of ARMY AVIATION

by Maj. Gen. Anthony Jones

This year's Aviation Leaders' Training Conference (ALTC) was held the first week of February at the U. S. Army Aviation Center and Fort Rucker. ALTC brought active and reserve component brigade commanders, command sergeants major, active and retired general officers and key military leaders together to discuss the "State of Army Aviation."

ALTC has evolved from what had once been the Brigade Commanders' conference, and now captures the abundant talent and experience of the active and reserve component military leaders who make up the aviation branch.

In his keynote address Gen. John N. Abrams, commanding general of U.S. Army Training and Doctrine Command, stressed that the success of the conference was dependent upon open communications in order to identify issues from the field. He challenged the participants to look for ways to collectively resolve those issues.

"Each one of you represents a unique capability in the Army," Gen. Abrams said. "You're optimized for a mission profile that your commanders in chief and your operational commanders want you to be good at. You have to tell us what your needs are. You shouldn't leave here without telling us where you think we need to improve on our mission support."

Gen. Abrams' mandate was successfully achieved through a series of open forum panel discussions and information briefings. The briefings – conducted by senior aviation observer-controllers at the combat training centers, TRADOC system managers and various Aviation Center directorates - allowed participants to hear firsthand the current status of various projects and issues facing our branch. Panel discussions provided current and updated information to the conference participants and, more importantly, allowed directors, systems managers and field commanders to provide on-the-spot feedback to the conference participants.

The panel and audience addressed such issues as integrating virtual, constructive and live training to achieve collective readiness; the impact of FAC 3 designations on leader development; the use of contractors on the battlefield; the ongoing development of the Combined Arms Training Strategy for different type units; and the current trends found during training at major combat training centers.

Information briefings were equally informative. Subject matter experts addressed such issues as trends in aviation training; expected challenges for brigade and battalion commanders in the upcoming year; Air Warrior and Organizational Clothing and Individual Equipment developments; and numerous issues involved with the three-part Functional Area Assessment.

One issue that received the attention of every participant was that of force protection. All participants agreed that regardless of how safe we are in the air, and regardless of how effective our risk management is, privately owned vehicle accidents are our soldiers' greatest threat. In response, driver training will soon be included in the POI for Advanced Individual Training, and continue into Common Task Training. The Army chief of staff challenge remains: Management of risk to reduce all types of accidents.

In addition to the numerous professional sessions, the Aviation Center hosted three significant social events to recognize our aviation soldiers, past and present. The no-host "Ice Breaker" was held at the newly re-opened Army Aviation Museum. The museum, after being closed for nearly a year, was graced by the presence of the participants who renewed old acquaintances and socialized while enjoying the new displays and exhibits. The annual Department of the Army Lt. Gen. Ellis D. Parker Awards luncheon and the Army Aviation Association of America awards dinner, sponsored by our local Fort Rucker chapter, recognized the outstanding Army aviation soldiers who strive for and achieve excellence in training, maintenance, operations and safety.

Last year's conference yielded important and complex issues. The USAAVNC community immediately dug in and went to work to find the best solutions. Last year's issues included: standardization of crew drills for the AH-64A, AH-64D and OH-58D; adequate training time at the combat training centers; and the concerns regarding the 93C MOS.

Many of this year's key issues revolved around readiness, modernization and our commitment to soldiers and families in the near term. Topics that received the most attention included: support personnel taskings for the CTCs; emerging trends from the CTCs; and changes to our doctrine. These issues will be addressed by the appropriate USAAVNC agency and staffed worldwide.

"The State of Army Aviation" cont'd. on page 18

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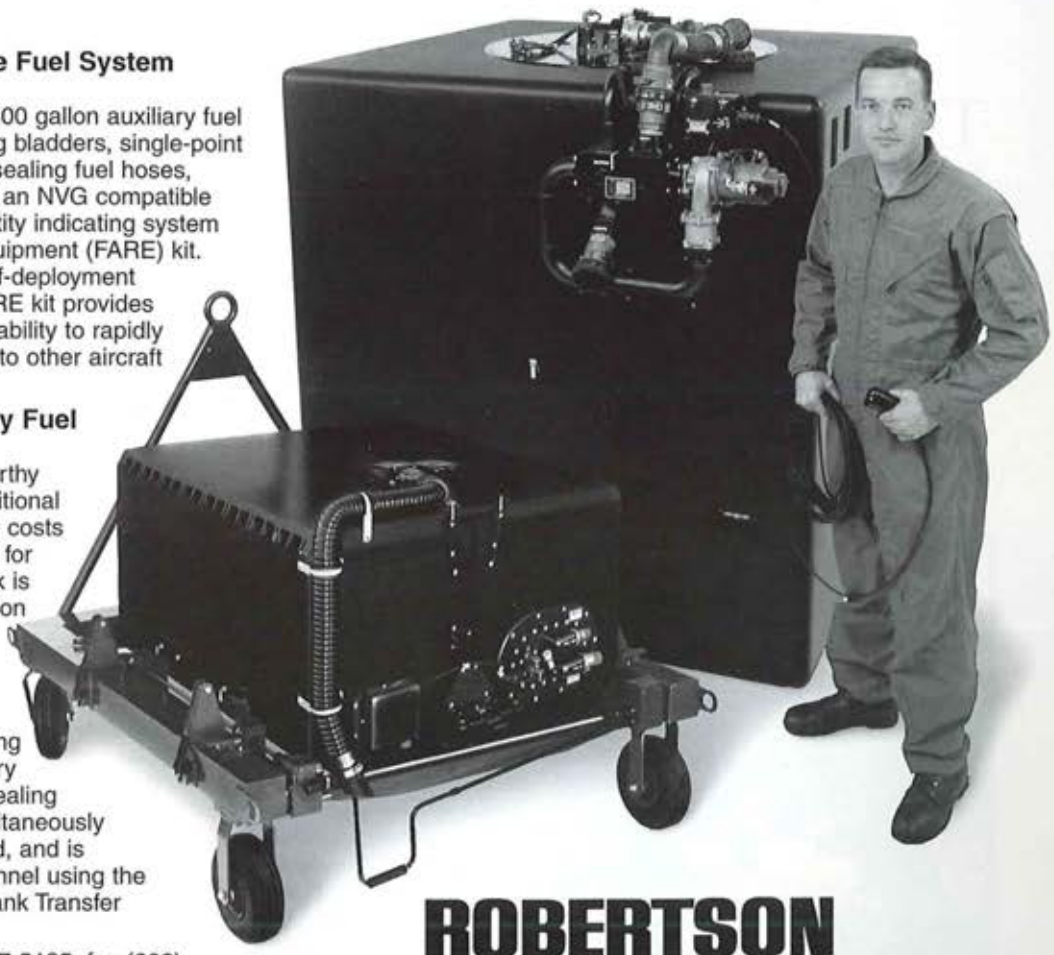

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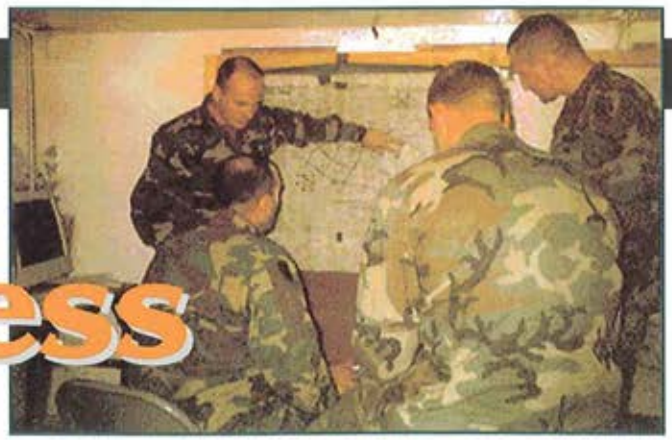

by Lt. Col. David J. Abramowitz

Anyone who has participated in more than one Combat Training Center (CTC) rotation can attest to the fact that winning at a CTC doesn't just happen. The opposing force (OPFOR) is highly trained, motivated and always fights with the home-field advantage. The OPFOR's intimate knowledge of the terrain, of how we fight (doctrine), and of MILES "gamesmanship" are tough obstacles to overcome. However, with the right plan of attack there are ways to even the odds.

The 1st Battalion, 1st Aviation Regiment, the "Gunfighters," completed the first-ever battalion-level Combat Maneuver Training Center (CMTC) rotation with MILES AGES II installed on its AH-64s. Success came from months of planning, preparation and a little initiative.

The 180-day Plan

The key to the battalion's preparation was to have all staff sections in synch with each other. Although six months seems a long time, being forward-deployed in Germany means the only "constant" is change. The battalion had to work around the fielding of the Unit Level Logistics System-Air (ULLS-A) and a headquarters move that included every staff office as well as every soldier living in the barracks.

To add to the difficulty of the CMTC preparation, the battalion would complete aerial gunnery just one week before deploying to Hohenfels. That meant that some aircraft would have to be rotated through the MILES installation process while the unit conducted gunnery; the remaining aircraft would get MILES upon returning from Grafenwöhr. All of this stretched the capabilities of the staff, commanders and maintenance personnel to the limit.

The first hurdle was to identify times that the battalion could set aside for training. The key was to ensure that the battalions' plans were in harmony with the brigade training calendar. This coordination also let the brigade commander and staff know what the battalion commander felt was necessary for the unit to be successful at CMTC. Two field training exercises were scheduled in order to focus the unit on assembly area occupation, validation of the staff functions, conducting battalion-level combat operations, and company-level mission planning cells. Additionally, the battalion planned on utilizing the talents of the Falcon Team (CMTC's Aviation Training Division) to assist in the preparation for success.

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Coordination was made with the CMTC observer-controllers to have the U.S. Army, Europe, Leader Training Program (ULTP) integrated into the training. The Gunfighters were the first aviation battalion to request the train-up with the ULTP in recent history.

ULTP

The ULTP is mainly geared to training the battalion staff in the military decision-making process. Staff exercises are conducted while the Falcons apply current doctrinal solutions and offer suggestions on ways to improve the orders and decision-making process. There are three phases to ULTP: Phase I is the Mobile Training Team (MTT), Phase II is titled ULTP and Phase III is WARLORD.

During Phase I the Falcons came to the battalion as part of their MTT. The goal for this phase was to integrate the unit and the Falcons. The instruction concentrated on how the OPFOR fights and the tactics used successfully by aviation units in the past.

Phase II, ULTP, is a five-day training event at CMTC. The focus centers on the Battalion Battle Simulation (BBS) exercise. The staff receives orders and develops a battalion order that is executed, through BBS, by the companies.

One of the great benefits during this phase is the terrain walk. The commander pushed this to the limit. The entire staff went to Hohenfels to drive the battlefield and walk the terrain. The S2 was able to correlate key terrain and choke points that were identified on the map with the actual terrain. The S3 was able to take a ground commander's look at the terrain and visualize the ground fight. Additionally, he saw how the OPFOR would use terrain to its advantage for concealment from the AH-64s. Through this terrain walk the staff realized that the OPFOR did not drive through the open terrain. They used the sides of the tree blocks to conceal movement and allow for a means of escape from direct-fire engagements.

Phase III, WARLORD, was not executed by the battalion due to gunnery and insufficient time between gunnery and the CMTC rotation. This phase is usually run right before the unit begins its situational training exercises (STX). The commander felt that our STX would be sufficient preparation.

In the Box

The results of all the training conducted prior to the deployment was obvious from the first mission. The integration of a liaison officer to the maneuver brigade was critical. He provided information on up-coming missions and kept the ground commander informed on the Apache's capabilities. The battalion fire support officer was involved in the development of all the scheme of fires and in Suppression of Enemy Air Defenses (SEAD) coordinating. Battle captains were able to take brigade-level orders and produce detailed and concise warning orders (WARNORDs) for the companies.

Each of the line companies received a WARNORD, operations order (OPORD) with graphics, and an Aviation Mission Planning System (AMPS) packet for each of the six missions conducted. The companies were given sufficient time to plan, and most importantly, to rehearse every mission. The battalion also conducted a rehearsal for each mission, ensuring the coordination of all the combat systems that would be involved in the fight.

The battalion brought all of its experience to bear against the OPFOR in a night deep attack conducted against a motorized rifle battalion (MRB). Each company received a WARNORD roughly 48 hours prior to the time on target. The company WARNORDs were issued that day and mission planning commenced immediately. The battalion OPORD followed the next day with a more detailed product with an excellent breakdown of where the enemy would be and when. Companies further refined their missions and developed schemes of maneuver to destroy the MRB.

The terrain at CMTC is a mix of rolling to steep hills covered with evergreen trees. Trying to locate and destroy mechanized forces in terrain like this is more than challenging. Attack by fire and battle positions (BPs) had to be built in depth with detailed engagement areas developed for each position. Intervisability drove most of the locations for the BPs. The speed at which the OPFOR slices through the terrain meant that the companies had to move quickly to subsequent BPs to keep the enemy to their front. The "box" itself is only 19 kilometers long and at times only five to six kilometers wide. What appears as "No Go" terrain to the OPFOR is only a means to flank or get behind the maneuver brigade.

The terrain at CMTC is a mix of rolling to steep hills covered with evergreen trees. Trying to locate and destroy mechanized forces in terrain like this is more than challenging. Attack by fire and battle positions (BPs) had to be built in depth with detailed engagement areas developed for each position.

Because of the terrain, direct-fire engagements routinely occurred at less than 1,500 meters, and often closer. Battles often resembled a knife fight in a phone booth. The constraints of the "box" take away the ability of the AH-64 to use its sensors and stand-off capability, forcing aircrews to fight inside the

OPFOR's engagement ranges. The S2 and the units quickly learned that air defense artillery is not the big killer in such confined operations. Crews were shot down more often by main-gun rounds from tanks and crew-served weapons than ADA.

Massing fires at times translated into placing four Apaches in an area suitable for one or two. Control measures were emplaced in order to prevent air-to-air collisions. However, these control measures have an adverse effect on maneuverability, decreasing the attack helicopters' lethality.

Each of the companies was able to locate and engage the OPFOR, but not with the success that was expected. If asked, whether I'd fight Apache helicopters in that terrain, my answer would be "no." However, the Army trains as it fights, and it could well be that Apaches will have to fight in less-than-optimal conditions. The CMTC offers realistic training scenarios that challenge every part of an Apache battalion/squadron. Once you get past the administrative constraints and can use the CMTC in the ways its designers intended, it's a great training tool.

Success can be defined in many ways. Beating the OPFOR is the most obvious, though meeting the battalion's training objectives and coming away a better-trained battalion is the measure of this battalion's success. Staff training and integration was the number-one objective during this rotation. Although staffs have similar functions in garrison, it takes many hours to make a cohesive battle staff. The staff's wartime mission is the MDMP, and only at a CTC can staffs really practice this very perishable skill.

Training soldiers is the primary reason for any field training exercise. We owe it to our young soldiers to make sure that they know what is expected of them in combat. We all know that field training is very hard to do in an era of shrinking budgets. CMTC is the place where USAREUR units can exercise the combined-arms fight. The integration of maneuver elements — aviation, infantry and armor — with fire support from the field artillery within the same battlespace is graduate-level work. As such, it takes realistic, challenging training to allow battalions to hone their combat skills. CTCs offer soldiers the chance to practice their warfighting skills and give them the experience we look for in all our soldiers.

These are only two of the training objectives that the 1st Bn., 1st Avn., used as a focus for training. With the assistance of the Falcon team and the focus of the brigade and battalion commanders, the Gunfighters are a better-trained Apache battalion today.

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Lt. Col. David J. Abramowitz is commander of the 1st Battalion, 1st Aviation Brigade.

WARRANT OFFICER update

By CWO 5 Thomas Flynn

The warrant officer corps is embarking on a new era. The role of the warrant officer has been redefined by the Army's senior leadership and the demands of an evolving Army mission. We can no longer afford to utilize warrant officers only as technicians – they must take on added responsibilities, especially in the leadership arena. But to do this they must be afforded the requisite training necessary to succeed. So how do we get there from here? Training, education, responsibility, accountability, empowerment and proper utilization!

Warrant officers are often called the "Quiet Professionals." In some cases, this quietness has resulted in a lack of understanding of what warrant officers can add to the accomplishment of the Army's mission. While warrant officers in the Aviation Branch tend to be given the most attention – their branch is the largest (in terms of warrant officers), has the highest operating cost and is seemingly the most visible – they are only a portion of the corps. Many former and current members of the military are unaware the warrant officer corps actually consists of 16 branches and 73 specialties and has more non-aviators than aviators. While there are over 23,000 active, National Guard and Army Reserve warrants, making up over 14 percent (approximately 2 divisions) of the total force, the aviator portion represents less than fifty percent of the total warrant officer corps.

But the truth is that non-aviation warrant officers play as vital a part in ensuring the success of the Army's mission as aviators. And retaining those experienced aviation and non-aviation warrants is possibly the biggest challenge facing the warrant officer corps. Any future changes in the "life cycle" of the warrant officer must address the means to retain all warrant officers, not just aviators. A shortage of warrants in the aviation community is truly no more important than a shortage of Patriot warrants. Ensuring that the warrant officer corps remains technically and tactically proficient, while retaining its best soldiers, is a challenge that must be met head on. The continuing rightsizing of our forces, increased operational tempo, quality of life issues and ongoing evolution of technology require us to maximize our utilization of personnel resources. It's a daunting task.

Over the last two years efforts have been made by senior warrant officers, in key positions, to address a variety of issues affecting the retention and morale of the corps. The fiscal year 1998 Warrant Officer Leader Development Conference identified a need to mask WO1 OERs, find a means to retain AH-64 pilots, promote technical warrants earlier, and create a warrant officer advisory council which can assist the chain of command in identifying initiatives to maximize the contributions of the warrant officer corps. Partly because of their efforts, WO1s OERs are being masked, a bonus is being given to mid-career AH-64 pilots and the promotion zone of consideration was increased to 18 months for tech warrants. Most importantly, the recent establishment, by Army Chief of Staff Gen. Dennis J. Reimer, of the Warrant Officer Leadership Advisory Council, has provided the corps a means to bring warrant officer leadership issues directly to the Army's senior leaders.

The follow-on FY '99 Warrant Officer Leader Development Conference was recently held at Fort Lee, Va. The single most significant result of the conference was the identification of the need for a re-evaluation of the training requirements for the corps. Across the corps, junior warrants (CWO 2, primarily) are being utilized in CWO 3/4 positions. The current professional and technical training available does not prepare our junior warrants for these positions. The last look at this topic occurred in 1986

and those issues developed were completed in 1992. Since then, vast mission, officer utilization (OPMS21) and noncommissioned officer (CINCOS) changes have occurred throughout the Army, placing more emphasis on where and at what level warrant officers are employed. All branch proponencies are currently engaged in the process of analyzing, evaluating and recommending integral changes to the training needs of future warrant officers. These possible changes include:

- Adjusting course length of resident professional development training.
- Providing professional training earlier in the "WO life cycle."
- Increasing opportunities for training with industry.
- Modification of critical-task lists to reflect present and future skills requirements.
- Increased leadership training.

These changes will ensure the Army has qualified and competent warrant officer leaders who can assume that mantle, should the need arise. Based upon the conference's recommendation, the commandant of the Career Center will forward a request to initiate a "life cycle" study of the Warrant Officer Corps (WOPMS XXI).

Another significant action from the conference was the adoption of a warrant officer vision statement. The statement says that we must be:

- A highly skilled corps capable of performing across the full spectrum of operational contingencies our nation will face in the 21st century. Supports, operates and maintains the ever-changing technical systems required to fight and win on future battlefields.
- An officer first and a soldier always.
- Technical expert and tactically proficient.
- Vital to the Total Army mission.
- A leader, trainer and mentor.
- Living Army values.

The way to succeed in this endeavor is crystal clear to the corps. If we are to ensure the success of the Army's future missions the training, education, empowerment and utilization of the Army's warrant officers must be placed at the forefront of our critical-task list. To do otherwise will deny the Army the fullest utilization of the talents residing within the corps. We must allocate the resources necessary to ensure their warrant officers remain the technicians, tacticians, mentors and leaders needed to take our Army into the 21st century. Without this allocation, we will continue to be challenged in the accession and retention of some of the brightest, most dedicated, patriotic and professional soldiers in our Army.

❖❖

CWO 5 Thomas Flynn is the branch chief of the Advanced Studies Branch at the Warrant Officer Career Center, Fort Rucker, Ala.

Keeping CORROSION at Bay

SPECIAL OPERATIONS AVIATION

By CWO 4 Charles B. Lapp Jr.

Life in the Republic of Panama is hot, humid and downright sultry most of the time. Panama Canal Zone rainfall averages more than 100 inches per year. Add the proximity of the Atlantic and Pacific Oceans into the equation and you have prime conditions for severe corrosion. It's no wonder that the U.S. Army Tropic Test Site conducts major end-item corrosion testing in the Canal Zone. Corrosion happens fast at Howard Air Force Base and it affects everything from aircraft to ground support equipment (GSE) and base BBQ grills.

Okay, "So what?"

You may think that your environment and methods of operations protect your aircraft and equipment from corrosion. Wrong answer! Have you ever done a preflight at 0700 and cursed the dew as it soaked your flight suit? Have you flown in the desert lately? Or landed in a dry lake bed and inhaled the stimulating alkali dust? Have you flown in areas that have high levels of such airborne pollutants as smog or forest fire smoke? Do your aircraft sit on the ramp in the rain? Have you ever canceled a flight due to thick fog? All of these situations contain factors that cause and promote corrosion.

Simply defined, corrosion is the process of a metal returning to a natural ore state through reaction with the environment. Dirt, dust, sand and salts attract and hold moisture, and this combination will speed the corrosion process. Fog carries airborne contaminants such as nitrates, sulfides and other chemicals. These contaminants and chemicals form corrosive solutions and they will be present on your aircraft. High temperature will intensify the chemical reaction. Saltwater corrodes absolutely, even stainless steel. Winds from the ocean can carry as much as 100 pounds of sea salt per cubic mile of air. Avionics equipment is particularly susceptible to corrosion-related problems when conditions of heat, humidity, moisture and dirt combine to allow the growth of fungus and molds. The electrolytic properties of the acid by-products can wreak havoc with your boxes! We can never stop the corrosion process completely, but we can slow it down.

Chapter 8 of TM 1-1500-328-23, "Aeronautical Equipment Maintenance Management Policies and Procedures," gives guidance on Corrosion Prevention Control (CPC) procedures and intervals on Army aircraft based on Mission, Design and Series (MDS). H-60-series Black Hawk helicopters are required to have a corrosion inspection every 90 days. However, this interval could be shortened depending on the individual unit mission and the operating environment. Now comes the hard part. We, as leaders at all levels in the Army aviation community, must ensure that adequate time and resources are allocated to corrosion control and preventive maintenance. This will enhance operational readiness rates, save tremendous amounts of money and keep our aircraft operating well into the 21st century.

"You may think that your environment and methods of operations protect your aircraft and equipment from corrosion. Wrong answer!"

The first step in controlling corrosion is to analyze your unit METL and where you operate geographically. Are factors present that promote corrosion? Read Chapter 7 of FM 11-486-29, "Corrosion Prevention and Protection," and decide for yourself. Then do a through inspection of your equip-

ment and aircraft. Did you find any obvious signs of corrosion such as rust or pitting? Did you see anything less obvious, but just as indicative? Look at any place that metals come together. Is the paint or protective coating bubbled? Look closely at rivet heads and joined areas, especially underneath your aircraft. Paint and other protective coatings will mask the corrosion, so look for irregularities such as blistering or flaking. Underneath such areas you will probably find a white powdery substance, which is the product of corrosion. Read Chapter 3 of TM-1-1500-343-23, "Avionics Cleaning and Corrosion Prevention/Control," for a better understanding of what corrosion looks like on different metals.

The most important aspect of corrosion control is to minimize the factors that promote corrosion in the first place. First, keep your aircraft clean. A regularly scheduled, thorough washing is perhaps the best form of preventive maintenance in any corrosion-control program. Keep the dust, dirt, sand, salts and other contaminants off your aircraft and a major factor is eliminated. This means inside and out. Remove panels, cowlings and covers as required. Pay particular attention to the bottom of your aircraft where contaminants collect. If you operate over the ocean and encounter salt spray on your aircraft, it is extremely important not only to meticulously wash the complete airframe, but also to flush the engine(s) using solvent and water per the applicable technical manual. Do this as soon as possible after flight!

Given the choice, would you park your expensive sports car outside in the driveway or put it in the garage? How much does a helicopter cost these days? So, hangar your aircraft whenever possible! I know that there is not enough space to hangar the fleet worldwide, but think about the following. Sunlight deteriorates paint and protective coatings. Heat accelerates the corrosion process and can damage components. Precipitation contains contaminants and forms corrosive solutions. Reduce or eliminate this combination of factors! You will save money and enjoy a better operational readiness rate.

Phase maintenance provides an excellent opportunity to inspect for and correct corrosion deficiencies. Inspect any place that metals come together such as joints and seams. Be sure to clean, treat and seal all underneath your aircraft. Demand that new hardware be used to buildup, especially in stress-critical areas. Why? Most common hardware is plated with zinc, cadmium, nickel or tin for corrosion protection. Tools remove this plating when the same hardware is used over and over. Corrosion on hardware combined with tension stress can cause catastrophic failure. Are you still skeptical? Read Chapter 3 of FM 11-486-29 and I'll bet you start replacing hardware.

Use approved corrosion-preventive compounds per the applicable TMs. There are several different types in the inventory and a few excellent commercial compounds that are MILSPEC-approved for use. They all have their niche in the corrosion-control process. Treatment intervals should be based upon your operating environment and coupled with preventive-maintenance procedures.

Development of an effective corrosion-control program starts with command emphasis. Realize the importance of corrosion control and allocate the necessary resources to implement a program. Inspect your aircraft and GSE. Evaluate your unit METL as it relates to your complete operating environment and identify the associated factors that promote corrosion. Corrosion inspections are a requirement, but remain only one part of an effective program. Your corrosion control/prevention maintenance program should be based upon the analysis of unit-specific conditions. Develop, implement and stick with a program. You will save resources, enjoy higher operational readiness and keep the aircraft flyable well into the 21st century.

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CWO 4 Charles B. Lapp Jr. is the Maintenance Platoon leader for Company D, 160th Special Operations Aviation Regiment at Fort Campbell, Ky.

T800... Comanche Engine Program in Transition

CHANGING THE CULTURE

by Lt. Col. Robert P. Birmingham

As the RAH-66 Comanche helicopter program proceeds toward another fiscally driven restructuring initiative, the T800 government-industry team continues to focus on the transition from engine development to production.

Over the past three years, the Light Helicopter Turbine Engine Company (LHTEC) and Comanche T800 Product Manager's Office (PMO) underwent significant programmatic and functional changes. Despite sweeping changes in key personnel and the organizations, the T800 team worked diligently to adjust engine delivery and test schedules, balance budgets and initiate an Early Production and Fielding Program (EPAF) supporting both the National Guard Bureau and the Comanche Program. The later will allow early engine operational experience and provide tremendous cost avoidance associated with keeping the T800 vendor base warm until Comanche completes development. The road has not been without a few bumps!

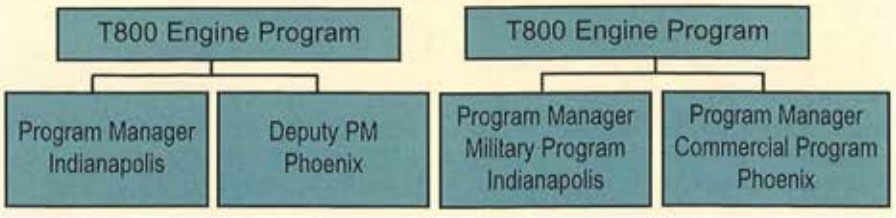
To accommodate the evolving and expanding T800 product line, Allied Signal Engine Company and the Rolls Royce-Allison partnership attempted to re-engineer LHTEC's internal management structure. Additionally, in June 1998 the Army decided not to retain a military officer and aviator as the T800 product manager (PM). The continued downsizing of military officers in the Army Acquisition Corps necessitated this "civilianization" initiative, which is arguably now more the trend than the exception based on recent reviews of the Military Acquisition Position List (MAPL).

For the Army, an expanded T800 product line meant a more complex program with opportunities for risk reduction and reduced costs in production, as well as many more management challenges. The loss of the military PM meant much less military experience in the acquisition process, which should be cause for concern for our soldiers and aviators – who are the final stop in the procurement process. For LHTEC, these changes drove a complex and occasionally contentious partnership in order to remain competitive and sensitive to the Army's "user" requirements. Collectively, these events reflect a widespread, changing procurement culture in the Army that necessitates a change in the way the government and industry will do business in the future.

Re-Engineering the Partnership

In late 1996 the T800 PMO and LHTEC "way of doing business" changed to provide a single military and a single commercial T800 PM to ensure the necessary focus and synchronization of effort to attain maximum benefit to the military and commercial programs.

CONTRACTOR PM ORGANIZATIONS



Contractor PM Organizations

Neither of these "industry" PM positions required nor necessitated any prior military user experience because each of the previous five Army T800 PMs had a strong background in user-level aviation and aviation maintenance, as well as several years in Department of Defense program management. This arrangement provided a sufficient user-to-material-developer interface, enabling implementation of MANPRINT and user related RAM initiatives that would positively impact the soldier, operating costs and system performance after fielding. The "user" interface centered at the PM also provided a solid reality check as program costs became independent variables in the development process. The military expertise in the PMO often became the single most important rationalization

for user requirements that could not be compromised or slipped.

Despite the changes in organization, the LHTEC corporate structure and culture remained the same. The top level leadership of LHTEC rotated biennially between the partnership prime vendors' military engine vice presidents at Allied Signal Aerospace and Allison Engine companies. LHTEC's senior leaders had many other duties and responsibilities with their parent companies and, as a consequence, they served LHTEC on an as-needed/part-time basis, leaving the LHTEC PMs to deal with the day-to-day detailed program details and the tactical focus.

This situation at times resulted in less than ideal communications, slower than ideal tactical/strategic decision making and, in a few cases, corporate friction and de-focus with the resulting confusion arising between the partners and the government PMO. Although the Army PMO had one LHTEC military and one commercial PM to focus problem resolution with, the LHTEC T800 PMs had the virtually impossible tasks of coordinating and focusing complex military and civilian variations of a multi-engine program with the normal contractual, engineering, testing and business actions between the Phoenix and Indianapolis operations, without the advantage of full-time, day-to-day leadership and conflict resolution.

By early 1997 the original Army T800 engine program had grown into several derivative configurations with several potential T800 foreign and domestic customers looming, including the Army National Guard's EPAF program to re-engine the UH-1 as an interim solution for the emerging Light Utility Helicopter (LUH) requirement. Most importantly, all these programs depended upon a successful Comanche T800 program.

At this point the LHTEC T800 industry team was an extremely "stovepiped" and matrixed organization with unclear reporting procedures and channels within each company and across the partnership. The result, by early 1997, was an organization that began to exhibit indications of low employee morale, a less than ideal focus and synchronization, and the routine loss of key personnel before LHTEC or government management could react to prevent or immediately backfill the loss. There was growing and widespread misinformation about test results and program status, as well as an uncoordinated strategy for the T800 future across the partnership. Periodic T800 Program Management Review (PMR) meetings provided the main venue for cost, schedule and test status reporting, though this was normally dated information or incorrect data to use in the evolving program.

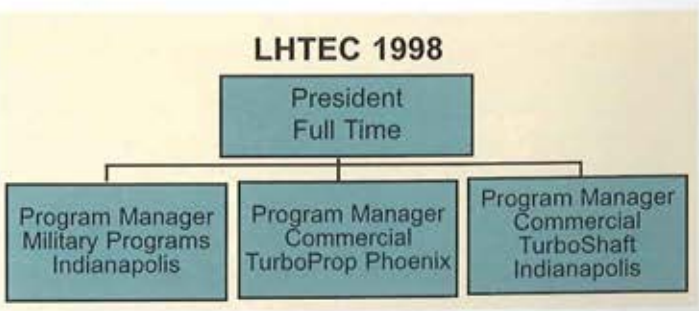
In late 1997 unplanned government budget reductions and engine-certification test delays, coupled with the changing Comanche program schedules, began to place the Army T800 program on a path leading to significant budget and schedule over-runs. In February 1998 the LHTEC T800 Military Program Manager left the program for a new position. Simultaneously, a change in cost accounting system and a new process of cost allocations was implemented at the Allison Engine Company. This, coupled with the additional test delays and underforecast labor rates resulting from a strong economy, adversely effected an already growing program Variance At Completion (VAC) over-run.

Perceptions

The implementation of the Rolls Royce Aerospace acquisition of the Allison Engine Company, coupled with the Army Acquisition Corps-directed military-to-civilian T800 PM transition, increased the perception of future uncertainty and program stability for the T800. From the government's perspective, the progressive loss of key LHTEC T800 engineers and managers indicated a serious lack of commitment to program success.

Initial perceptions in LHTEC about the loss of the military T800 PM suggested that the Army and Comanche program were downgrading the importance and relevance of the engine program. To overcome these perceptions LHTEC hired a new military T800 PM in late April 1998 and a full-time LHTEC president in May 1998; they were charged with controlling and reducing the over-runs and refocusing the industry team. Together they instituted a new leadership process providing an empowerment framework for tactical program decisions below the corporate board of directors, and established clear lines of communication and direct reporting which resulted in a much more responsive organization for the government PMO to deal with.

By June 1998 the Army aviation LTC T800 PM was replaced with a civilian (GS-14) PM who, although he had no aviation experience, did have solid logistics and managerial skills. It was clear that the new PM was up to handling the task of bringing T800 out of development and into production. However, concerns about losing the military interface remained at both LHTEC and at TRADOC.



The Solution

The new LHTEC military programs manager brought to the program a resumé of Army aviation and program management success, coupled with extensive end-user and fielding/fielded system sustainment experience. This PM selection promised to keep the military user needs and military-to-contractor interface well balanced. The new LHTEC president brought previous experience in the early development phase of the T800. More importantly, he also brought a wealth of experience in proven commercial partnership management, production implementation and fielded-systems customer support, thereby focusing the industry team on production execution and fielded-systems support.

The outgoing Army PM assisted the new LHTEC PM transition/ assimilation process by identifying specific focus areas that were perceived as sources of managerial impediments contributing to program shortfalls within the LHTEC partnership. Friction between the partners, slow response to government issues and concerns, and an action plan that directly addressed the increasing Variance-At-Completion (VAC) were issues on top of the list for the newly assigned industry PM.

The Result

The new LHTEC management team's review, audit and change of numerous processes and procedures made a significant impact on the program. Clear lines of responsibility and authority were implemented. The focus of the partnership was refined and the members of the two partner organizations were drawn closer together. The remaining development tests were reviewed, and input from both the government and industry team members on how to accomplish the test intent and diminish risk while reducing or avoiding costs was also implemented. The overrun to date was reduced over 91 percent.

As a result of the new LHTEC PM's military experience and understanding of the government acquisition process, he forged a close relationship with the new civilian Army PM. They established procedures that allowed problems and their resolutions to be brought to a quick conclusion. This balance clearly kept T800 on track.

Conclusions

This article makes two points. First, changing the culture in a partnership in which the partners are fierce competitors in the same marketplace is tricky business. LHTEC is successfully adapting to changes in the T800 program and the Army Acquisition Corps by pushing cultural change through solid managerial leadership, improved communication and empowerment.

Second, as the Army Acquisition Corps continues to downsize its military population, more government civilians with little or no military user or product experience will enter the AAC workforce as product and project managers. These civilian leaders should be chosen carefully in order to match personnel skills with product requirements. Industry must also be tuned to these "customer" personnel changes and seek out, when possible, former military "users" and managers to keep complex programs in focus with the user's requirements.

The job of material development can be extremely troublesome for industry while waiting for new Army managers to climb steep learning curves. Without a balance in industry and the government, we will soon be fielding systems to users with less and less experience. The result will be less consideration given to RAM, MANPRINT and life-cycle support issues that directly impact the soldiers receiving these systems.

The unique perspective that an aviator gives an aviation program, or a tanker gives a tank program, should not be undersold. Our civilians are doing a great job, but keeping military expertise on military systems makes sense for both industry and the government. As long as this balance is maintained, our aviators and soldiers will continue to get the best from our procurement process.

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Lt. Col. Robert P. Birmingham, a senior Army aviator and former T800 product manager, is currently a National Security Fellow at Harvard University's John F. Kennedy School of Government.

"The State of Army Aviation" cont'd. from pg. 6

The annual Aviation Leaders' Training Conference is the forum that lays the groundwork for our leadership to attack challenges head-on. Leaders from across the Army aviation spectrum are determined, capable and ready to propel Army aviation into the next millennium. The challenges facing the Aviation Branch will be met with the same fervor and energy that has made our Army the strongest, best equipped military force in the world.

Just as the Aviation Leaders' Training Conference is the forum to discuss branch issues, so is the AAAA National Convention. The convention scheduled for this May in Nashville, Tenn., will be the forum in which we focus on all aspects of Army aviation. This year's theme, "Heroes, Heritage, and Hardware," promises to be an appropriate blend of showcasing the past and an insightful look at the future. The convention provides an excellent opportunity to build upon the outstanding relationship that we have with industry, and to relay to industry the capabilities we need to accomplish our future mission. In addition, industry takes this opportunity to display the fruits of its efforts as it unveil new systems and hardware.

The convention is just another step in the right direction toward providing our deserving aviation soldiers the best training and resources available to accomplish their missions. The convention is sure to be as rewarding and productive as ever.

I'd like to take this opportunity to publicly recognize the hard work that so many of you contributed to ensure that the Aviation Leader's Training Conference was an overwhelming success. Your efforts to showcase Fort Rucker paid dividends, both tangible and intangible. Your dedication to duty and willingness to go the extra mile ensured a meaningful experience for the leaders of our branch, our Army and our country. It is your efforts and actions that cause our country's leaders to refer to Fort Rucker as a "National Treasure." Please accept my thanks on behalf of the entire Aviation Branch. You are all truly "Above the Best."

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Maj. Gen. Anthony Jones is commanding general of the U.S. Army Aviation Center at Fort Rucker, Ala., and chief of the aviation branch.

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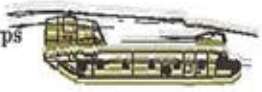
The Case for AVIATION MODERNIZATION

Rotary Wing Aviation Employment

Unit	Objective(s)	Where?	Aircraft
Air Cavalry/Reconnaissance -- Provide Information -- Provide Reaction Time -- Provide Maneuver Space -- Preserve Combat Power (Economy of Force) -- Facilitate Movement -- Provide Force Security	Gain Information Dominance Protect the Force	Division Armored Cavalry Regiments	 OH-58C  AH-1  OH-58D
Attack -- Attack Armored or Light Forces -- Extend Influence of Force -- Reinforce Ground Forces -- Defeat Enemy Penetrations -- Dominate Avenues of Approach -- Theater Missile Defense -- Suppression of Enemy Air Defense -- Provide Information/Security	Decisive Operations Protect the Force Shape the Battlespace	Corps Division Armored Cavalry Regiments	 AH-1  OH-58D  AH-64A/D* *Note: AH-64D in very limited numbers
Utility -- Air Assault -- Air Movement (supplies, equipment, personnel) -- Command & Control -- Medical Evacuation -- Search & Rescue -- Aerial Mine Warfare -- Intelligence/Electronic Warfare	Sustain the Force Project the Force	Echelons Above Corps Corps Division Armored Cavalry Regiments	 UH-1  UH-60A/L
Cargo (Heavy Lift) -- Air Movement (supplies, equipment, personnel) -- Aerial Recovery -- Air Assault	Sustain the Force Project the Force	Echelons Above Corps Corps	 CH-47D

As the pressure to further reduce the Army's Research, Development and Acquisition (RDA) budget grows, major aviation modernization initiatives are certain to face additional scrutiny. Withstanding this scrutiny depends, to a large degree, on ensuring these programs and their impact on the future needs of the Army are well understood.

Relevance

Aviation units conduct combat, combat support, and combat service support utilizing a variety of platforms. Air cavalry/reconnaissance units conduct reconnaissance and security operations to provide the tactical commander critical combat information, early warning, and force protection. Attack helicopter units, with the capability to deliver precise, lethal fires without massing forces, provide a unique maneuver force that contributes to all forms of offensive and defensive combat. Utility and cargo helicopter units provide tactical air movement of combat forces and their assets, allow commanders and their staffs to command while on the move, and perform front line medical evacuations.

These forces provide increased speed, range of fire and maneuver, and mobility of troops and equipment in support of operations from war to stability and support. No other force can match aviation's ability to rapidly project the force and build combat

Update

Special thanks to Brig. Gen. James M. Hesson, Ret., and the Directorate of Combat Developments, Ft. Rucker, Ala., especially, Col. Jesse Danielson and Mr. Jeffrey Longchamp for their contributions to this special report.

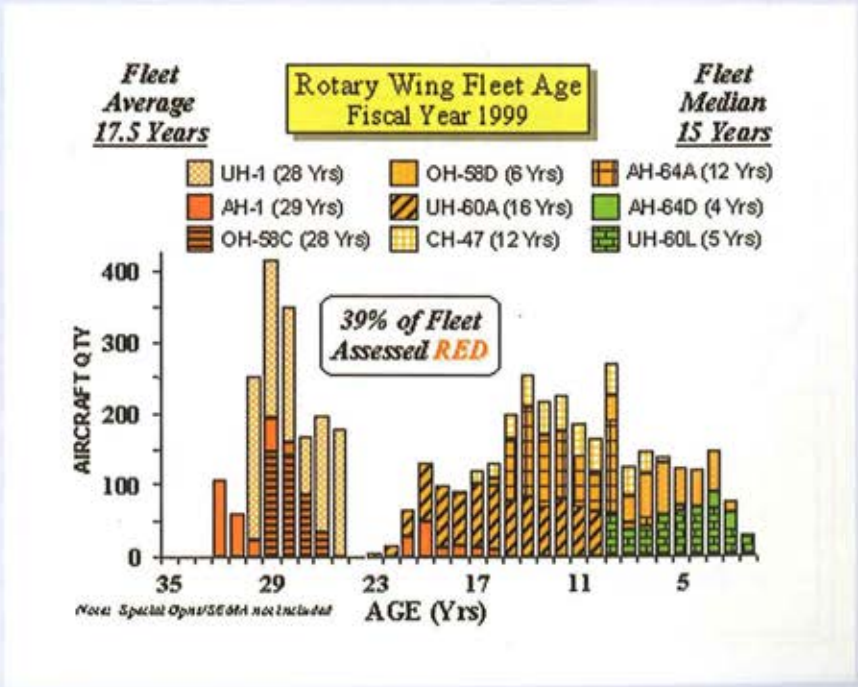
power in an immature theater. Speed and terrain independent mobility offset the affects of distance and undeveloped transportation networks throughout the military operation. These attributes ensure aviation will be a key facilitator in achieving information dominance and providing force sustainment and transition. Aviation is ideally suited to provide the joint force the lethality, speed, mobility and versatility required to meet future worldwide demands.

Modernization Driving Factors

The current rotary wing fleet consists of approximately 5,000 aircraft. This is a significant reduction from the 8,500+ aircraft in the inventory 10 years ago. As detailed below, the average age of the rotary wing fleet is over 17 years. Average ages for individual aircraft are shown in the legend.

Significant numbers of aging AH-1, UH-1, and OH-58C remain in the inventory. Aviation's so-called "modern" aircraft were introduced in 1977 (UH-60A), 1981 (CH-47D), 1982 (AH-64A), 1985 (OH58D), and 1989 (UH-60L). For planning purposes, aircraft useful life projections are 30 years for utility (UH-1 and UH-60) and 20 years for reconnaissance and attack (AH-1, OH-58C, AH-1, OH-58D). When the CH-47B/C aircraft were remanufactured to the CH-47D in the 1980s and early 1990s, a twenty-year life extension was projected. The bottom line is a large percentage of the fleet exceeds or is approaching the replacement or remanufacture point. Although age is an important consideration in modernization decisions, warfighting capability is the most compelling. The figure above also provides a RED/ AMBER/GREEN assessment of warfighting capability for each aircraft. Greater than 30 percent of the current fleet is assessed RED in terms of warfighting capability. The RAH-66 Comanche, AH-64D Apache Longbow, UH-60 Modernized Black Hawk, and CH-47 Improved Cargo Helicopter modernization programs are essential to allow retirement of these aircraft and offset additional fleet obsolescence.

The special insert in this issue provides a brief "primer" on each of these major modernization initiatives. After reviewing this insert, we believe you will agree that the Army can afford no further program delays.

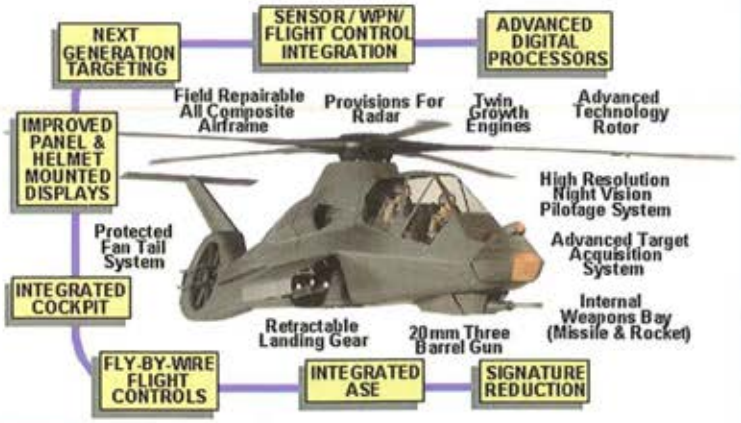


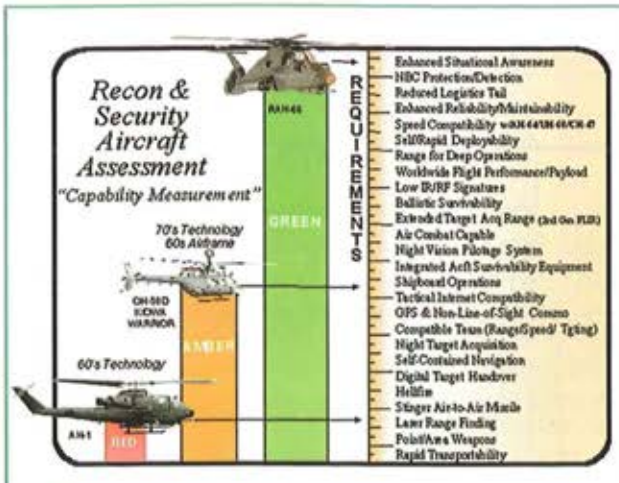
RAH-66 Comanche
First Unit Equipped: 2008

Future doctrine calls for fluid, high tempo more expansive battlefields. This requires survivable, rapidly deployable, multi-role aircraft capable of achieving near-real-time sensor to shooter linkages with a high degree of coupling to UAVs and other C3I assets. The RAH-66 Comanche will provide tactical reconnaissance to clarify information obtained from UAVs or national assets and force protection for the mobile forces of the next century.

The Comanche, which executed its first flight in 1996, introduces major technological advances in the acquisition and processing of battlefield information, rotary wing aircraft survivability, and logistical support. Fielding strategies place Comanche first in air cavalry/reconnaissance units, where it will provide accurate and timely response to the tactical commander's combat information, security or firepower needs. It will also provide critical combat power during early/forced entry operations as the attack aircraft in light divisions, complement the Longbow Apache in a scout role by closing undetected to acquire targets, and meet requirements for special operations forces light attack operations. Approximately 1200 RAH-66 are needed to meet these requirements.

Approximately 500 AH-1 Cobra aircraft remain in the Army inventory. These aircraft, which average over 25 years old, have inadequate flight performance, weapons and mission equipment to meet requirements. Approximately 390 OH-58D Kiowa Warrior will remain in the inventory well into the 21st century. The OH-58D, a remanufactured OH-58C with target acquisition, avionics and weapon system upgrades, falls far short of mission requirements. It is simply not cost effective to upgrade Kiowa Warrior to address major deficiencies in weapon payload, speed, endurance, IR/RF signature and ballistic protection against small-arms fire.





- ✓ **Reconnaissance/Security/Attack**
- ✓ **Quarterback of the Digital Battlefield**
- ✓ **Range/Payload/Endurance Compatible w/Requirements**
- ✓ **Survivable by Design**

Average Age of Reconnaissance/ Light Attack Fleet

	FY2005	FY2015	FY2025
w/Comanche	18	13	10
w/o Comanche	18	28	38

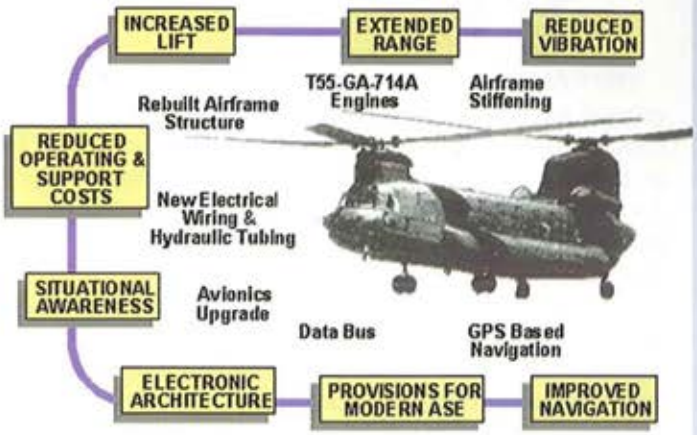
CH-47D Modernization
First Unit Equipped: FY 2004

As the U.S. Army's only heavy lift cargo helicopter, the mission of the CH-47 is to transport (by internal or external means) weapons, ammunition, equipment, troops and other cargo in general support of combat or stability and support operations. The Army inventory consists of approximately 430 CH-47 fielded primarily to aviation brigades at Corps. History has proven that the CH-47 is essential in supporting the spectrum of Army mission requirements. The CH-47 has proven itself from Vietnam to the Gulf War, to civil support fighting forest fires to peacekeeping operations in Bosnia.

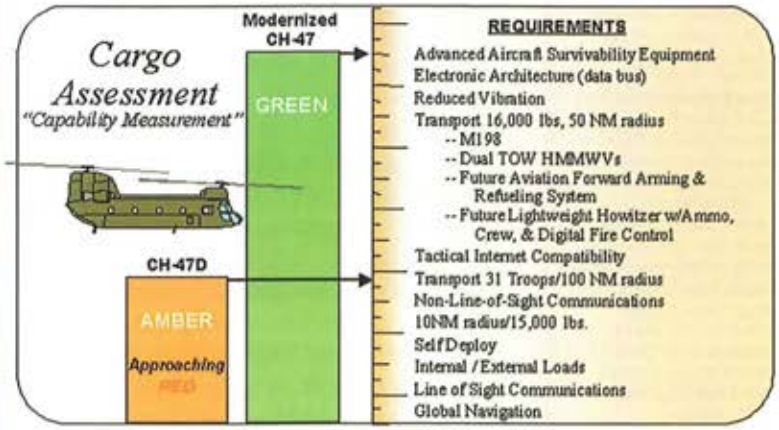
The CH-47 was first fielded in 1962. The CH-47D modernization program extended aircraft useful economic life of the original CH-47A/B/C approximately 20 years beginning in 1982. Consequently, the CH-47D remanufacture point will be reached in FY 2002.

Payload and range capability has fallen below the requirement after years of aircraft modifications. The CH-47D is not compatible with the Army XXI digital battlefield and Operating and Support (O&S) costs continue to rise.

714 Engine Program + Improved Cargo Helicopter (ICH) Program = 20 Year Life Extension



An immediate requirement is to upgrade the existing engines to recapture lift and range requirements. The Improved Cargo Helicopter (ICH) program will extend aircraft life through vibration reduction, structural modifications, and addition of an electronic architecture for digitization and future avionics compatibility. Failing to modernize the CH-47D means that by 2015 the aircraft will have 30 year old systems/subsystems, will not be capable of transporting critical combat systems such as the M198, will not be compatible with the digital battlefield and will have O&S costs more than 50% greater than today.



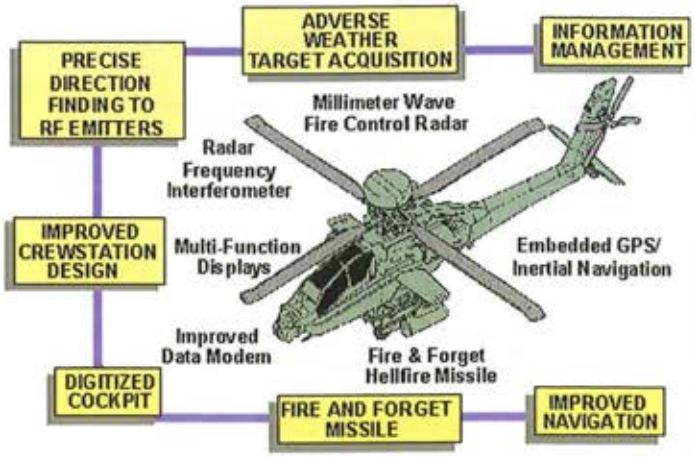
- ✓ **Air Movement/Recovery, Air Assault**
- ✓ **Extend Service Life 20-25 Years**
- ✓ **Restore Payload/Range Performance**
- ✓ **Reduce Operating and Support Costs**
- ✓ **Digital Battlefield Compatibility**

AVERAGE AGE OF CARGO FLEET

	FY1998	FY2010	FY2015
with ICH	11	13	13
w/O ICH	11	23	28

AH-64D

First Unit Equipped: 1998

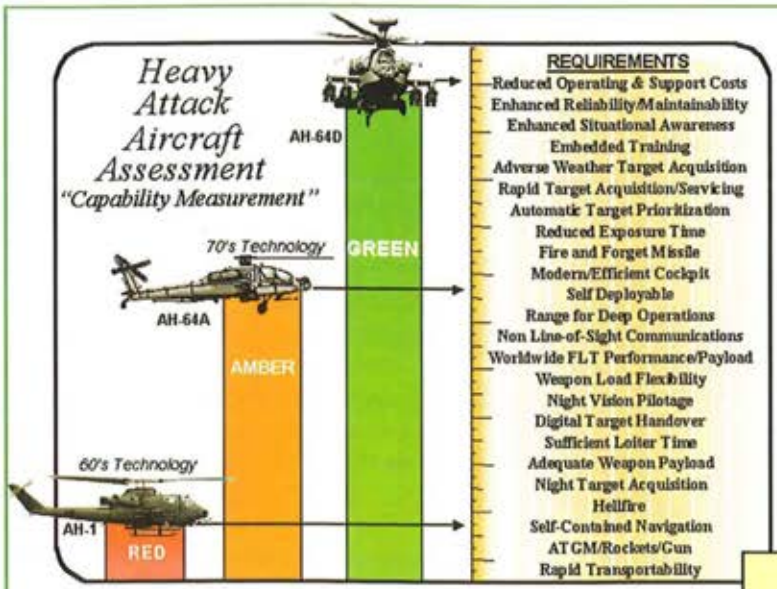


The AH-64D Apache Longbow provides the ground-force commander the capability to deliver synchronized, massed effects on the battlefield in day, night, and adverse weather. It represents a key component of the Army's strategy to incrementally improve capability to ensure continued combat overmatch.

The AH-64D is a remanufactured AH-64A which provides precision inertial and Global Positioning System (GPS) navigation, enhanced displays and crew stations, structural upgrades, digital communications, modifications to allow each aircraft to fire the RF Hellfire missile and aircraft reliability improvements. The current program objective calls for 227 Longbow Weapon System mission kits which consist of the Longbow Millimeter Wave (MMW) radar, Radar Frequency Interferometer (RFI) and upgraded engines. The radar automatically detects, classifies, and prioritizes targets for handover to the fire and forget RF Hellfire missile, significantly increasing survivability, rates of fire and adverse weather capability.

The goal is to remanufacture all AH-64A aircraft to the AH-64D configuration. The impact of Apache Longbow goes well beyond the capabilities it delivers against armored threat and in adverse weather conditions.

- Extends the life of the Apache Fleet. It will be beyond the 2020 timeframe before an AH-64D replacement can be afforded.
- Addresses the digital connectivity requirements for Army XXI necessary for interoperability and situational awareness.
- Reduces the AH-64As workload intensive mission equipment.
- Provides significant supportability enhancements, which will save millions of dollars over the life of the aircraft.



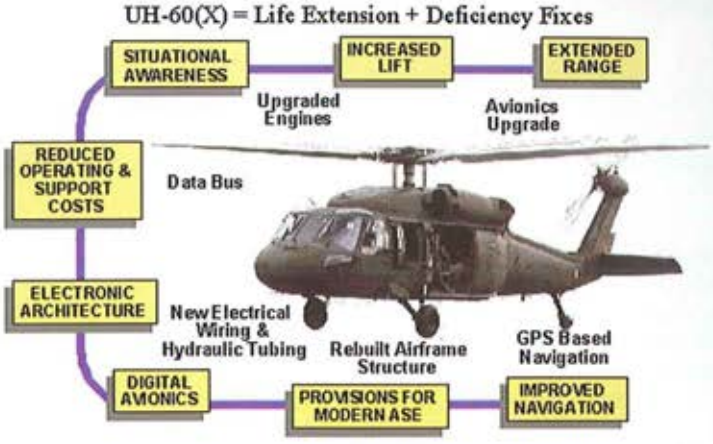
- ✓ **Attack Operations**
- ✓ **Adverse Weather Target Engagement**
- ✓ **Improved Lethality & Survivability**
- ✓ **Digital Connectivity**

Average Age of Heavy Attack Fleet

	FY1998	FY2005	FY2010
with AH-64D	11	11	8
w/o AH-64D	11	18	23

UH-60 Modernization

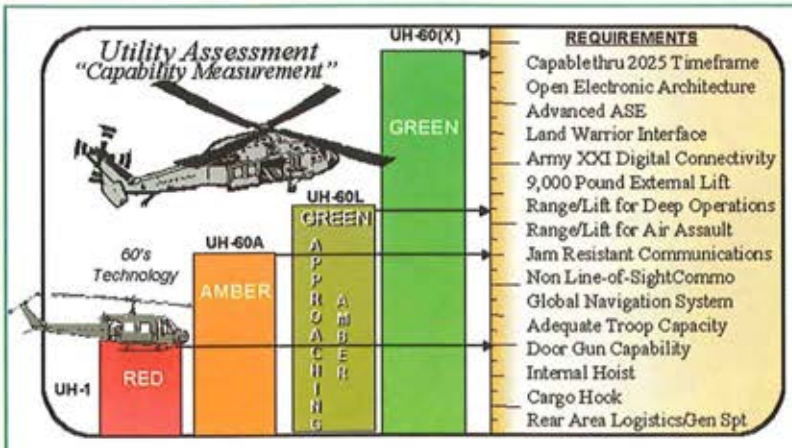
First Unit Equipped: TBD



The UH-60 Black Hawk is the Army's primary air assault, air movement and medical Evacuation (MEDEVAC) aircraft. Air assault forces overcome obstacles, assist in the seizure of critical terrain, and perform follow-on and support missions to preserve the momentum of attack. UH-60 air-movement operations move supplies and equipment, reposition forces on the battlefield and perform downed aircraft recovery to sustain combat operations. MEDEVAC UH-60s provide timely, efficient movement and en route care of sick, wounded or injured to medical treatment facilities. Other missions include airborne command and control, aerial mine warfare, and combat search and rescue. Variants of the UH-60 (EH-60, MH-60) are also used for electronic warfare and special operations.

UH-60A production began in 1977. Over 900 UH-60A remain in the fleet with no replacement envisioned until the 2025 timeframe. Unless something is done before this timeframe, these aircraft will average over 40 years old. Over 400 UH-60L, which began production in 1989, have also been delivered and they, too, will probably require upgrades prior to their eventual replacement.

The UH-60 is the "workhorse" of Army Aviation. The Black Hawk has enhanced the overall mobility of the Army with its troop capacity and cargo lift capability. Failure to address UH-60 life extension and future warfighting requirements will jeopardize the Army's ability to project and sustain the force.



- ✓ **Air Movement, Air Assault, MEDEVAC, Command & Control, Search & Rescue, Aerial Mine Warfare, Intel/Electronic Warfare**
- ✓ **Extend Service Life 20-25 Years**
- ✓ **Restore Payload/Range Performance**
- ✓ **Reduce Operating and Support Costs**
- ✓ **Digital Battlefield Compatibility**

AVERAGE AGE OF UH-60 FLEET

	FY1998	FY2010	FY2015
with UH-60X	11	13	13
w/o UH-60X	11	21	26

ARMY AVIATION: A Historical Perspective

The roots of Army aviation can be traced to 1861 and the formation of the Civil War-era Balloon Corps, which pioneered the missions of reconnaissance and artillery spotting.

Between World War I and World War II, while the Army Air Corps was concentrating on increasing capabilities for what had become its primary missions — bombing, close air support and air-to-air combat — the field artillery was experimenting with using smaller, unsophisticated aircraft for adjustment of artillery fire. On June 6, 1942, the War Department authorized the field artillery to have as organic aircraft two "Cub"-type aircraft in each artillery battalion. These aircraft were flown and maintained by artillery personnel — separate from the Army Air Force — to undertake the same reconnaissance and observation missions as those undertaken by Civil War balloons. What has now become Army aviation was born.

In July of 1947 the U.S. military underwent a major reorganization when the Department of Defense was created and absorbed the War and Navy Departments. This action had little effect on Army aviation because the Army, like the Navy and Marines, retained its organic aviation to perform the missions proven in World War II.

Of greatest significance during the period between World War II and Korea was the awakening of interest in the helicopter. The Army Air Force had employed Sikorsky helicopters to a very limited extent during World War II, primarily for air rescue in the Far East. This, combined with technological advances in the helicopter, alerted the military to its great potential.

During the Korean conflict the helicopter proved its value in battle. The Army employed Bell H-13s with external litters for front-line medical evacuation, ultimately lifting 21,212 wounded troops.

Significant events between the Korean and Vietnam conflicts included:

- The turbine engine was introduced to power helicopters and fixed-wing aircraft.
- The Army initiated development of the first turbine-powered helicopter designed specifically for the Army. Successively designated the XH-40, HU-1 and UH-1, the "Huey" was intended to be used for medical evacuation.
- The OV-1 Mohawk was developed as the Army's first surveillance airplane.
- The U-1 Otter, CV-2 Caribou and CV-7 Buffalo were procured to increase the capability of the Army's fixed-wing fleet.
- The OH-6 and OH-58 were developed to replace the OH-13 and the L-19.
- The H-25 and the CH-47 were developed to replace the CH-21s and CH-34s. The CH-54 was procured to replace the CH-37s.
- Rockets, missiles and machine guns were fired from OH-13, CH-21, CH-34 and CH-37 helicopters. Tests indicated that the helicopter could be a very effective weapons platform.

The Howze Board brought together the new-technology aircraft and the concept of substituting aircraft for ground vehicles in all functions of combat. The result was the true airmobile concept embodied in the organization of the prototype air assault division and the doctrine for its employment.

The Vietnam conflict began with Army aviation operating a fleet of piston-engine aircraft including the L-19, L-20, U-1, U-8, OH-13, CH-19, CH-21 and CV-2. The UH-1B was introduced with makeshift armament for use as a gunship. Shortly thereafter came the UH-1D and H, replacing the CH-19 and CH-21. The 1st Cavalry Division deployed with a full range of modern turbine-powered aircraft. Eventually, the OH-6s replaced the OH-13s and the AH-1G Cobras supplemented the UH-1B, C, and M model gunships. OV-1s and U-21s supplemented the fixed-wing aircraft.

Since Vietnam and through its formation as a separate branch of the Army on 12 April 1983, Army aviation has continued to modernize with new turbine-powered aircraft. The Army can be justly proud of its OH-58Ds, UH-60s, AH-64s and CH-47s, all of which performed so admirably in Operation Desert Storm. With the integration of the new AH-64D Longbow, MH-47E, MH-60K and RAH-66 Comanche, Army aviation stands on the threshold of a new century more mission capable than ever.

It Wasn't ALL the Driver's Fault

MAJ Gary J. Kotouch

When someone says "safety" aviators tend to think of flight-related mishaps. But as soldiers, we must also be safety conscious when operating the many types of ground vehicles upon which the Army's surface mobility is based. The lessons in this story apply to us all.

It began as a mission to tow a disabled 5-ton truck with an M984A1 heavy expanded mobility tactical truck (HEMMT) wrecker to the unit maintenance collection point (UMCP). It ended with the driver having multiple skull fractures and severe brain damage and the passenger sustaining multiple head, back and leg injuries. The cause of this accident was a chain of preventable human errors.

Prelude to Disaster

The HEMMT wrecker, towing the 5-ton truck, was part of a convoy that was traveling over rolling terrain marked with steep ridgelines reading grades over 10 percent. As the convoy proceeded down a long, sloping hill to a 'Y' in the road, the HEMMT wrecker veered to the left as the convoy lead proceeded to the right. The HEMMT wrecker honked his horn twice as if to signal a problem as his vehicle proceeded down the hill at an increasing rate of speed. It then careened off the road, went airborne for 34 feet, rolled to the right, and traveled an additional 150 feet before coming to rest upside down with the cab roof crushed.

As the accident investigation board began to pick through the facts surrounding this accident, it became obvious that unsafe soldier actions, preconditions for unsafe soldier acts, supervisory failures, and an organizational failure had all caused this preventable accident to occur.

Unsafe Soldier Actions

There were specific unsafe actions by the driver that directly contributed to the accident. These included:

- Failure to follow procedure. The driver failed to follow proper hook-up procedures as outlined in the operator's manual. The technical manual was present in the vehicle, but was not used. The connection of these brake lines would have provided a means of deceleration by braking the back six wheels of the 5-ton truck.
- Speed violation. The driver was traveling the route at speeds between 20-30 mph while following a commercial utility cargo vehicle (CUCV). According to the TM, the maximum speed for a HEMMT while maneuvering off paved roads is 15 mph. At the point of departures from the road, the HEMMT and 5-ton truck were traveling approximately 36 mph.
- Driving blind. The driver was unfamiliar with the road and the route. The dirt road was unmarked. Consequently, it was not until about 875 feet from the curve that the driver realized that the road did not continue straight, but made a sharp 115-degree right turn. But at his rate of speed it was too late to react and maintain vehicle control.
- Driving skill error. The driver elected not to use the "Jacobs" engine brake for speed control. The Jacobs brake would have provided a means of deceleration by using the engine to slow the rate of speed. Additionally, the transfer case shift lever was in the HIGH position instead of the LOW position. The low position would have provided an additional capability to decelerate the vehicle. This was felt to be the result of improper training.

Preconditions for Unsafe Acts

While the unsafe acts by the driver were clearly the immediate causes of this accident, there were other equally important contributing causes. These causes were beyond the soldier's control, yet directly affected his performance. The soldier's unit could have avoided these problems, which included:

- Fatigue. The night prior to the accident the members of the driver's unit, a maintenance support team (MST), were only allowed 4 hours of sleep. They were awakened at 0300 for a movement ultimately delayed for 12 hours while the unit located some missing equipment. These soldiers were not allowed to sleep. This clearly affected the accuracy and speed with which the driver could react in a difficult situation.
- Inexperience. The driver and the co-driver were both inexperienced. The driver was a 63W10 (wheeled vehicle mechanic) and was licensed/qualified on the HEMMT only on level, paved roads. He was inexperienced in off-paved-road driving, towing or recovery of vehicles. The co-driver was a 45G10 (fire control systems repair specialist) and not qualified to drive the HEMTT. Their ability, individually or as a team, to risk-manage the hazards of their mission that day was compromised.
- Support failure. The Organizational Maintenance Shop (OMS) that conducted annual services on the HEMMT used the same preprinted checklist for all trucks regardless of the make or model. It shows a check for "brake travel" which checks the travel of the brake pedal from full extension to where it stops on depression. This is fine for trucks with standard brakes, but it is not applicable to the HEMMT, which has air brakes. The proper procedure is to check for the slack adjustment on the HEMMT. As a result, the HEMMT wrecker had three of its four back brakes out of tolerance, rendering them

ineffective. This situation did not cause the accident, but contributed to the inability of the driver to stop his vehicle soon enough to avoid the accident.

Unsafe Supervision

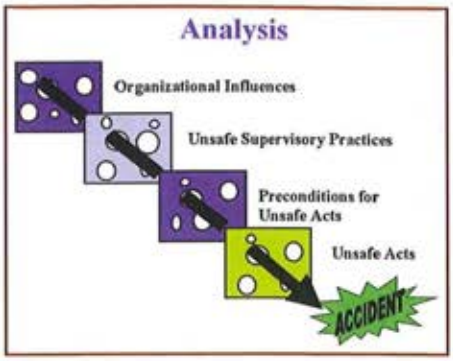
Military organizations rely on the leadership of supervisors (officer, non-commissioned officer and civilian) to set the example and provide clear guidance for their soldiers to ensure mission success. Circumstances in this accident cause one to question whether this happened. These included:

- Failure to correct a known problem. A battalion motor sergeant who observed the driver and co-driver hooking the 5-ton truck up to the HEMMT wrecker did not make an on-the-spot correction to let them know that they had forgotten to hook up the brake lines. He left to assist in repairing a Bradley. At the accident site, he specifically checked to see if they had attached the brake lines and noted that they had not. The power of on-the-spot corrections to stop problems from becoming accidents should never be underestimated.
- Inadequate NCO supervision. The MST assistant section sergeant left with the UMCP serial instead of staying with the HEMMT wrecker convoy (the last group of vehicles). As the serial was about to depart, the sergeant instructed the CUCV driver (a PFC) to lead the last group to the UMCP when they were ready. Positive communication was not established between vehicles and the soldiers were not given a strip map or a route of march.
- Inadequate maintenance supervision. The OMS mechanic was not supervised or checked by production control or quality control supervisors during or after servicing the HEMMT wrecker. The failure to adjust the slack in the brakes may have been spotted at this time. This denied the driver effective braking when he most needed it.

Organizational Failures

Army components have a responsibility to appropriately resource Army programs — to give soldiers the means to meet mission requirements. The Driver's Training Program (DTP) is one such program that failed to set the stage so that this soldier could succeed in his mission.

The DTPs for this unit and most units of this major Army component were found to be deficient in that ample training opportunities for the soldiers to become proficient in on-road and off-road driving conditions were not provided. To create circumstances where a driver must acquire his off-road skills during a deployment to an Army training center, while performing a support mission and without adequate train-up, should not be the way we do business.



Conclusion

It is well recognized that human factors are involved in 80 percent of all accidents. Unfortunately, when human errors, human failures or human factors are mentioned, there is a tendency not to look beyond what the individual at the wheel did and simply allow the soldier to shoulder complete responsibility for the accident. This HEMTT wrecker accident highlights the need to look beyond the soldier who was sitting behind the wheel. Failure to do so will result in a similar chain of human events repeating itself in the future — with a more deadly outcome.

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Maj. Gary J. Kotouch is assigned to the Ground Systems and Accident Investigation Division at the U.S. Army Safety Center, Fort Rucker, Ala.

Introducing TORMS-A

By CWO 4 Susan R. Wheeler

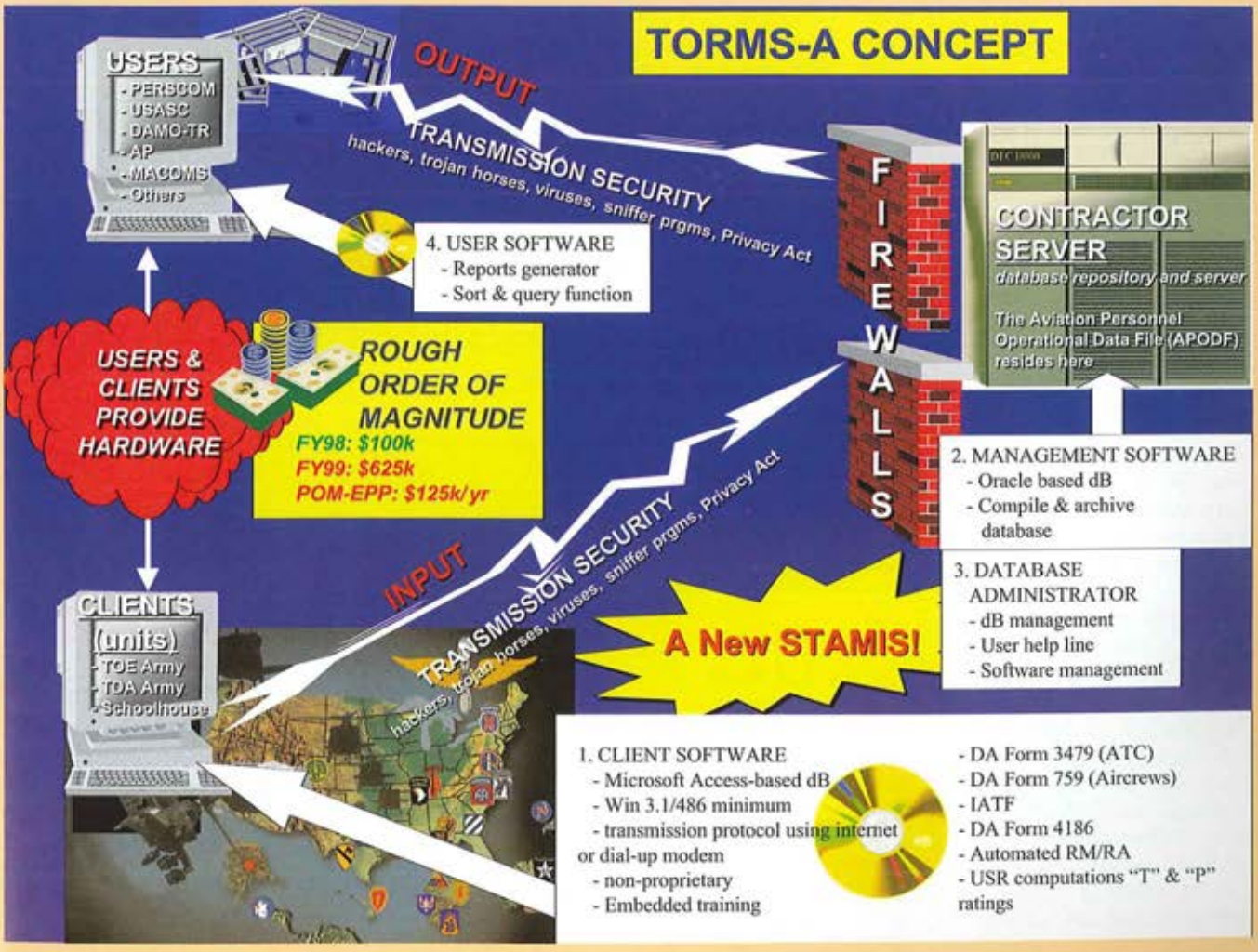
It's a fact of life that Army aviation cannot accomplish its mission without fully trained crews. Risk cannot be mitigated without accurate knowledge of experience shortfalls. Yet critical pieces of readiness information are still not available to decision-makers.

Assumptions about an individual's flight experience based on rank or years of service are inaccurate and abstract, but we have unfortunately been forced into subjective assessments because there is no system to provide oversight of aviator-experience data. Current methods for tracking flight time, training events and qualifications use obsolete systems that rely on archaic programs or stubby-pencil forms and records. And access to this information is available only at the unit level.

Individual flight records are currently maintained by aviation units and logged on a DA Form 759, while training events are tracked in the Individual Aircrew Training Folder (IATF) for aircrew members, and on DA Form 3479 series for air traffic controllers (ATC). Reassigned aviation personnel hand-carry their files to their next assignments, thus denying the gaining unit the ability to forecast the type and amount of training required until the new soldier arrives on-station. There is no backup for lost or destroyed records, unless the individual has saved personal copies. The U.S. Total Army Personnel Command has some visibility of the various aircraft qualifications shown on the Officer Record Brief (ORB), but has no access to recency, amount or specific type of flight experience. This prevents PERSCOM from balancing experience between units. Major commands and staff agencies cannot monitor the impact of management policies and procedures upon the readiness of the force.

To fix this problem, the commanding general of the U.S. Army Aviation Center (USAAVNC) began a process in 1997 to develop a new automated system. This initiative, the Training and Operations Records Management System-Aviation (TORMS-A), will replace the DOS-based Automated Flight Records System (AFRS) and the Aviation Center Flight Records System (ACFRS) currently used to prepare DA Forms 759, and will automate the IATF and DA Forms 3479 series. TORMS-A will possess functionality for tracking aviation experience (officer and enlist-

"TORMS-A" cont'd. on page 32



Sustainment Training Plans as a Combat Multiplier for Army Aviation's Enlisted Soldiers

Where to Start

by William Harris

Anyone who has spent an appreciable amount of time working in and around Army aviation realizes that assessing the capability of new mechanics reporting to their first unit of assignment is, more often than not, a formidable task. Capability to perform many of the critical tasks taught in the respective IET courses of instruction are perishable if not reinforced on a continuous basis. Additionally, on occasion and for any number of reasons, many tasks may not be taught to standard or, in isolated cases, may not be taught in residence at all. Among these reasons may be non-availability of training devices, unserviceable equipment and various distractors to training.

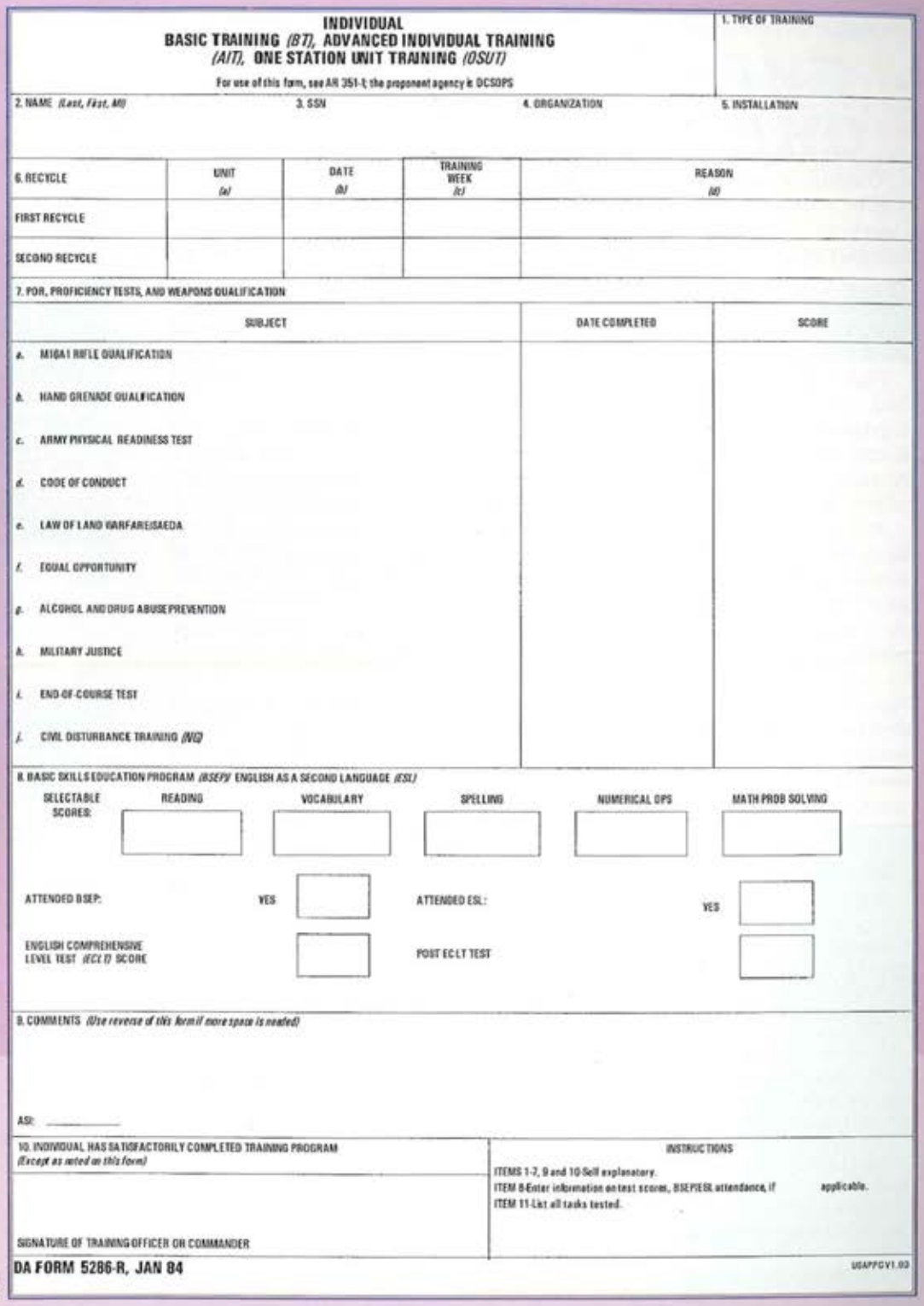
All of these factors impact on the ability of field commanders to develop a viable and healthy training plan for reinforcing and improving on-the-job performance for new mechanics and crew chiefs. Unknown by many commanders but available to all are the Individual Training Records (ITR) DA Form 5286-R and Continuation Sheet DA Form 5286-1-R. Use of the form is outlined in Army Regulation 351-1, "Individual Military Education and Training," and detailed use is further discussed in TRADOC Regulation 350-6, "Initial Entry Training (IET) Policies and Administration".

Unit training officers and NCOs are generally aware that DA Form 5286-R lists common tasks, Basic Combat Skills and military indoctrination training [see Figure 1]. However, many are not aware that DA Form 5286-1-R, Continuation Sheet, lists all critical tasks taught to students during IET and the performance level achieved by them on each one. At the U.S. Army Aviation Logistics School (USAALS) the DA Form 5286-1-R is also used to identify tasks that are not taught to standard or that could not be taught at all due to an unforecasted support failure. This makes the ITR the perfect tool for establishing training programs that can be tailored to the specific needs of the individual, novice mechanic.

Upon initial arrival of the recent IET graduate, the unit commander should ensure that copies of the ITR are made available to the supervisory chain responsible for training and improving the mechanic's job performance. This will allow an immediate assessment of the mechanic's expected strengths and weaknesses and allow a training program, tailored to the individual, to be developed. The ITR will be found with other important training and qualification documents sealed inside the Individual Personnel Records Jacket (IPRJ). It is, therefore, very important that local and regional personnel-administration centers are informed of the importance of the ITR so they can ensure that copies are forwarded to the gaining unit.

In addition to information already discussed, the Continuation Sheet will also include instructor comments assessing the individual's overall proficiency, ability to work in groups and/or alone, leadership potential and other relevant observations, throughout the duration of the course, that might not be readily visible upon initial arrival. With IET course lengths averaging 17 weeks, these additional observances should prove valuable during initial assessments. The ITR can be used to support decisions pertaining to the selection of maintenance team leaders, crew chiefs and unscheduled maintenance teams, to name a few.

"It is incumbent upon unit commanders to establish a program for collecting the Individual Training Records and assessing individual capabilities, strengths and weaknesses."



INDIVIDUAL
BASIC TRAINING *(BT)*, ADVANCED INDIVIDUAL TRAINING *(AIT)*, ONE STATION UNIT TRAINING *(OSUT)*

For use of this form, see AR 351-1; the proponent agency is DCSOPS

1. TYPE OF TRAINING

2. NAME *(Last, First, MI)* | 3. SSN | 4. ORGANIZATION | 5. INSTALLATION

6. RECYCLE	UNIT *(a)*	DATE *(b)*	TRAINING WEEK *(c)*	REASON *(d)*
FIRST RECYCLE				
SECOND RECYCLE				

7. POR, PROFICIENCY TESTS, AND WEAPONS QUALIFICATION

SUBJECT	DATE COMPLETED	SCORE
a. M16A1 RIFLE QUALIFICATION		
b. HAND GRENADE QUALIFICATION		
c. ARMY PHYSICAL READINESS TEST		
d. CODE OF CONDUCT		
e. LAW OF LAND WARFARE/SAEDA		
f. EQUAL OPPORTUNITY		
g. ALCOHOL AND DRUG ABUSE PREVENTION		
h. MILITARY JUSTICE		
i. END OF COURSE TEST		
j. CIVIL DISTURBANCE TRAINING *(NG)*		

8. BASIC SKILLS EDUCATION PROGRAM *(BSEP)/* ENGLISH AS A SECOND LANGUAGE *(ESL)*

SELECTABLE SCORES:	READING	VOCABULARY	SPELLING	NUMERICAL OPS	MATH PROB SOLVING

ATTENDED BSEP: YES | ATTENDED ESL: YES

ENGLISH COMPREHENSIVE LEVEL TEST *(ECLT)* SCORE | POST ECLT TEST

9. COMMENTS *(Use reverse of this form if more space is needed)*

ASI: _____

10. INDIVIDUAL HAS SATISFACTORILY COMPLETED TRAINING PROGRAM *(Except as noted on this form)*

SIGNATURE OF TRAINING OFFICER OR COMMANDER

INSTRUCTIONS

ITEMS 1-7, 9 and 10-Self explanatory.
ITEM 8-Enter information on test scores, BSEP/ESL attendance, if applicable.
ITEM 11-List all tasks tested.

DA FORM 5286-R, JAN 84 USAPPGV1.03

Figure 1

It is incumbent upon unit commanders to establish a program for collecting the Individual Training Records and assessing individual capabilities, strengths and weaknesses. This will ensure that, rather than wasting resources establishing general training programs for all, maximum return on investment can be realized through tailored programs for the individual. It will also ensure that special requirements are identified and instituted where and when needed.

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William Harris is chief of USAALS' Training Operations Division. Address inquiries to harrisw@eustis.army.mil, or call (DSN) 927-6661 or commercial (757) 878-6661. General inquiries can also be submitted using the "Inquiry System" button on the main USAALS homepage at www.usaals.com.

"TORMS-A" cont'd. from page 29

ed) in TO&E and TDA units for both the active and reserve components, and will provide automated risk management and readiness algorithms.

TORMS-A is a software solution that will be installed on existing unit computers and employ web-based technologies to access a centralized database. It will capture unit-level information to populate the centralized database, and will provide information to those with a need to know.

Flight operations specialists will enter data from the DA Form 2408-12, and instructor pilots will log IATF training events into a Microsoft Access, Windows-based software program, using screens that look and feel familiar.

At a given interval, data will be sent from the unit to a contractor-operated server using dial-up modem or web-based protocols. The server converts the data to Oracle language, and compiles it in a manner that can be queried by select agencies and commands. Agencies with appropriate access will then be able to obtain information via a webserver, and can analyze this data through standard reports and ad hoc query capabilities.

Access to information will be firewalled according to agency functions. For example, PERSCOM assignment officers could have visibility on individual records, but the Office of the Deputy Chief of Staff for Operations' Training Directorate would only be able to view flight-hour data by major command and aircraft type. Unit commanders will have access to data for personnel assigned to their commands. Since all the unit-level records will reside on the unit's hard drive, this information will be available immediately; commanders will not have to use the centralized server to access unit data.

"So when may I expect to receive TORMS-A in my unit?" you ask. The prototype will be field-tested until late March and, following additional funding, you may expect to receive TORMS-A at the end of the second quarter of fiscal year 2000. For additional information on TORMS-A, visit Aviation Proponency's website at http: //www-rucker.army.mil/ ap/ap.htm.

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CWO 4 Susan R. Wheeler, a personnel proponent systems manager in the Aviation Proponency Office at Fort Rucker, is the primary action officer for TORMS-A.

2-6 CAV, 11th Aviation Regiment

On Feb. 22 the 2nd Squadron, 6th Cavalry, 11th Aviation Regiment, deployed 250 miles from its base at Illesheim, Germany, to the British base at Gutersloh. There the Army aviators joined the British Army's 652 Squadron for Exercise Winter Dart, which pitted 17 of the 2-6 Cav's 24 Apaches and 12 British Lynx and Gazelle helicopters against High Velocity Missile Air Defense armored vehicles of Britain's 12 Battalion, Royal Artillery Regiment.

The HVM, also known as the Starstreak, is intended for use against helicopters and low-flying fixed-wing aircraft. The British air defenders deployed their 108 HVM systems doctrinally along a divisional frontage and depth, and the U.S. and British helicopters had to locate and "destroy" them.

The Apaches, Lynxes and Gazelles flew six squadron and regimental battle drills in just four days. The battles took place in adverse weather and at night, and included members of the French Polygon Electronic Warfare Unit, NATO elements, Royal Air Force fixed-wing aircraft and many support units. This test, the first of its kind, caused the air defense unit to be certified and it will now move on to live-fire operations.

During the exercise 2-6 CAV also inserted several of its crews along with British crews and conducted combat search and rescue missions to recover them as an adjunct to the main mission. CAV soldiers received cross-training that enabled them to deploy a FARP on one of the missions to refuel British helicopters.

"The level of allied cooperation — which included formation flight, shared battle position operations, FARPs, and common mission planning and briefing — was extremely high," said 2-6 commander Lt. Col. George Rhynedance.

Briefings *continued from pg. 3*

The U.S. Army Communications-Electronics Command (CECOM) at Fort Monmouth, N.J., has awarded **Cubic Defense Systems Inc.** a $14.3 million contract for Joint Surveillance Target Attack Radar (J-STARS) data links. The contract covers the production of Ground Data Terminals (GDTs) and the stowage cases in which the GDT's masthead antenna is transported. The GDT is the ground segment of the J-STARS data-link communications between the Air Force's E-8C aircraft and the Army's Common Ground Station. The first production GDT is scheduled for delivery in May 2000.

DRS Technologies — a defense electronics company — has also won a CECOM contract. The $6.6 million award covers production of assemblies used in the tracking and imaging systems on such Army platforms as the M1A2 Abrams tank and M2A3 Bradley infantry fighting vehicle. The contract represents the initial order on a new, multiple-year contract with a not-to-exceed value of approximately $28 million. DRS is already delivering the assemblies under a previous contract through September; the new contract extends deliveries through July 2000.

The General Services Administration's Federal Technology Service (GSA/ FTS) has honored **Computer Systems Technology Inc.** for its "powerful partner in spirit with GSA/FTS." CST has since 1996 held a GSA contract to provide computer facilities operations support to federal agencies.

Royal Netherlands Air Force pilots and maintainers have begun AH-64D Longbow Apache training at the Boeing Company facility in Mesa, Ariz. The training — the first to involve international AH-64D aircrew — covers six pilots and seven maintainers from the RNLAF's 302 Squadron, which will operate the first 15 of 30 AH-64Ds The Netherlands is purchasing. After completing two months of classroom and flight training in Mesa, the Dutch students will move to Fort Hood, Texas, for AH-64D collective training under the guidance of the 21st Cavalry Brigade.

***Briefings** continued*

The Starstreak ground-based air-defense weapon built in Northern Ireland by **Shorts Missile Systems** has demonstrated its air-to-air capabilities at the Army's Yuma Proving Ground in Arizona. During recent tests the beam-riding missile, which ejects three hypervelocity darts early in its flight, scored hits in each of five live-fire tests against stationary, moving and aerial targets. SMS has joined with Lockheed Martin and the Boeing Company in an Army-funded demonstration of the system's capabilities as a helicopter-mounted air-defense system.

mailbox

Share your opinion on matters of interest to the Army aviation community. The publisher reserves the right to edit letters for style, accuracy or space limitations. All letters must be signed and authors identified. The publisher will withhold the author's name upon request. The opinions expressed are those of the authors, and do not reflect the opinion of ARMY AVIATION Magazine. Send letters to AAAA MAILBOX, 49 Richmondville Ave., Westport, CT 06880-2000, Tel: (203) 226-8184, FAX: (203) 222-9863, E-Mail: aaaa@quad-a.org.

Dear Editor:

I am researching the 2.75-inch rocket as used in Vietnam. I am interested in the various types of warheads and the color each was painted. Finding a copy of the manual would sure be a big help — I'll gladly pay for a copy.

John F. McCabe
1090 Maxwell, Box 357
Victoria, KS 67671-0357

Dear Editor:

The Maine Army National Guard is currently recruiting qualified UH-1 and UH-60 pilots. Our goal is to recruit 15 warrant officers and 6 lieutenants or junior captains. These positions are for traditional Guardsmen only.

The duty requirements for these positions are: one weekend a month, two weeks of annual training a year and 24 to 48 additional flight training periods per year. Aviation units are stationed at Bangor International Airport in Bangor, four hours northeast of Boston and one hour from Bar Harbor, Maine, along the coast.

Interested aviators should contact the state Army aviation officer at (207) 947-6593 or (DSN) 881-3450.

Lt. Col. Robert G. Carmichael, Jr.
State Army Aviation Officer
Maine Army National Guard

people on the move

Col. Tyrone Lee Graham, an Army Reserve AGR officer and a master Army aviator with nearly 30 years of aviation experience, has assumed his duties has chief of the Joint Operational Airlift Support Center at Scott Air Force Base, Ill. Originally commissioned as an armor officer, Graham has served as scout and attack helicopter pilot, an instructor pilot, a command aviation safety officer and in several key command positions.

ARMY AVIATION ASSOCIATION OF AMERICA (AAAA)

49 RICHMONDVILLE AVE., WESTPORT, CT 06880 ● PHONE (203) 226-8184 ● FAX (203) 222-9863

Please check one: ☐ Change of Address: ☐ New Membership Application

I wish to join the Army Aviation Association of America (AAAA). My past or current duties affiliate me with U.S. Army Aviation and I wish to further the aims and purposes of the AAAA. I understand that my membership includes a subscription to AAAA's official magazine "Army Aviation", and that my membership will start on the subsequent first of the month. Contributions or gifts to AAAA are not deductible as charitable contributions for federal income tax purposes. Dues payments may be deductible by members as ordinary and necessary business expenses.

Rank/GS Grade _____ First Name _____ MI _____ Last Name _____ Sex _____

Mailing Address _____

Mailing Address _____

City _____ State _____ Zip + 4 Code _____

Active Duty or Civilian Job Title and Unit or Firm name _____

Area Code Office Phone _____ Area Code Residence Phone _____ Area Code FAX _____

Consent: ☐I do ☐I do not consent to the publication or release of the above information to third parties.

Signature _____ Date _____

Citizenship _____ Nickname _____ Spouse's Name _____

Date of Birth (Mo/Yr) _____ Social Security No. _____

AAAA ANNUAL DUES

Applications other than those listed below:
( ) 1 yr, $21; ( ) 2 yrs, $39; ( ) 3 yrs, $57
Full-Time Students; Enlisted; WO1s; GS-8 DACs & Below; Wage Board 12 DACs & Below:
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Are you a former AAAA member? ☐Yes ☐No

If yes, what year did you join? _____

Chapter Affiliation Preferred _____

Print Name of Recruiter _____

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SERGEANTS FIRST CLASS
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AAAA Locator

The AAAA offers its members the opportunity to contact the National office for addresses and phone numbers of other members with whom they have lost touch over the years.

In addition, as a service to our members, a brief announcement may be placed in these pages to help locate those who are not AAAA members.

Leann Strobel is interested in locating any information pertaining to the military career of her uncle, Army aviator WO Louis W. Heinrichs. He and two other soldiers — WO James Thomas Hampton of Olney, Texas, and Col. James A. Bassett of Dallas, Texas — were killed in a helicopter crash near Carthage, N.C., on Nov. 19, 1954. Ms. Strobel can be e-mailed at strobelite@havilandtelco.com.

Memorial Data Requested

We are in the process of constructing a memorial for all lieutenants killed prior to completing OBC/flight school and receiving their aviator wings. Data is especially scarce in the 1965-1972 years. We need to know the lieutenant's name, date of death, and how they were killed (POV, type aircraft accident, etc.) POC is Maj. Shawn Allen (DSN) 558-3604, commercial (334) 255-3604 or e-mail: AllenS@rucker.army.mil

AAAA NEWS

NEW MEMBERS

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HONOLULU, HI
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Mr. Bill R. Charlton

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2LT Andrew J. Nebl
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IRON MIKE CHAPTER
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SPC Jackie Smith

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PFC Rosa Alaniz
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SGM Larry E. Simon
Mr. Jack Trowbridge
Mr. Periklis N. Zorzovilis

AAAA National Executive Board Nominations

In accordance with the AAAA By-Laws, notice is hereby given that in addition to the nominations recommended by the Nominations Committee for those NEB offices in which vacancies occur at the time of the annual election, floor nominations may be made at the Annual Convention, provided that the names of the floor nominees appear on nomination petitions signed by 25 AAAA members and said petitions are provided to the Chairman of the Nominations Committee at the AAAA National Office at least 30 days prior to the conduct of the AAAA Annual Meeting.

Dr. (Col.) James Hertzog (Ret.), a former flight surgeon known to many Army aviators past and present, died on Jan. 19 in Pennsylvania after a long battle with cancer. As a flight surgeon of the 1st Aviation Brigade and USARV in Vietnam 1966-67, Col. Hertzog organized and supervised the medical support for thousands of Army aviators and flight crews flying the 4,000 aircraft that literally were carrying the war to the enemy.

At Fort Rucker, R. Hertzog commanded Lyster Army Hospital and the Army Aviation Research Laboratory and implemented the aeromedical lessons learned in combat. He was responsible for the expansion of the hospital and participated in the planning and design for a new research laboratory building. He was widely respected for his aeromedical expertise and his compassion.

LEGISLATIVE REPORT

Col. Sylvester C. Berdux, Jr., Ret.
AAAA Representative to
The Military Coalition (TMC)

Senate to Vote on Pay Raise/Retirement Bill

As this article went to press the full Senate was debating S. 4, the important military pay raise, retirement and education benefits package recently approved by the Senate Armed Services Committee. TMC strongly supports this measure as essential to the reversal of increasingly worrisome retention and readiness shortfalls, but some senators have reservations about its cost and prefer the more modest Clinton Administration plan. The latter plan, while clearly a major improvement over past budget proposals, would fix only part of the retirement shortfall for members who entered service after July 31, 1986, and would not materially reduce the existing 13.5 percent pay raise gap for a substantial part of the force.

TMC's view is that budget constraints on needed compensation adjustments have been a major factor in causing the current readiness crisis, and that significant, aggressive steps such as those in S. 4 are needed immediately to reverse the situation. Failing to do that risks worse problems that will end up being even more expensive to fix.

To recap, S. 4 would:

(1) Provide active and reserve component pay raises that exceed private sector pay growth by one-half percentage point per year for the foreseeable future, starting with a 4.8 percent raise on Jan. 1, 2000.

(2) Provide a one-time special additional raise ranging from zero to 5.5 percent (varying by grade and years of service), effective July 1, 2000.

(3) Authorize service members to deposit up to 5 percent of their basic pay in the tax-deferred Thrift Savings Plan currently available to federal civilian employees. Service secretaries would have the discretion to match up to 5 percent of basic pay for members in critical skills.

(4) Authorize service members who first entered service after July 31, 1986, a choice, upon attaining 15 years of service, between the retirement system available to previous service entrants (50 percent of highest three-year average basic pay after 20 years, with full-inflation COLAs for life) or accepting a one-time $30,000 bonus, combined with the reduced post-1986 retirement plan (known as REDUX, which provides 40 percent after 20 years, with CPI-1 percent COLAs); the bonus (and any other bonuses payable to the individual) could be put in the tax-deferred savings plan, at the member's option.

(5) Authorize a special payment of $180 per month to food-stamp-eligible members in grade E-5 or below, with the objective of eliminating that eligibility.

(6) Enhance Montgomery GI Bill coverage by eliminating the $1,200 participant contribution (no refunds for contributions already made), allowing service secretaries discretionary authority to let members transfer education benefits to their immediate family members, and increasing monthly GI Bill benefits by about 14 percent.

Murtha Introduces Pay Raise/REDUX Bill

Defense Appropriations Subcommittee ranking minority member Rep. John Murtha kicked off the pay raise and retirement debate in the House by introducing H.R. 500, which mirrors the Clinton Administration proposals in these areas for active duty and reserve component personnel. Last fall, Murtha's unsuccessful attempt to include REDUX repeal in the fiscal year 1999 Omnibus Appropriations Act first put this important readiness issue in the national limelight. REDUX, enacted over a decade ago, cut future retired pay value by almost 20 percent for members who first entered service after July 31, 1986, but did not affect previous entrants.

This year the shoe has been on the other foot, and the Senate Armed Services Committee has led off by approving more extensive legislation (S. 4) involving additional, and potentially better, retirement options for REDUX-eligible, as well as larger annual pay raises than the Administration proposed plus substantial GI Bill improvements. While expressing general support for pay raise and REDUX upgrades, House Armed Services Committee leaders so far have not endorsed any specifics on these matters.

In a "Dear Colleague" letter to other House members, Murtha sounded a note of caution, implying the Administration proposal may be all the country can afford.

At this point, there seems to be less interest in quick action on the House side. Leaders of the House Armed Services Committee (HASC) have said they plan more deliberate consideration of these issues in the normal schedule for the Defense Authorization Bill (which is not usually finalized until September or later). While generally supportive of pay and retirement upgrades, HASC leaders are leaning toward taking a closer look at the reasons for past retirement system reductions and how proposed upgrades address current circumstances. Also, HASC leaders hope to include a more aggressive strategic missile defense initiative in the Defense Authorization Bill than has been supported by the Administration, and believe including the popular compensation enhancements in that bill will help reduce the chance of a presidential veto.

Taxpayer Relief Act of 1997 Correction Introduced

S. 309 (Sen. McCain, R-Ariz.) would count all the time service members are assigned on military orders away from their principal residence as continuous occupancy of that residence for capital gains tax exclusion purposes. It would correct an oversight in the Taxpayer Relief Act of 1997, which exempted up to $500,000 in homeowner capital gains from federal income taxes for homes occupied as a principal residence for at least two of the last five years. The new law inadvertently penalizes members assigned away from their homes for more than three years on government orders, who now find themselves with substantial tax liabilities when they sell their homes. Last year's tax bill, which included a similar provision, died because of Senate and Administration concerns about funding sources. Prospects look better this year.

Survivor Benefit Plan (SBP) Offset Proposed to be Eliminated Once Again

H.R. 363 (Rep. Filner, D-Calif.) would eliminate the offset to the uniformed service Survivor Benefit Plan (SBP) that occurs at age 62, and provide the survivor a lifetime annuity of 55 percent of retired pay. Filner has introduced this bill for several consecutive Congresses without winning serious consideration for it. To date, there has been little indication that such action is likely, despite years of support by military and veterans associations.

Its $500 million annual cost has proved a perpetual stumbling block. Based on this experience, TMC believes the best way to approach this issue is to push for a series of incremental increases in the minimum post-62 SBP annuity over a period of years, from 35 percent to 40 percent immediately, then to 45 percent, 50 percent, etc. We will be working with Filner and others to pursue such legislation during the current Congress.

Saxton Introduces Paid-Up SBP Bill

Rep. Jim Saxton (R-N.J.) has introduced H.R. 601 to change the effective date of last year's 30-year paid-up Survivor Benefit Plan (SBP) authority from 2008 to 2003. When the paid-up SBP authority was enacted last year, House Budget Committee concerns over costs forced the delayed implementation date. This means members who retired after 1978 will be able to stop paying SBP premiums (while retaining full SBP coverage for their survivors) once they have attained age 70 and paid SBP premiums for 30 years. But earlier retirees will have to wait longer to attain paid-up SBP status - up to 36 years for the initial SBP enrollees from 1972. This is particularly unfair, since these members also paid higher premiums during the earlier days of SBP.

Long-Term Care Insurance Prospects

Since the president's FY 2000 budget proposed providing group long-term care coverage to federal civilian employees and retirees, TMC has been working with Administration and congressional contacts to ensure uniformed services beneficiaries are included in any such legislation. In particular, we've been discussing the issue with the staff of the House Government Reform Subcommittee on Civil Service, chaired by Rep. Joe Scarborough (R-Fla.).

TMC was disappointed when Scarborough introduced H.R. 602. That covered federal civilians and retirees, but not service members. Scarborough's personal staff indicates the intent was to avoid delaying introduction of the bill, and they will try to include service members during subcommittee action this spring. Hopefully, lots of letters to legislators will help ensure that happens.

TMC Urges FEHBP-65 Premium Protection

The Military Coalition has written Dr. Sue Bailey, (assistant secretary of defense for health affairs), urging quick Pentagon action to ensure that Medicare-eligible uniformed services beneficiaries who enroll in the Federal Employees Health Benefits Program (FEHBP-65) test this fall won't have to pay premiums significantly larger than those paid by federal civilian enrollees.

Some concerns on this score have been raised by two rulings of the Office of Personnel Management (OPM), which oversees FEHBP. First, OPM issued guidance that all FEHBP plans at each site, no matter how small, must participate in the demonstration. Further, because of what seems to be an overly strict interpretation of establishing separate risk pools, OPM will not allow the various plans to use any of their reserves to compensate for possible financial risk, as is typically done under FEHBP.

Unless the Pentagon intercedes to protect test participants, the small numbers of beneficiaries at each site, the requirement for a separate risk pool and the restrictions on the use of reserves could force some FEHBP plans (especially the smaller ones) to set premiums very high for uniformed service beneficiaries, at least, until they can gather actual claims data for this new group.

TMC is very concerned that high premiums would dampen participation in the test and skew the results. Far worse, they could create a significant backlash of negative publicity about the test, since beneficiaries quite reasonably expect to participate in FEHBP under the same rules and with the same (or nearly equivalent) premiums as other federal employees and retirees.

The Coalition urged Bailey to create a Defense Department reserve fund for FEHBP plans at each test site - to assure the smaller plans they won't be at financial risk in setting premiums equivalent to those for federal employees and retirees. Since not all of the 66,000 beneficiaries in the test sites will actually enroll in FEHBP, there should be ample funds for DOD to assume the liability for excess costs, should any materialize.

DOD would not need to find additional money to create the reserve, but could use a small part of the $78 million budgeted for the first full year of the FEHBP-65 test. If it becomes apparent (as we believe it will) that claims experience for uniformed services beneficiaries is no different than for federal retirees, there would be no risk for DOD in subsequent years.

We've urged Bailey to act quickly to reassure FEHBP plan managers that DOD is willing to help ease the uncertainty of financial risk, since these plans are going to be negotiating premiums within the next few weeks.

Key Senators Propose Tricare Upgrade

Senators Kay Bailey Hutchison (R-Texas), Wayne Allard (R-Colo.) and Chuck Hagel (R-Neb.) have introduced a bill aimed at enhancing the Tricare military health care system. With tests of Medicare subvention and FEHBP-65 underway or pending enrollment later this year, The Military Coalition will be redoubling efforts this year to effect much-needed Tricare upgrades, and this bill is the opening legislative shot on that issue. The sponsorship of Armed Services Personnel Subcommittee Chairman Allard is very important, since his subcommittee has oversight responsibility for this issue.

Specifically, S. 350 would: (1) require Tricare to provide coverage that is "substantially similar" to the largest health care plan offered under the Federal Employees' Health Benefits Program, considering premiums and out-of-pocket costs; (2) ensure beneficiaries enrolled in one Tricare region can receive care in any other region; (3) require DOD to "minimize" the authorization or certification requirements imposed on beneficiaries as a condition of access to benefits (pre-authorization and non-availability statements requirements); (4) require claims-processing practices similar to the best commercial practices; and (5) authorize the secretary of defense to increase Tricare reimbursement levels to providers if necessary to ensure an adequate number of providers under the Tricare program. These requirements would have to be completed within one year of enactment.

AAAA NEWS

New Chapter Officers

America's First Coast:
CWO 4 William R. Halevy, Pres.; Capt. James D. Lord, Sec.; Sfc. Chris T. Wolfla, Treas.; 1Lt. William B. Bradley, VP Membership Enrollment; 1st Lt. Dudley R. Capps, VP Programs

Colonial Virginia:
Lt. Co. Mark Bingaman, Sr. V.P.; Lt. Col. Robert S. Saunders, V.P. Prog.

Edwin A. Link:
Ms. Judy L. Roberts, Secretary

North Texas:
Robert (Bob) A. Brady, Pres.; Mr. Ray Swindell, Sr. V.P.; Mr. Wally Herzog, Sec.; Mr. Thomas J. Daley, Treas.; Mr. Terry Reininger, V.P. Indus. Relations; Mr. Bob Reschak, V.P. Membership/Ticket Sales; Mr. Jim Barkley, V.P. Public Affairs; Mr. John M. Magness, V.P. Programs; Mr. Garry Bass, Asst. V.P. Programs; Advisory Board: Mr. Jim Schwalbe, Mr. Tom Russell, Mr. Eddie Moore, Mr. Leroy Worm.

Talon:
1st Lt. Anthony J. Cassino, Treasurer.

AAAA Soldiers of the Month

A Chapter Program to Recognize Outstanding Aviation Soldiers on a Monthly Basis

Spc. Corinna V. Capraun
October 1998
(Talon Chapter)

Jennifer J. Flannagan
January 1999
(Tennessee Valley Chapter)

Spc. David C. Smith
July 1998
(Talon Chapter)

SP4 Edwin R. Thompson
February 1999
(Oregon Trail Chapter)

Javier L. Velasco
February 1999
(Tennessee Valley Chapter)

Sgt./E-5 Williams H. Welborn
March 1999
(Oregon Trail Chapter)

AAAA Soldier of the Quarter

A Chapter Program to Recognize Outstanding Aviation Soldiers on a Quarterly Basis

Spc. Wallace R. White
1st Qtr. 1999
(Aviation Center Chapter)

1999 Top ROTC Cadet

Cadet Joshua A. Nanes

AAAA NCO of the Quarter

A Chapter Program to Recognize Outstanding NCOs on a Quarterly Basis

Sgt. Santino Maestas
1st Qtr. 1999
(Aviation Center Chapter)

AAAA Instructor of the Quarter

A Chapter Program to Recognize Outstanding Instructors on a Quarterly Basis
Ssg. Karen R. Coleman
1st Quarter FY 99
(Colonial Virginia Chapter)

New AAAA Life Members

CWO 5 Myron F. Babcock
Ms. Debbie L. Berry
Lt. Col. Carolyn A. Carroll
Maj. Forrest L. Carpenter
Mr. Jerry D. Craig
Mrs. Sue A. Ference
2nd Lt. Arthur W. Galloway
Lt. Col. Reginald R. Gillis
Lt. Col. Allan G. Johnston, Ret.
Capt. David R. Kramer
Lt. Col. James C. Miller
Col. Austin R. Omlie
Col. Larry N. Osborn, Ret.
Lt. Col. Terrance L. Reininger, Ret.
Lt. Col. Sidney L. Strickland, Ret.

New AAAA Order of St. Michael Recipients

Mr. Thomas L. House (Gold)
CSM Clifton P. O'Brien (Silver)
1Sgt. Robert G. Wilson (Bronze)
1Sgt. Lawrence E. Lewis (Bronze)
1Sgt. Miriam C. Wallace (Bronze)
CWO 4 Barry L. Baker (Bronze)
CWO 4 Mark F. Dyment (Bronze)
CWO 4 Hal D. Meeks (Bronze)
Csm. Shelby D. Watson (Bronze)
Maj. Louis A. Vogler (Bronze)
CWO 3(P) Dodd M. Day (Bronze)
Maj. Terry J. Jamison (Bronze)
Mr. William D. Lapham (Bronze)
Mr. Tony Karpinski (Bronze)
Sfc. Roy Moser (Bronze)
CWO 3 Nelson R. Lubold (Bronze)
Capt. Kevin D. Mobley (Bronze)
1Sgt. George E. Ward (Bronze)
CWO 3 Thomas Ward (Bronze)
Lt. Col. Jerry D. Scott (Bronze)
Maj. Richard M. Beckinger (Bronze)
1Sgt. Melvin V. Moton (Bronze)

Aces

The following members have been recognized as Aces for their signing up five new members each.

Mr. William J. Cannon
CWO 3 Roger A. Graf
Lt. Col. Michael F. McClellan, Ret.

New AAAA Industry Members

Belzon Inc.
MacSema, Inc.
Radian Incorporated

In Memoriam

Lt. Col. Marion E. Avrett
Col. Dennis M. Boyle
CWO 2 Robert L. Brown
Maj. Gen. Emil L. Konopnicki
Lt. Gen. G. P. Seneff, Jr.
CSM Kenneth R. Weast

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Mr. Arthur H. Kesten

Museum Liaison:
MG George S. Beatty, Jr., Ret.

Parliamentarian:
COL John W. Marr, Ret.

The Military Coalition (TMC) Representatives:
COL Sylvester C. Berdux, Jr., Ret.
MG Charles F. Drenz, Ret., Alternate

Contact the National Office for P.O.C. information 203-226-8184

The Adjutant General for the State of Alabama, MG Clyde A. Hennies, (left), received the Gold Order of Saint Michael award at a 14 January 1999 luncheon in Montgomery, Alabama. Presenting the award was LTG Ellis D. Parker, Ret., (right) the former Director of the Army Staff and Army Aviation Branch Chief. MG Hennies was recognized for his outstanding achievements over 40 years in Army Aviation especially as the commander of the Task Force 160, Commander of the Army Safety Center, and his most recent assignment as the TAG. MG Hennies retired on 15 January 1999.

Helicopter Pioneer Bartram Kelley Dies

Famed helicopter designer and longtime Bell Helicopter executive **Bartram Kelley** died Dec. 17 at the age of 89.

Kelley and a friend signed their first design contract with Bell Aircraft Company in 1941, and ultimately played a major role in the design of Bell's famous Model 47. A helicopter pilot himself, Kelley went on to design Bell's pioneering Model 209 — which became the Army's AH-1 Cobra — and participated in the design of virtually every other Bell helicopter produced through the mid-1970s.

During the course of his career with Bell, Kelley served as both director of engineering and senior vice president for engineering before his 1975 retirement from the company after 35 years' service. His distinguished role in the development of rotary-wing aviation led to honorary fellowships in both the American Helicopter Society and the Royal Aeronautical Society.

Kelley is survived by his wife, Dorthea Nolte Kelley, three sons and eight grandchildren.

Fort Rucker ALTC Luncheon

On Wednesday 3 February 1999 the Command Sergeants Major and Brigade Commanders assembled at Fort Rucker for the Aviation Leaders Training Conference (ALTC) attended a working lunch hosted by AAAA to discuss what AAAA can better do to serve the needs of today's soldiers. AAAA President MG Dave Robinson, Ret. presented a series of slides showing what AAAA had accomplished over the last year and goals for the next. A lively give and take then ensued with all parties offering ideas and suggestions on how AAAA should be shaped for the future.

Corpus Christi Chapter

The Corpus Christi Chapter is partnered with 100 fifth graders at Luther Jones Elementary School, and helped organize a recent visit to the school by an aircraft and personnel from Corpus Christi Army Depot. The visit was undertaken as part of Fifth Dimension, a program sponsored by the Corpus Christi Business Alliance to bring a special event to the students monthly.

Colonial Virginia Chapter

Colonel Louis A. Bonham (left) presented the Order of St. Michael Bronze Award to Mr. Walter J. Mileham on Feb. 11, 1999. Mileham was recognized for his outstanding contributions in the training of 67Rs.

AAAA NEWS

Nile Delta Chapter

Two Bronze Order of St. Michael Awards were given during the Jan. 5 Nile Delta Chapter General Membership Meeting. Recipients were Mr. James G. Aderholdt (left) and Lt. Col. William A. Tucker Jr. (right). Awards were presented by Maj. Gen. Ward, Chief of OMC, Embassy, Cairo, Egypt.

Aviation Center Chapter

AAAA Annual Turkey and Skeet Shoot

The first annual Daleville Chamber of Commerce and Army Aviation Association of America Turkey and Skeet Shoot was held recently at the Fort Rucker Skeet Club.

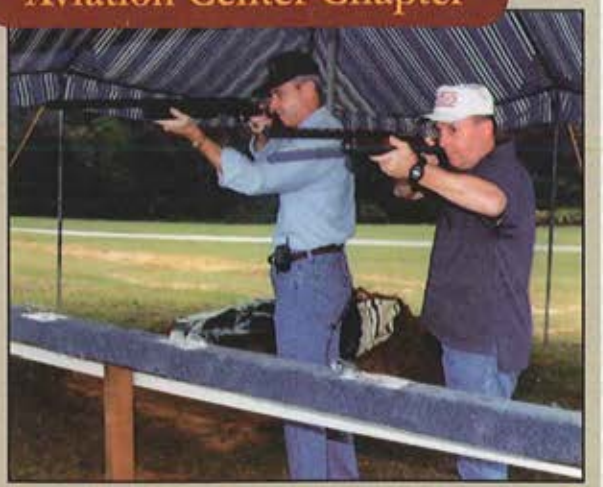
More than 380 people turned out Friday and Saturday for the Turkey Shoot and 100 people participated in the Skeet Shoot, winning 150 turkeys and door prizes donated by several businesses in Daleville.

During the Turkey Shoot 10 shooters lined-up, side-by-side, and shot at a target for a guaranteed winner. The winner was whoever shot closest to the bullseye.

The Skeet Shoot, which involved five-person teams, actually consisted of two events and a total of 50 rounds. The first 25 rounds were used for cross targets. The second part of the skeet shoot was the trap shoot. Occupying ranges one through four of the Skeet Club, Skeet Shooter teams were striving to win first place and the Top Gun individual shooter. But it was John Campbell who took home the Top Gun title.

The first-place winners in the team skeet shoot received a total of $100, which they split five ways, and each team member also received a turkey, a free round of skeet and a box of ammunition.

- Maj. Mike Negard



Brig. Gen. Charles M. Burke, (left) commander of the U.S. Army Safety Center, and Maj. Gen. Anthony R. Jones, commander of the U.S. Aviation Center and Fort Rucker, take aim during the first annual Daleville, Ala., Chamber of Commerce and Army Aviation Association of America Turkey and Skeet Shoot on Feb. 5, 1999.

The three Army Aviators of the 1999 Air War College class, from left to right, Lt. Col. Douglas R. Eller (enroute to the NTC), Lt. Col. Thomas C. Johnson (enroute to PACOM), and Lt. Col. Warner D. Farr, (enroute to JSOC).

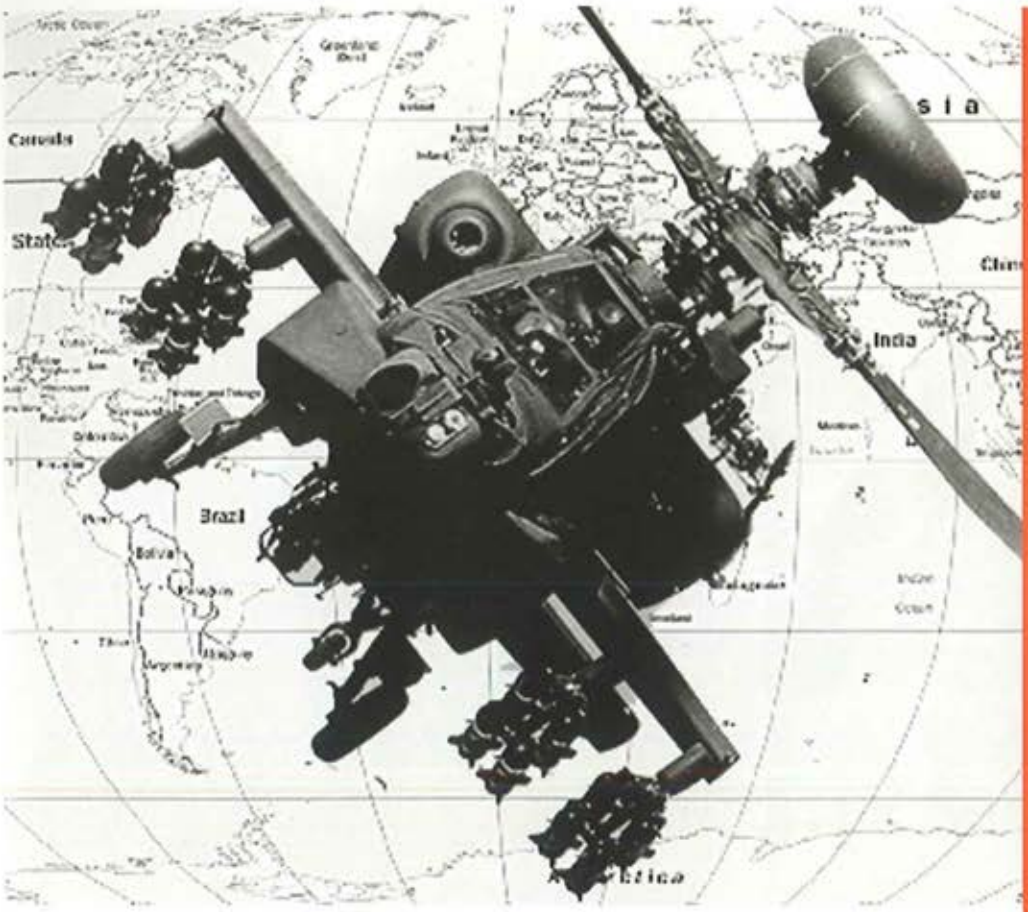
April 26-29. Cargo Helicopter Users Conference, Sparkman Center, Huntsville, Al. Lodging at Holiday Inn Research Park. Contact Patty Barron (256) 313-4409; e-mail: barronp@peoavn.redstone.army.mil.

May 9-12. AAAA Annual Convention, Opryland Hotel, Nashville, TN.

May 9. AAAA National Executive Board Meeting, Opryland Hotel, Nashville, TN.

May 10. AAAA Scholarship Foundation, Inc. Governors Meeting, Opryland Hotel, Nashville, TN.

May 25-27. American Helicopter Society Forum, Montreal, Canada.



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