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ARMY AVIATION

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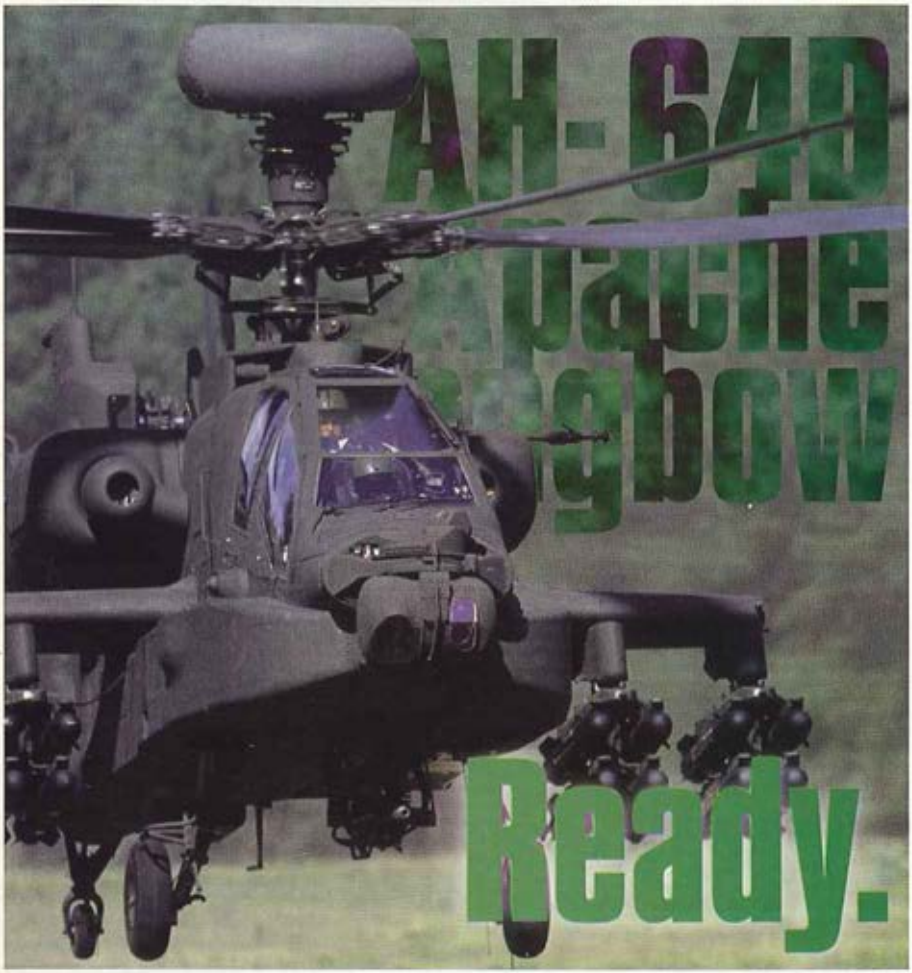

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Announcement ...

Dear Readers:

We are pleased to share with you the exciting news that the January 1998 issue of **ARMY AVIATION** will premiere our new, standard-size format. After 45 years of the familiar digest size, our moving to standard size will offer more visual impact area for our editorial material and represents our commitment to becoming an even stronger voice of the Army Aviation community and a more dynamic forum for the exchange of ideas.

We are also pleased to welcome Stephen Harding to the staff as Editor. Steve served in the U.S. Army during the Vietnam period. He later attended the University of California, where he earned his BA and MA degrees in military history. A former staff historian for both the Army and the Air Force, he later became a defense journalist. Steve has authored numerous articles and books on aviation and defense topics, including his most recent, **"U.S. Army Aircraft Since 1947".** Bill Harris, currently serving as AAAA's Acting Executive Director, has been named Editor-in-Chief.

Sincerely,
Lynn Coakley, Publisher

Briefings

Elizabeth "Liz" Carr, a blinded veteran from Glen Oaks, New York, has been selected as the new National President of the Blinded Veterans Association (BVA). Carr is a Vietnam-era veteran of the United States Air force. She was blinded as a result of a severe head injury she suffered during a training exercise. After her accident, she earned a Bachelor's degree from CW Post College and a double Master's degree in Public and Health Care administration from New York University. After completing her education, Carr became the first legally blind person ever hired by the New York State Education Department Office of Professional Discipline.

Blinded Veteran Association is the only veterans service organization chartered by Congrees to represent the needs of blind and visually impaired veterans.

The Field Service Program, the backbone of BVA activities, employs blinded veterans as Field Service Representatives who act as role models. They encourage fellow blinded veterans to take charge of their lives and link veterans with services,

cont'd. pg. 32

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FEATURE ARTICLES

ROTARY AND FIXED WING UPDATES

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DEPARTMENTS

FRONT COVER

Paid Advertisement: Pilot and maintenance training activities for the AH-64D Apache Longbow, built for the U.S. Army by **The Boeing Company** in Mesa, Ariz., continue on schedule. The first unit will be equipped in July 1998. For an update on Apache, see the article on page 24 by Apache Project Manager Col. Stephen Kee. Photo by Bob Ferguson. Caption provided by advertiser.

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GUEST EDITORIAL **By Lt. Gen. Paul J. Kern**

THE ARMY AVIATION TEAM ... MEETING TOMORROW'S NEEDS

Our military success has taken us in a new direction and provided us with unprecedented opportunities. We are now working to build an Information Age Army, a logistically unencumbered force with greater lethality, versatility, and strategic and operational mobility. We envision a new battlefield where information is gathered, processed and used differently than ever before. Digital technology will enable us to move information instead of people, equipment and supplies.

The Army's primary aviation technology development in the Information Age is the RAH-66 Comanche

Army aviation has a critical role. It is integral to our total military capability just as are artillery, infantry, armor or air defense. Army aviation has played a critical role in our military success during this century, and that role will continue to increase in the 21st century.

The Army's primary aviation technology development in the Information Age is the RAH-66 Comanche armed reconnaissance helicopter. Our ground commanders need near real-time battlefield information to make the best tactical, timely decisions. During the Task Force XXI Advanced Warfighting Experiment last March, Apache Longbow — along with the Joint Surveillance and Target Radar System (Joint STARS), unmanned aerial vehicles, the Army Airborne Command and Control Systems (A2C2S) and the enhanced Kiowa Warrior — provided commanders with highly effective friendly and enemy information. This was only a glimpse of the future. When Comanche is fielded it will bring greatly improved night/adverse weather reconnaissance and target acquisition, deep reconnaissance without detection, survivability, deployability and lethality.

While Comanche is our aviation technology carrier for the 21st century, we are modernizing our existing fleets of Apaches, Chinooks, Kiowa Warriors and Black Hawks by incorporating updated communications capabilities and computers. These upgrades will be compatible with Abrams tanks, Bradley fighting vehicles and Paladin howitzers and will allow the exchange of friendly and enemy position data through the tactical internet. The systems will also interface with the Army Battle Command System. This powerful linkage of combat systems allows the commander to provide a common view of the battle to all elements, speeds up

With over 12 million hours, the T700 is the most trusted turboshaft of our time.

Millions of flight hours and several battlefields later, the T700 continues to prove itself on the Army's Black Hawks and Apaches. The T700's operational experience is legendary. Ten thousand T700 family engines delivered. Twenty million flight hours. Twenty-four models of helicopters and fixed-wing aircraft.

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GE Aircraft Engines

the tempo of maneuver and reduces the potential for fratricide.

Changes in science and technology require a more rapid approach to upgrading and improving our aviation assets. In order to succeed, we must be innovative and creative. We need everyone working together, sharing ideas and capabilities.

We must give the greatest priority to making rotorcraft more affordable to produce, operate and support. Reducing operating costs is every bit as important as reducing production costs. One major initiative is the National Rotorcraft Technology Center (NRTC), a collaborative effort among the Army, the Office of the Secretary of Defense, the Navy, the National Aeronautics and Space Administration, the Federal Aviation Administration, industry and academia.

In this era of austerity, NRTC is a low-overhead catalyst to facilitate rotorcraft research and technology development to retain battlefield superiority of our rotorcraft systems while strengthening our rotorcraft industry's economic security. NRTC serves to cooperatively develop and implement a national rotorcraft strategy and technology plan that addresses the highest priorities of both military and civilian markets, including critical dual-use technology, passenger and environmental acceptance, product and process development, aviation infrastructure, and civil and military standards.

Our plans for a modernized aviation warfighting force are included in the Army Modernization Plan. We are now working with the Aviation Center, the Deputy Chief of Staff for Operations and other key Army leaders to produce the 1998 Army Modernization Plan, which will be available early next year.

Our acquisition reform program directly supports the modernization plan. Efficiencies within our own operation enable us to reinvest often substantial savings in modernization and other high priority needs. As we continue our efforts, we find that there are more cost reductions to be realized, efficiencies to be achieved, and better technology to be acquired and provided to the soldier.

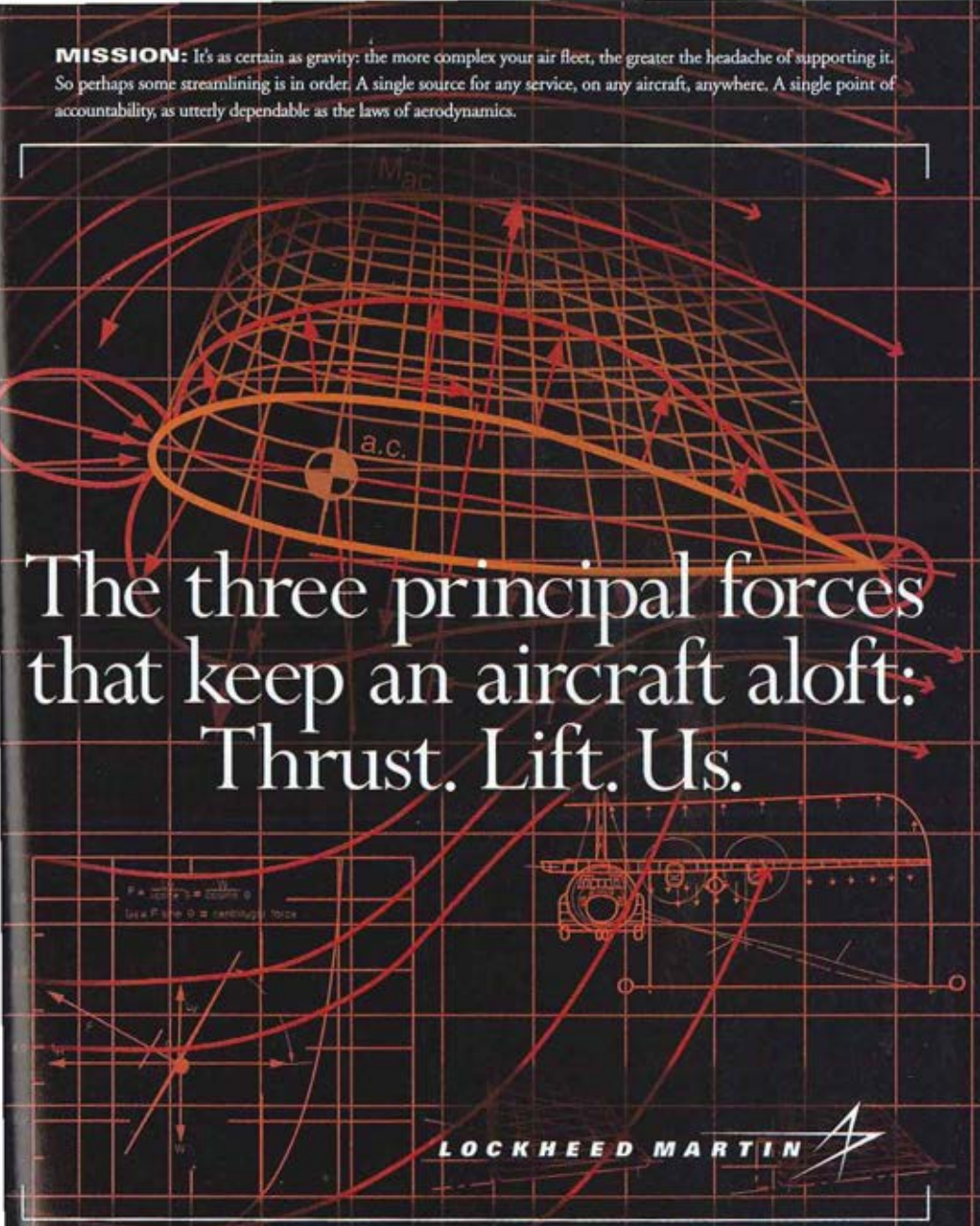
While the acquisition community supports aviation modernization through the program offices, contracting commands and test organizations, there are a few important reform initiatives where the Army aviation industry/government team is making significant contributions to our overall modernization program.

"Changes in science and technology require a more rapid approach to upgrading and improving our aviation assets."

Integrated product teams (IPTs). IPTs are designed to give the warfighters what they need, when they need it and at an affordable cost. IPTs bring together representatives from several disciplines to allow early and continuous insight by all stakeholders in a program. An atmosphere of trust and cooperation among team members enables them to identify and resolve issues in a timely manner and thereby contribute to a successful program. IPTs allow us to quickly identify requirements and improvements that can be supported by the Army's Warfighting Rapid Acquisition Program.

Team Comanche is a model IPT. Government and industry have worked closely to identify products, services, and manufacturing and management processes that support the Comanche development program and

MISSION: It's as certain as gravity: the more complex your air fleet, the greater the headache of supporting it. So perhaps some streamlining is in order. A single source for any service, on any aircraft, anywhere. A single point of accountability, as utterly dependable as the laws of aerodynamics.



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ensure a successful transition into production. The program applies commercial approaches where practical and uses simulation to the maximum. Our goal is to retain full capabilities and to achieve several hundred million dollars of cost savings and avoidances. We are making good progress.

Warfighting Rapid Acquisition Program (WRAP). WRAP was established in 1996 to accelerate fielding of systems and technologies that emerge successfully from Advanced Warfighting Experiments, Battle Labs, Advanced Technology Demonstrations or Advanced Concept Technology Demonstrations. Candidates for the program are selected based on urgency of need, technical maturity, affordability and effectiveness. In order to promote program stability, candidates receive WRAP funds for the first two years, which allows time to build them into the overall budget. WRAP funds helped to accelerate the A2C2S Engineering and Manufacturing Development phase by 21 months.

"In the past, cost and schedule were thought of as dependent variables in the acquisition process..."

Prime Vendor Support (PVS). PVS may be an innovative way to reduce overall operations and support costs, improve spares availability, maintain weapon system readiness rates, and save money to reinvest in modernization. This initiative would allow the prime contractor of an Army weapon system to assume complete responsibility for its overall field performance.

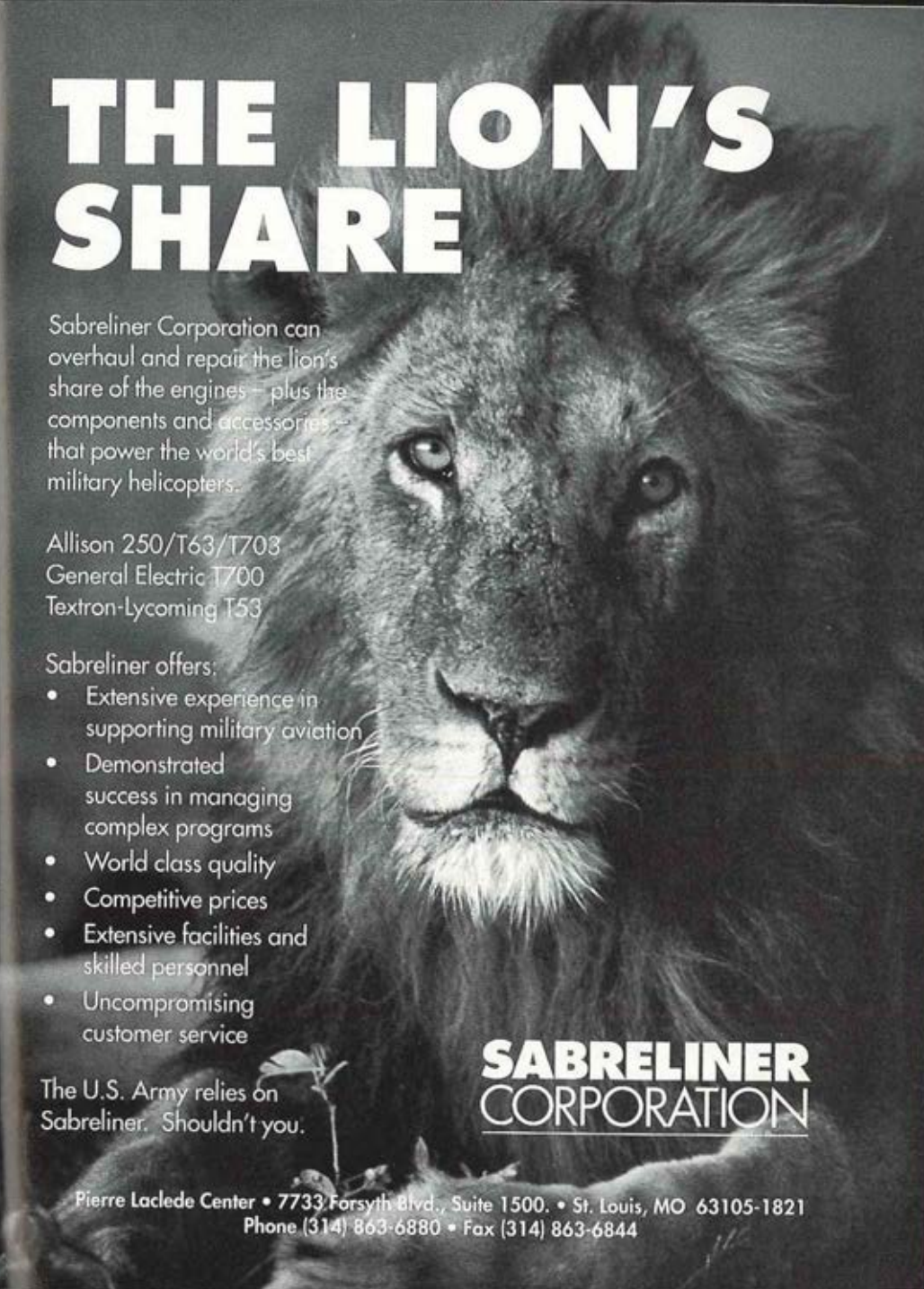
The Army is currently evaluating a joint Boeing-Lockheed Martin PVS proposal for the Apache. This proposal would transfer responsibility for complete wholesale support to a single accountable corporate entity, which would eliminate the need for government personnel and facilities to manage and store spare parts. While the benefits seem to outweigh the risks, the proposal is under careful review.

Cost as an Independent Variable. In the past, cost and schedule were thought of as dependent variables in the acquisition process because performance levels to meet the threat were specified and the cost and schedule were adjusted to achieve that outcome.

Today, Cost as an Independent Variable (CAIV) helps us to make a trade-off between performance and cost. When system requirements are established and translated to key performance specifications, we do rigorous analysis and assessment up-front to determine what the system might look like in the end. Simulation-based design methods help considerably. With that work, we establish early-on a unit production cost goal and a life-cycle cost goal. We invite contractors to suggest changes in performance specifications which they determine are cost drivers; this further enables us to come close to the target cost.

During the contract's life, as we see cost drivers arise as a result of particular performance specifications, we assess the overall system performance impact of relieving those requirements. In this way, we find the closest solution to the original performance goals at an affordable price and still have a much better system.

The CAIV philosophy guided the formu-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lation of the RAH-66 Comanche requirements definition. The Comanche Early Operational Capability (EOC) program plan provided the most mission capable aircraft possible in today's funding environment. Many acquisition-reform initiatives applied early to Comanche have helped us to streamline the program and save a significant amount of money. These include:

- establishing cost and performance objectives for all program phases;
- early user interface and influence in the end product;
- establishing product development teams and IPTs for key program elements;
- incorporating planning and evaluation tools to obtain optimum program progress while accepting reasonable program risk, and
- reducing or eliminating such past requirements as military specifications, Contract Data Requirement List items and restrictive policies.

Modernizing Through Spares. While our experience with modernization through spares is limited, the Black Hawk is a good example of the success the Army has had in similar efforts. One reason modernization through spares is so important to the Army is that new starts will continue to be extremely limited even though the rate of technological advancement continues to accelerate. Modernizing through spares allows us to leverage normal O&S expenditures to improve existing weapon systems. New technology is captured in a manner that allows the Army to incrementally modernize systems through iterative product improvements made to spares.

Reducing life-cycle costs. Our initiatives have thus far focused primarily on the front end of the acquisition cycle. Now, life-cycle costs are also under scrutiny and we are focusing on logistics reform as a way to reduce life-cycle sustainment costs for our weapon systems. From requirements development to disposal, we must design systems that don't break down as frequently, that are more fuel efficient, and that can be economically upgraded by inserting new technology. It is a high priority within the Army and the Office of the Secretary of Defense.

On new systems, we must pay attention to life cycle costs early in design. Each technology effort must "buy its way onto our programs" by reducing life-cycle costs and program risks. However, our constrained resources and the limited rate of introducing new systems mean we cannot wait for new systems development to address the growing costs of operating and supporting existing systems. Our reforms must therefore include creating proper incentives to insert new low cost technologies in fielded systems to improve their reliability, maintainability and sustainability.

Savings in this area are key to increasing our modernization accounts and other high priority needs. O&S costs can comprise up to 80 percent of a system's total life-cycle cost. With current resources we must continually seek innovative methods to reduce O&S costs today to avoid significant budget and readiness costs in the future.

The Army is strongly committed to maintaining a solid base of aviation upgrades and aviation capabilities. Our aviation team — industry and government — must continue to work together to provide our warfighters with what they need, when they need it, and at an affordable cost.

* *

Lt. Gen. Kern is the Military Deputy to the Assistant Secretary of the Army for Research, Development and Acquisition, Washington, DC.

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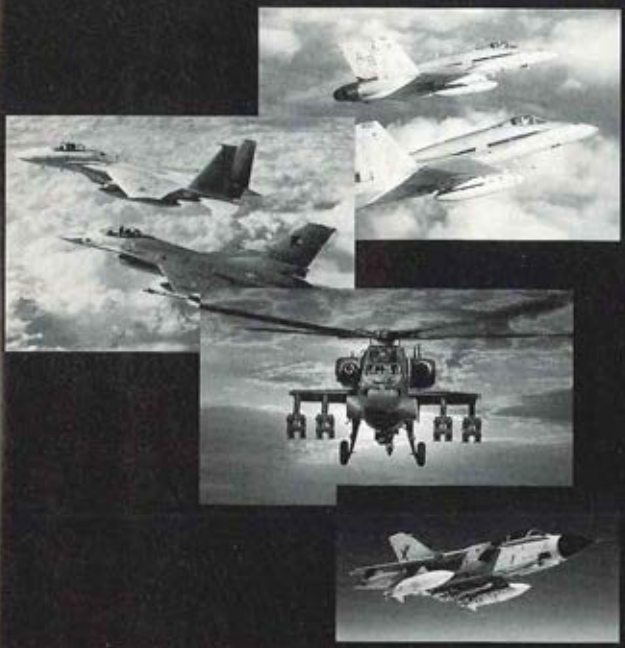

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USAAVNC BUILDING FOR THE FUTURE

As we enter a new fiscal year, I want all who support Fort Rucker to know how pleased we are with the progress made this past year. We spent precious tax dollars efficiently without sacrificing quality — all while protecting the force in the broadest sense. It took dedication and teamwork from many to make this year work. We trained the force and made improvements to our home base.

Army Aviation is firmly established on course!

As we lean forward into the new year, the United States Army Aviation Center will continue to meet our nation's commitments by training military, civilian and international personnel in aviation and leadership skills while developing doctrine, force structure and materiel for warfighting capabilities today and in the future. Additionally, we will continue to manage our available resources effectively, providing facilities and services for a safe environment and superior quality of life. We want all members of our aviation family to be proud of their home. We want you and your family to look forward to serving our nation and our branch here.

Fort Rucker just keeps getting better. Throughout post, new structures are emerging to replace old and less efficient wooden buildings. In FY 97 alone, 93 buildings were demolished under the War on Wood (a U.S. Army Training and Doctrine Command Program), with an additional 70 buildings scheduled for demolition in FY 98. We will however, preserve a piece of our World War II heritage by keeping a barracks structure designed to honor that era of the post. It will sit in a future memorial park across from the museum. New buildings like the Single Soldier Living Complex represent the newest change in the Army. It's the first of its kind and is the Army's pilot project for the One-Plus-One standard. This building is a sound investment in the quality of life for our single soldiers, and stands today as a clear commitment to the cause of caring for our most valued asset —the soldier.

We are no less committed to the quality of life for our married soldiers. On the family housing front, our five-phase Whole Neighborhood Revitalization Project — starting with the Allen Heights residential area — is providing military families with homes and communities comparable in design and quality to those in the private sector. We are reworking the junior enlisted housing first, and the response of the soldiers' families who have moved into revitalized homes has been very positive. We are doing the right thing.

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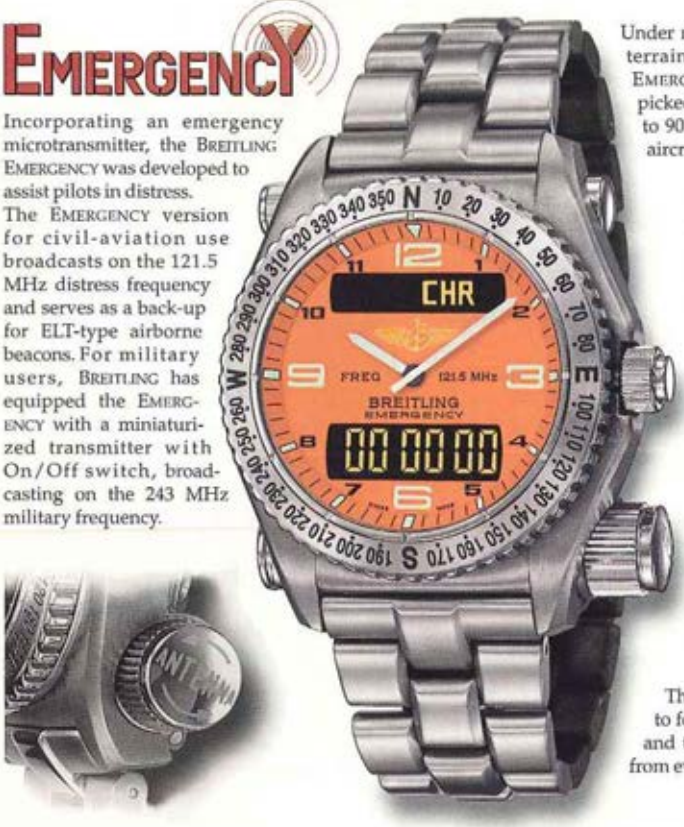

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INSTRUMENTS FOR PROFESSIONALS

Another building nearing completion is the new Soldier Service Center. This magnificent 130,000-square-foot facility will provide offices for approximately 560 personnel and will possess the capability to take care of the personal affairs of the entire post's military and civilian population. It is the centerpiece of our commitment to providing our civilian workforce a great place to work while serving our aviation soldiers, who train here. We are working hard to make the soldiers' time at Fort Rucker a positive learning experience. What we do here this year will live on in the service of the lieutenants, captains, warrant officers and AIT soldiers as they join our force in the field.

Training soldiers goes hand-in-hand with caring for soldiers, and USAAVNC is doing it right! Aviation Warfighter Training remains our hallmark. From the Aviation Officer Basic Course and Initial Entry Rotary Wing Training up through the Pre-Command Course and Aviation Leaders Training Conference, flight training and leadership development is being conducted better, safer and more effectively than ever before. We recognize these soldiers by conducting all graduations in our magnificent Aviation Museum. We encourage you to attend one of these graduations —it will lift your spirits and make you proud of your branch. We are truly fortunate to have such fine young Americans wanting to be part of Army aviation.

This coming February, Fort Rucker will once again host the Aviation Senior Leaders Training Conference. This is a great opportunity to bring the aviation brigade commanders, their sergeants major and safety officers together to discuss current issues facing warfighters — lessons learned from recent operations and simulations, CINC priorities and how Army aviation meets those priorities; how aviation fights; and training, manning, sustaining and equipping the force. It is also a chance to project our mission, vision and goals. To help us, we have invited active and retired aviation general officers and SES's to attend. The senior aviators' insights are valuable to those commanders who are daily meeting the mission.

It is important that Army aviation continue its quest toward the future. On-going Advanced Warfighting Experiments (AWEs) at the division level are currently defining and developing Army XXI and all its battlefield operating systems. With a focus on gaining insights as to how the Army should redesign itself, the AWEs will provide a template for how our soldiers will be organized, trained and equipped in the next century. We have been an integral part of this effort. Our Battle Lab, DCD, DOTDS and TSMs have represented our branch well. You can be proud of these soldiers and civilians.

As we boldly approach the next century and Army XXI, USAAVNC will continue to provide the force highly motivated aviation soldiers and leaders equipped with modern systems and trained to world class proficiency, operating in organizations that are inherently versatile, with maneuver advantages and warfighting effectiveness that will influence all dimensions of the current and future battle space.

With a proud heritage, quality soldiers, competent leaders and a willingness to grasp the future, Army aviation is firmly established on course ... en route to the objective.

Above the Best!

* *

MG Petrosky is Aviation Branch Chief and CG, U.S. Army Aviation Center (USAAVNC) and Ft. Rucker, AL, and Commandant, U.S. Army Aviation Logistics School (USAALS), Ft. Eustis, VA.

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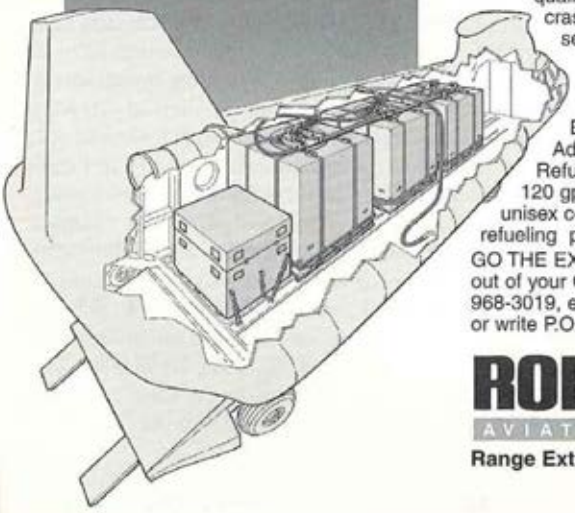

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By Brig. Gen. Robert E. Armbruster

AVIATION EFFORTS IN THE AMCOM DSA

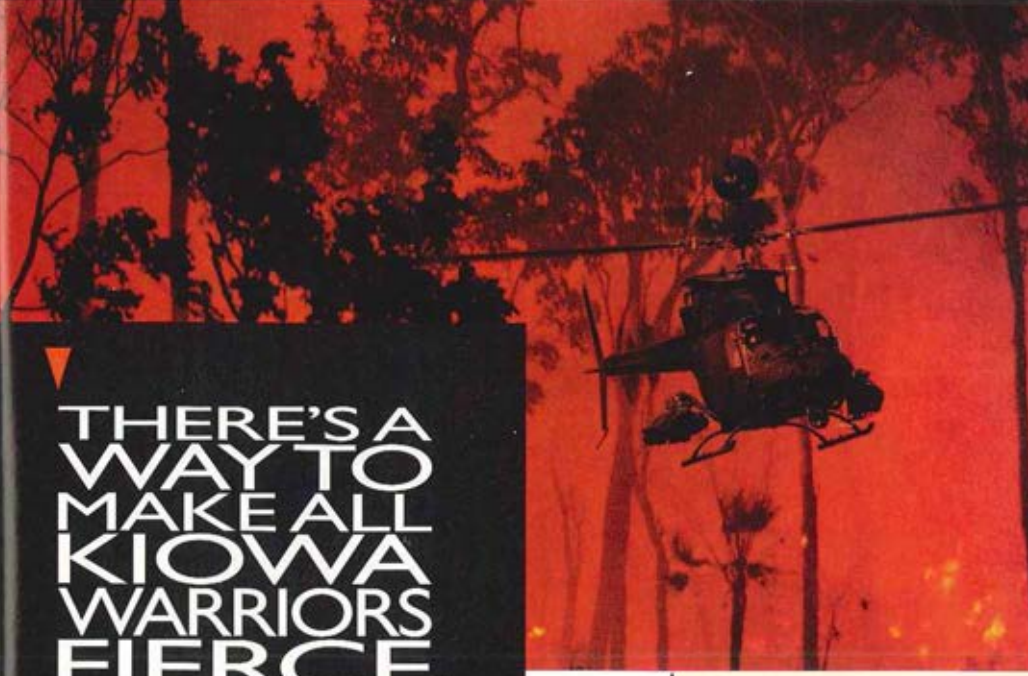
The merger of the aviation elements of the Army Aviation and Troop Command (ATCOM) with the Army Missile Command (MICOM) is nearly completed. The Army Aviation and Missile Command (AMCOM) was officially established Oct. 1, 1997. AMCOM is taking advantage of the synergy of skills, technologies and talent inherent in ATCOM and MICOM. Aside from the physical merger of these organizations, much change also has occurred in the way AMCOM is organized to manage our many systems, projects and products.

"AMCOM is taking advantage of the synergy of skills, technologies and talent inherent in ATCOM and MICOM."

Recent Army guidance directed that some systems be transferred from Program Executive Office (PEO) management to AMCOM. Army Materiel Command (AMC) subsequently established a general officer position within AMCOM called the deputy for systems acquisition (DSA — Fig. 1) to manage those systems that transferred from our associated aviation and missile PEOs, as well as all the existing programs from ATCOM and MICOM.

We in the DSA are responsible for various aviation, missile and test measurement and diagnostic equipment systems, including utility helicopters and Kiowa Warrior, which recently transferred to AMCOM from the PEO Aviation; scout/attack aircraft; fixed-wing aircraft; air traffic control; enhanced fiber optic guided missiles; Stinger (SHORAD), which in-cludes the Stinger Missile, the Avenger platform and the Bradley Linebacker platform; Multipurpose Individual Munition/Short Range Assault Weapon (MPIM/SRAW); test measurement and diagnostic equipment; and unmanned ground vehicles. We also manage the Smart Weapons Management Office and the Weapon Systems Directorate, which includes aviation ground support equipment, lasers/armored vehicles, thermal viewers, missiles and HAWK.

Most readers will recall that ATCOM managed the CH-47D Chinook project in St. Louis, Mo. That has now also changed. Simultaneous with the transfer of the Utility Helicopters and Kiowa Warrior project offices from PEO Aviation to AMCOM's DSA, the Chinook has reversed course and moved from AMCOM to PEO Aviation. As many of you know, new and exciting actions are being taken to improve and enhance the Chinook.



THERE'S A WAY TO MAKE ALL KIOWA WARRIORS FIERCE.

The S/SEP upgrade will give the OH-58D superior situational awareness and hang time, as well as allow it to talk digitally to the "joint world."

Thanks to the Systems Safety Enhancement Program, over 300 fielded OH-58Ds can be as fierce as current production Warriors. This retrofit, including digital avionics and communications upgrades, advanced navigational aids, a 19 percent power boost and improved crash protection, makes this aircraft an even more lethal weapon. As the OH-58D's builder and participant in its evolution, we long ago recognized its potential. And no one's more qualified than us to make sure it lives up to it.

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Figure 1

Now let's take a quick survey of the aviation efforts within the AMCOM DSA.

UH-60 Black Hawk. The UH-60 Black Hawk and the UH-1 Iroquois have been combined into the Utility Helicopters Project Office. The Black Hawk program remains on stable footing based on continued multi-year contracting. Multi-year IV deliveries of 60 aircraft per year ended in June, and the new multi-year V deliveries of 36 aircraft per year in Fiscal Year 1997, and 18 per year in FY 1998 through FY 2001, began in July. The deliveries are split between Army (58), Air Force (8) and Navy (42).

Another important part of the Utility Helicopters Program is the UH-60Q aeromedical evacuation aircraft, which is at the mid-point of a two-year integration/qualification phase. Digitization capability being produced as part of the UH-60Q program may be the model for future modernization upgrades to the entire UH-60 fleet. The Aviation Center at Fort Rucker has chartered a Black Hawk Modernization Integrated Concept Team to address such requirements.

UH-1 Iroquois. Effective with the establishment of AMCOM, the UH-1 Weapon Systems Management Office (WSMO) falls under the Utility Helicopters Project Manager. The Huey will be handled as a distinct product line within the project office. This change places the management of all lift aircraft (UH-1 and UH-60) under a single manager.

Major efforts underway for the UH-1 include continued application of approved safety and sustainment modifications, completion of aircraft retirement goals, management of the resulting fleet transfers in accordance with our established "Keeper Fleet Strategy," and continued sustainment of remaining aircraft to assure a safe and reliable fleet.

OH-58D Kiowa Warrior. Enhancements to the mission equipment package, which replaces aging electronics with state-of-the-art digital processors, have moved from the drawing board to operational reality. The incorporation of improvements such as Embedded Global/Inertial Navigation, a multi-targeting Improved Mast Mounted Sight Processor and moving digital map display — made possible by the Improved Master Controller Processor — provides highly accurate targeting and situational awareness. The addition of an Improved Data Modem and Single Channel Ground to Air Radio System provides the capability to rapidly communicate across the battlefield from the front line to the farthest corner in near real time. Fielding these Force XXI enhancements to the Army organizational OH-58D has been a major focus for 1997.

Scout/Attack. As the Kiowa Warrior is fielded, the AH-1F Cobra and the OH-58A/C light observation helicopter (LOH) have been reassigned to the National Guard and retired through the Foreign Military Sales process. The current Aviation Modernization Plan calls for these aircraft to continue to operate in aviation units in the National Guard until 2014 and 2017, respectively. The Scout/Attack Product Manager's Office (PMO) supports these aircraft with life-cycle management, placing primary focus on readiness and operations and support-cost reductions.

Ongoing efforts include replacement of the old decaying Kapton wiring harnesses in the Cobra with new Tefzel wiring. Units with rewired aircraft have realized a 10 percent increase in readiness rates. Additional upgrades for the Cobra are SINCGARS radios and Global Positioning Systems (GPS). The OH-58 aircraft is receiving SINCGARS radios, GPS and external oil filters. With the transition to AMCOM, the PMO also picks up management of the M-65 Airborne TOW subsystem, the primary targeting system for the Cobra.

Air Traffic Control. The PMO for Air Traffic Control Systems (PM-ATC) is continuing the development and fielding of state-of-the-art tactical and fixed-base ATC systems. Furthermore, with the recent relocation to its new Huntsville, Ala., home, PM-ATC is now operating as a true Integrated Product Office, following the successful merging of its Tactical and Fixed Base divisions from St. Louis and Fort Monmouth, N.J., respectively.

Some of the ATC developments and fieldings include:

- The Tactical Airspace Integration System (TAIS), which is now performing the automated, digitized A2C2 mission for the Task Force XXI Advanced Warfighting Experiment. This A2C2 platform gives both the division and corps G-3 an airspace coordination planning and execution capability unmatched by any system of its kind.
- The Tactical Terminal Control System (TTCS), which continues its fielding and operator/maintenance training to units worldwide. This highly mobile and versatile long-range communication system is proving its worth as it provides forward-deployed air traffic controllers a reliable means to support aviation warfighters conducting deep and extended aviation operations.
- The Air Traffic Navigation, Integration and Coordination System (ATNAVICS), which is currently completing its engineering and manufacturing development, will provide Army aviators both a tactical and fixed-based precision approach and landing capability in adverse weather. Its area surveillance and precision approach radars and operations shelters will be HMMWV-

mounted and deployable by a single C-130.

- The Mobile Tower System (MOTS), which will replace the existing tactical tower with a new, enhanced, comfortable and readily deployable platform.

PM-ATC is also taking part in the revolution of the National Airspace System (NAS). Working with the Federal Aviation Administration and other services, we are modernizing and enhancing both military and civil towers and their approach control centers. Fort Rucker also will benefit from a new ATC radar training complex aimed at training future radar controllers with a commercial training system currently being installed. The initial Enhanced Terminal Voice Switching System (ETVS) is being installed at Fort Rucker, providing the Army radar approach control facility with an unprecedented digitized communications and switching system.

"PM-ATC is also taking part in the revolution of the National Airspace System (NAS)."

Aviation Ground Support Equipment. Aviation ground support equipment (AGSE) continues to acquire tools, ground support and test equipment common to all aircraft and essential to make an aircraft, or one of its associated systems or subsystems, operational in the intended environment. Our goal is to replace obsolete, unsupportable AGSE with new and standardized equipment compatible with all Army aircraft, enhance battle damage repair procedures and speed the return of aircraft to a combat-ready status.

One AGSE product just around the corner is the New Aviation Tool System (NATS), which provides five new tool boxes and an Aviation Foot Locker (AFL), each of which permits a quick inventory of tools. The tools are warranteed by manufacturer through the General Services Administration with a 4-14-day replacement turnaround time. NATS replaces existing tool boxes while the AFL is designed as a preventative maintenance tool set with increased mobility and replaces the AVUM No. 1 tool set. The AFL is configured for all Army aircraft, is easily deployed and provides ready access to tools necessary for preventative maintenance tasks. To date, NATS has been fielded to Fort Rucker; Fort Campbell, Ky.; Fort Stewart, Ga.; Fort Bragg, N.C.; Fort Drum, N.Y.; Fort Hood, Texas; and Fort Eustis, Va.

The Flexible Engine Diagnostic System (FEDS) is manufactured under the Arsenal Act at Corpus Christi Army Depot, Texas (CCAD). The FEDS uses state-of-the-art automated data acquisition and instrumentation with air dynamometer technology to test, troubleshoot and trim the T63, T53, T55 and T700 series engines. The support concept for FEDS is contractor logistics support (CLS) provided by CCAD. FEDS will help keep suspect engines out of the air, save money on engine shipment costs and reduce maintenance downtime by providing faster engine turnaround time. To date, the FEDS has been fielded to the Springfield, Mo., AVCRAD (prototype); Fort Campbell (prototype and T700 only); Fort Hood; Fort Bragg; and Wheeler AAF, Hawaii.

Non-Destructive Test Equipment (NDTE) provides an increased capability to detect structural defects in aircraft and aircraft com-

ponents. The new NDTE types are ultrasonic, harmonic bond, eddy current and radiological flaw. New NDTE reduces unnecessary teardown, thus reducing maintenance man-hours and costs. All NDTE components can be used with all Army aircraft.

An AGSE future product is shop equipment contact maintenance (SECM), which provides a contact maintenance vehicle for disabled aircraft. The SECM can be configured to repair all types of aircraft mechanical and electrical failures. Also on the horizon for maintainers is the generic aircraft nitrogen generator, a four-wheeled, towable, self contained and enclosed trailer-mounted cart which produces high purity nitrogen using air separation membrane technology.

Fixed Wing. Fixed wing (C-12/U-21 Life Cycle Contractor Support) is the largest and most complex readiness task we have ever tackled. It's a unique Army, Navy and Air Force effort that leverages cost savings by consolidating support requirements. The Army, as the largest user, serves as the lead agency for this contract. Full and open competition has resulted in the services choosing AGES Group Inc. as the new contractor for the current support effort. Raytheon Aerospace has served the Army for more than 20 years, and we're thankful that they've so ably transitioned support activities to the new contractor.

It is obvious that we have a full plate within the DSA and, like all of the people within AMCOM and the PEO, we remain committed to our most important customer, the soldier.

* *

Brig. Gen. Robert E. Armbruster is the deputy for systems acquisition at U.S. Army Aviation and Missile Command (USAAMCOM), Redstone Arsenal, Ala.

By Col. Stephen G. Kee

APACHE UPDATE

Every day, around the world, AH-64 Apaches fly in defense of freedom. Wherever they fly, they dominate the skies and deter potential aggressors.

The world's most capable attack helicopter continues to improve with age.

During Operation Desert Storm the Apache earned a reputation as the finest attack helicopter in the world. That standing was further enhanced this year by the continued outstanding achievements of AH-64A Apaches in Bosnia and by the AH-64D Apache Longbow's extraordinary performance at the Task Force XXI Advanced Warfighting Experiment (AWE). Apache Longbow dominated the AWE's digital battlefield, just as Apaches dominate Bosnia's airspace. Apaches in Bosnia have flown 9,584 hours and maintained an 84 percent readiness rate, which is an extraordinary achievement by the units involved. Most importantly, they've done what the Apache does best; maintain peace through intimidation.

Task Force XXI. Eight AH-64A Apaches and two prototype AH-64D Apache Longbows participated in the Task Force XXI AWE at the National Training Center at Fort Irwin, Calif. In two of the exercise events, the two Apache Longbows destroyed an opposing force air defense command-and-control network in a deep attack and rendered a division artillery group and combined arms regiment combat ineffective in a deliberate attack. The two Apache Longbows, flown by six Army pilots, successfully accomplished all missions and maintained 98 percent availability. Describing the AH-64D's performance in the AWE, one exercise evaluator said the helicopter was "employed with devastating effect" and was the "most lethal killer in the exercise."

AH-64A Modifications. The A-model Apache production line closed in November 1996 and the last A-model built was delivered to Egypt. Readiness rates in the U.S. Army remain the highest in the history of the program, despite austere budgets. Everyone involved in Apache supply, support and maintenance should take pride in that accomplishment.

Since the last Army AH-64As will not be converted to AH-64Ds until 2009, several improvements are planned for the AH-64A. Depot teams are currently installing the Embedded Global Position/Inertial Navigation System (EGI) on Apaches equipped with the 137 Doppler. To date, 16 percent of the Army's A-model fleet has

been converted. This program will last through April 1999. The AVR-2A Laser Warning Receiver modification work order has been verified and depot teams will start installing these kits in the spring of 1998. In January 1997 depot teams began installing gas generator (GG) rotor sections on all T700-701 undamped engines. This team has completed 50 percent of the undamped engines and will continue at a rate of 50 per month until all undamped rotors are replaced worldwide. All engines on aircraft will be finished by April 1998 and all spare engines by July 1998.

We continue to seek opportunities to improve the reliability and performance of the Apache's Target Acquisition Designation Sight/Pilot Night Vision System (TADS/PNVS). By accelerating the installation of eight reliability Engineering Change Proposals (ECPs) to reap the benefits of these modifications, we are already seeing impressive reliability improvements. Additional near-term upgrades users should expect to see include a Charged Coupled Device (CCD) Camera replacement for the three vidicon cameras; an improved Automatic Contrast Module (ACM) circuit card to reduce TADS forward-looking infrared (FLIR) shading; an ECP to reduce Day Sensor Penta Prism delimitation; and a more durable and maintainable W-1 Funny Harness.

AH-64D Remanufacture. On March 21, 1997, we celebrated the first production Apache Longbow at a Mesa, Ariz., roll-out ceremony attended by Sen. John McCain. The Army was represented by Lt. Gen. Thomas H. Schwartz, the commander of III Corps. Ten days later the Army accepted the first production Apache Longbow — right on schedule. Through the end of October we have accepted 14 production aircraft. We're on contract to remanufacture 232 of the planned 754 aircraft to the AH-64D configuration. Thirty-one additional aircraft were in various stages of the premodification/remanufacture process at Boeing. The first unit to begin reequipping with the AH-64D is the 1st Cavalry Division's 1st Battalion, 227th Aviation.

One of the many systems that will aid the 1-227th and other Apache Longbow operators is the aircraft's interactive electronic technical manual — the world's first — which will eliminate 74 paper manuals containing over 32,000 pages. The aircraft will incorporate a Maintenance Data Recorder with crash-survivable memory designed to improve troubleshooting.

Longbow Fire Control Radar. The keys to Apache Longbow lethality on the digital battlefield are situational awareness and systems integration. The Longbow's AN/APG-78 Fire Control Radar detects, classifies and prioritizes stationary and moving tracked, wheeled, air defense, rotary- and fixed-wing targets in clear or adverse weather, battlefield obscurants and low light.

The FCR also provides a Terrain Profile Mode to assist navigation. The AN/APR-48 Radar Frequency Interferometer (RFI) passively detects, identifies and locates in azimuth-emitting enemy air defense radar systems. Receiving input from the RFI, the FCR is able to rapidly and accurately isolate emitting air defense targets. The FCR targeting information may be used to fire the 30mm gun, 2.75-inch rockets and the Longbow Hellfire missile. Using the TADS and FCR target data, the AH-64D can launch the Semi-active Laser (SAL) Hellfire missile. The Improved Data Modem (IDM) on all aircraft allows target information to be transmitted from FCR-equipped aircraft or such joint assets as JSTARS to all other AH-

64Ds, whether or not they are FCR-equipped.

The FCR and RFI finished the first year's production in November 1997. The Army received ten mission-capable FCRs and thirteen RFIs, enabling the AH-64D to meet its first unit-equipped requirement. The production contract has been very successful in meeting its performance specification, on-time delivery requirement and contract costs. We are looking forward to an equivalent success on the Lot 2 contract, which began earlier this year; deliveries are to begin in March 1998.

The Army anticipates awarding a multiyear contract to buy-out the remaining 207 FCR/RFI systems in Fiscal Year 1998. The multiyear contract continues the trend of acquisition reform with performance-based billing, a savings/incentive clause, five years of fixed-price spares support and a performance-based warranty.

"Forty-one aviators have so far completed the AH-64D Aviator Qualification Course and 23 aviators have completed instructor pilot training."

Training and Training Devices. Initially, the first two battalions of AH-64D operators and the first three battalions of maintainers will receive individual training at Boeing's Mesa facility. Operator training will transition to Fort Rucker in 1999 and maintainer training will transition to Fort Eustis in 2000.

Forty-one aviators have so far completed the AH-64D Aviator Qualification Course and 23 aviators have completed instructor pilot training. Four maintenance test pilots and 45 AH-64 Attack Helicopter Repairers (MOS 67R) have graduated. Classes for AH-64 Armament/Electrical Systems Repairers (MOS 68X) will begin in January 1998. Interactive computer-based training (CBT) for the A-model was completed and is being used at Fort Rucker. D-model CBT is in development and will be provided to the schools and the field to support institutional and sustainment training.

AH-64D maintenance training will be conducted using two devices — the Airframe, Engine and Drivetrain Systems Trainer (AEDST) and the Multiplex, Avionics, Visionics, Weapons and Electrical Systems Trainer (MAVWEST). The Longbow Crew Trainer (LCT) will be used to conduct individual and crew training for operators, and collective training will be conducted using the Longbow Collective Training System (LCTS). Each location with D-models will receive an LCT and an LCTS.

A team with members drawn from AAH PMO, STRICOM, USAAVNC (TSM-LB, ATB, & DOTDS), USAALS, FORSCOM, EUSA and USAREUR is guiding the development of all training devices to ensure they can adequately train the critical tasks to operate and maintain the AH-64D.

Efforts continue on the Tactical Engagement Simulation System (TESS), which will enable AH-64Ds to train at home station and the three Combat Training Centers. Additionally, each aircraft will be equipped with an RF HELLFIRE Training Missile Emulator (TME), which will pro-

vide an embedded training capability to conduct up to 16 simulated RF missile engagements.

Forty-four hours of Interactive Multimedia Instructional Training (IMI) for the A-model have been completed and IMI is being used in the AH-64A Aviator Qualification Course at Fort Rucker. IMI training for unit-level maintenance is being developed, with the first two instructional programs (Aviation Vibration Analyzer and the 10 hour/14 day Inspection) scheduled for release to field units this month. D-model IMI is in development and will be provided to the schools and field to support institutional and sustainment training.

The Road Ahead. Although the AH-64D is a major improvement over the AH-64A, we continually look at future upgrades to improve maintainability, reliability and performance. The focus is on the D-model, but changes to the A-model that carryover to the D-model receive equal consideration. This past year we have made considerable progress on two improvements that are anxiously awaited in the field.

The first of these is the removal of the Optical Relay Tube (ORT). We signed a contract with Lockheed Martin to remove the tube on 232 aircraft and install a six-inch multifunction display in place of the Heads Up Display. This change is designed so that the ORTs can be removed from either an A-model or D-model, so removal won't be tied to the remanufacture schedule. Second, we are testing an internal auxiliary fuel tank, which fits in the ammo bay. It reduces the ammunition carrying capability to the 72 rounds carried in the chute, but adds 130 gallons.

Effort also continues on the Suite of Integrated IR Countermeasures (SIIRCM), Suite of Integrated Radar Frequency Countermeasures (SIRFC) and the ARC-220 HF radio under the direction of the Aviation Electronics and Communication (AEC) Project Manager. These enhancements add weight and are being evaluated for their suitability to Apache. Long-term efforts to improve the FLIR, engine, transmission and rotor blades are underway by industry and government research and development to maintain the operational viability of the Apache.

Innovative approaches to the Apache's continuous modernization in an austere budget environment are also under evaluation. An industry team of Apache prime vendors (Boeing, Lockheed Martin and General Electric), partnered with Texas' Corpus Christi Army Depot, has proposed to reduce life-cycle cost, improve supply support and modernize through spares while guaranteeing system performance. This proposal is being evaluated by the Army in conjunction with Army Materiel Command reinvention initiatives and a study of operating and support costs by the Army Cost Evaluation and Analysis Center (CEAC).

By any measure it has been an extraordinary year for the Apache program. Success doesn't just happen, though. It is the result of the dedication, selflessness and hard work of many people in government and industry. ARMY AVIATION Magazine provides an excellent forum to thank all of those members of the Apache Team who have made the soldier their top priority. Apaches around the world are better because of you.

* *

Col. Kee is the PM for Apache Attack Helicopter Manager's Office, Redstone Arsenal, Ala.

COMANCHE SIMULATION UPDATE

As the RAH-66 Comanche program moves closer to production, modeling and simulation (M&S) are becoming increasingly important tools. This article outlines M&S efforts over the last year and looks at our plans for the future.

User input will help improve Comanche hardware, tactics, techniques and doctrine.

Figure 1 shows the major man-in-the-loop simulators currently being used in the Comanche program. The Engineering Development Simulator (EDS) is a full motion-based simulator, located at the Sikorsky plant in Stratford, Conn. The Comanche Player Station (CPS) is located at the Aviation Test Bed at Fort Rucker, Ala., and is a fixed-base device.

The Comanche Portable Cockpit (CPC), also a fixed-base device, is mounted in two modules on the back of a semi tractor-trailer. The CPC has its own power supply and air conditioning, and can be set up and ready to "fly" in a matter of a few hours.

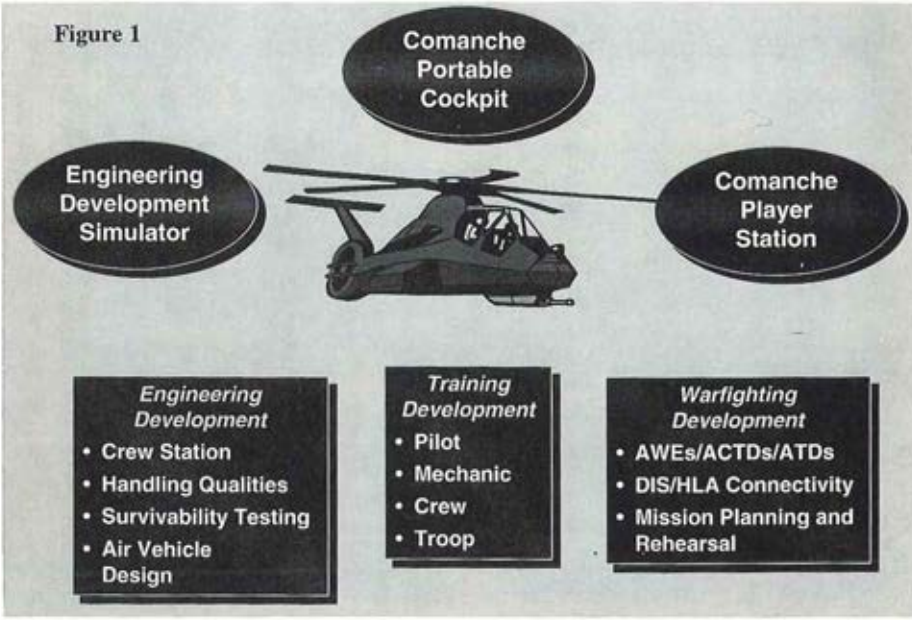
Comanche M&S are multifaceted. Today we are gathering user inputs from simulated combat missions to improve Comanche hardware, tactics, techniques and procedures, and doctrine. The simulation community refers to this as training, exercises and military operations (TEMO), advanced concept requirements (ACR) and research development and acquisition (RDA) integration. Activities such as Advanced Warfighting Experiments (AWEs) and training flights for the Early Operational Capability (EOC) Troop are the tactical baseline.

Figure 2 depicts Comanche Force XXI simulation activities. The key to Force XXI is information dominance. The CPC allowed the 4th Infantry Division's 4th Aviation Brigade to rehearse missions and demonstrate aviation's information-dominance capabilities prior to actual conduct of the missions in the Force XXI Corps Battle Simulation (CBS) exercise. This versatile tool was connected to the Battlespace Integrated Concept Emulation Program (BICEP) and the Army Tactical Command and Control System (ATCCS). Collectively, these systems provided a full spectrum environment for leader development and collective team training. This full-dimensional virtual simulation allowed warfighters to examine battle command, staff planning and battle tracking.

Since delivery in early February of this year, the CPC (Figure 3) has participated in 18 deployments to different installations, industry shows such as AAAA and AUSA, and simulation integration exercises.

The CPS at Fort Rucker will continue to be the primary familiarization training device for EOC pilots at that post. Ongoing upgrades to this cockpit will be completed next month.

Figure 1



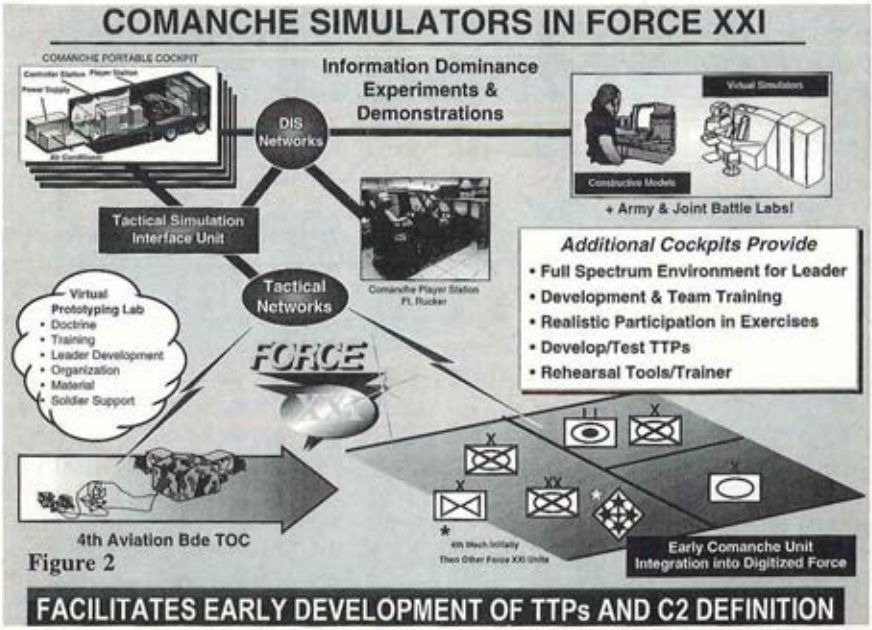


Figure 2

COMANCHE PORTABLE COCKPIT (CPC)

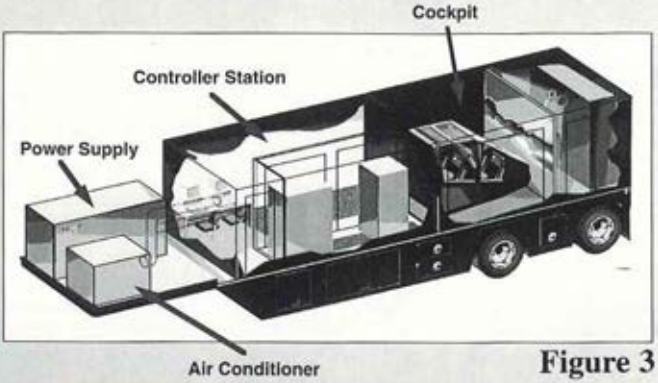


Figure 3

The CPS will also be participating in concept evaluation programs (CEPs) sponsored by the Air Maneuver Battle Lab for the next three years, and will be linked by Distributed Interactive Simulation (DIS) with simulations involving the CPC. In addition, the CPS and CPC will be used to conduct FDTE II at Fort Rucker in Fiscal Year 2000.

Rounding out the Comanche simulation devices is the EDS. The EDS is used to test new flight control simulation loads before they are flown in the prototype aircraft. It will also be used in a cockpit assessment program (CAP), which leads to the final design of the EOC aircraft to be delivered in FY 2003. The first Force Development Test and Evaluation (FDTE) will be flown in the EDS in FY 1999. This is the first time that an FDTE will be flown in simulation rather than in the actual aircraft.

Our logistics branch is working hard with Boeing-Sikorsky, DOTDS and DCD to complete a training media analysis in FY 1998. This analysis will be used to develop the plan to train pilots and maintenance personnel. One question yet unanswered is: How much, if any, motion is required for training simulators? There are those who say you must have a full six degrees of freedom (DOF), and others who say if you have an adequate visual system and some device to stimulate the pilot (a "seat shaker," for example), that is good enough. A major disadvantage of a full-motion simulator is that it has to be sunk in concrete and cannot be taken to the field for mission rehearsals. Our conceptual plan for training is depicted in Figure 4. As the future of the Aviation Combined Arms Tactical Trainer (AVCATT) and the Aviation Reconfigurable Manned Simulator (ARMS) become better defined, the Comanche's final Integrated Training System design and configuration will become much clearer and stabilized.

M&S has been an important part of the Comanche program from the beginning, and continues to be important as we build and fly the world's most technologically advanced reconnaissance and attack helicopter. The

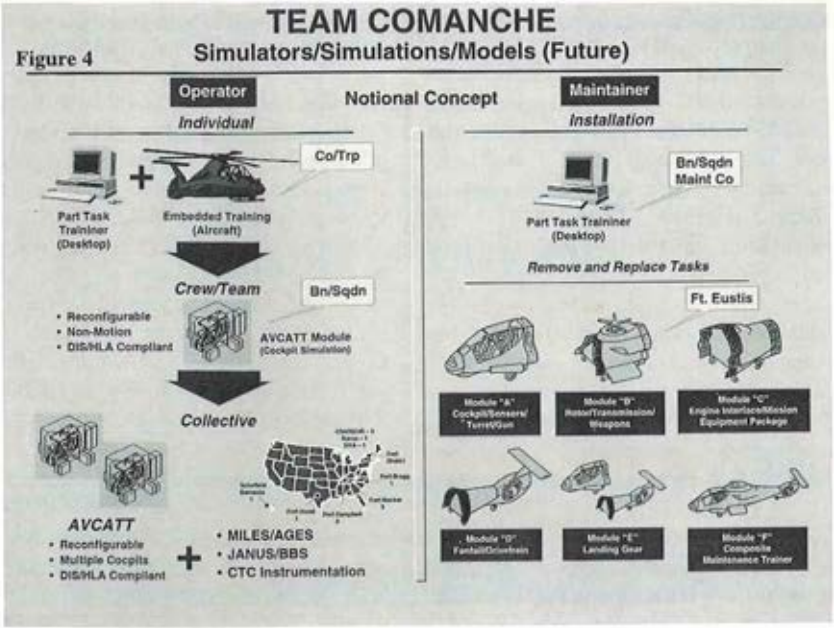


Figure 4

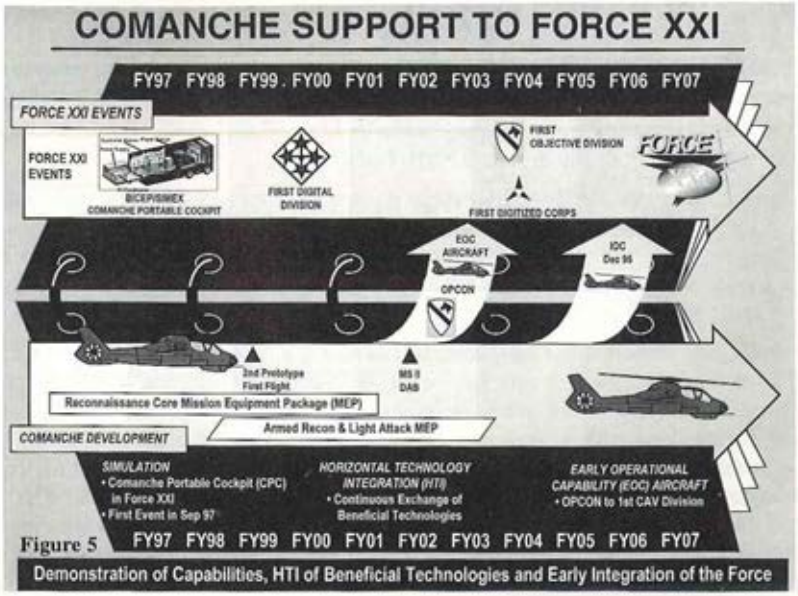


Figure 5

trends are obviously for the increased use of modeling and simulations throughout Comanche development and acquisition. Force XXI will realize the payoff of these simulation initiatives, and Figure 5 depicts the "real world" strategy for injecting the Comanche into Force XXI.

Simulation will enhance horizontal technology integration with other Force XXI units by allowing a full-scale, low-cost test of ideas and hardware. If tankers have a better idea or piece of hardware, we will test it in simulation and roll the outcome into our airframe. The tankers also get the advantage of having a close-up view of the capabilities we're building into our system — capabilities that potentially could benefit them. Concurrently, we will train the Comanche pilots of the future and provide the digitized corps with EOC aircraft to continue the full-spectrum refinements initiated with the CPC in September. At IOC, the Comanche will be completely integrated into Force XXI, and ready to lead the Army After Next.

* *

Lt. Col. Gary Jerauld is the Product Manager for Comanche Crew Support Systems, Comanche PMO, Huntsville, Ala.

Briefings

continued from page 2

rehabilitation training and benefits offered by VA, state and local agencies. Any veteran who loses their sight during or after military service is eligible for BVA's assistance at no charge. For more information about the Blinded Veterans Association call (800) 669-7079.

Kent E. Hutchinson, former president of Norden Systems subsidiary of Northrop-Grumman, has been named senior vice president of Kaman Aerospace Corporation and Kaman Aerospace International Corp. of Bloomfield, Conn.

The World War II-era **446th Bomb Group (H)** will hold its annual reunion April 30 to May 3, 1998, in Savannah, Ga. The 8th Air Force B-24 unit was stationed at Bungay, England, from 1943 to 1945. For further information, write to Link Veazey, 1938 Harbour Oaks Drive, Snellville, GA 30278, or call him at (770) 972-5883.

The **Boeing Sikorsky RAH-66 Comanche** helicopter prototype No. 2 is undergoing final assembly at Sikorsky Aircraft Corporation in Stratford, Conn. The aircraft will be delivered in December to West Palm Beach, Fla., to join Comanche No. 1 at Sikorsky's Development Flight Center, where it will initially serve as a back-up aircraft. The second flying prototype will be upgraded with the Comanche Mission Equipment Package in the year 2000.

The **Army** and **The Boeing Company** are evaluating a new crashworthy, ballistically self-sealing internal auxiliary fuel tank for the AH-64D Apache Longbow. Jointly developed by Boeing and **Robertson Aviation** of Tempe, Ariz., the tank fits into the Apache's ammunition bay and is interchangeable with the aircraft's ammunition storage magazine. Without the current external fuel tanks, the Apache Longbow can be armed with a full load of 16 Hellfire Missiles or 76, 70mm rockets, or a combination of both. AH-64Ds equipped with the new internal tank would still have nearly 100 rounds for area weapon support. Two crew members can install or remove the tank or the magazine in less than 30 minutes using the Apache magazine and auxiliary tank transfer system (AMATTS).

THE COMANCHE TEST FLIGHT PROGRAM

The U.S. Army's next generation armed reconnaissance/light attack helicopter, the RAH-66, will provide tomorrow's commanders with unprecedented capabilities. Advanced sensors, automatic targeting and detection, low-observable technology and aircraft weapon systems will make the Comanche the most lethal armed reconnaissance helicopter in the world. The Comanche's ability to act as the "quarterback" on the digitized battlefield will provide a unique synergy across the battlefield. The aircraft's ability to gather, process and distribute real-time tactical intelligence and information throughout the battlespace will allow the maneuver commander to conduct operations with greater speed, precision and lethality.

The RAH-66 prototype has continued to expand its flight envelope since the aircraft's first flight on Jan. 4, 1996.

The RAH-66 prototype has continued to expand its flight envelope since the aircraft's first flight on Jan. 4, 1996. Upon its upcoming delivery the second prototype will begin preparations to test the Comanches' Mission Equipment Package (MEP). The flight test data from both prototypes will be used to refine the Early Operational Capability (EOC) and production aircraft designs. Six EOC aircraft will be delivered in Fiscal Year 2003 to support early user assessments of the aircraft's performance in an operational environment.

Test Approach. The Comanche program has realized efficiencies in the test program by adopting a concept known as combined testing. This is a method for integrating the government and contractor efforts throughout the development process, and is intended to optimize the test process by eliminating redundancy, avoiding duplication of effort and searching for ways to reduce test costs in the program. The concept calls for one test which meets both the government's and contractor's test requirements. This produces a much more cost effective and efficient approach to testing.

The members of the various government agencies and the contractors are organized as a Combined Test Team (CTT). The CTT consists of members from the Comanche Program Manager's office, the U.S. Army Test and Experimentation Command (TEXCOM), U.S. Army Test and Evaluation Command (TECOM), U.S. Army Operational Test and Evaluation Command (OPTEC), U.S. Army Aviation Technical Test Center (ATTC), and the Training and Doctrine Command (TRADOC) System Manager (TSM), Comanche. The government and contractor testers work together as an Integrated Product Team (IPT) to develop test plans, resourcing requirements, test execution and test analysis.

The CTT has four military members permanently assigned to the Sikorsky Developmental Flight Center in West Palm Beach, Fla. The Comanche PMO has a government test director, who is responsible for coordinating the efforts of the CTT to ensure government test requirements are integrated with the contractor. The TRADOC TSM-Comanche provides a user presence on site, with a senior warrant officer and a noncommissioned officer. These individuals have proven invaluable in providing input to the contractor concerning the aircraft design, logistical support and training.

An Army experimental test pilot (XP) from ATTC routinely participates in aircraft test flights. He is fully integrated into the contractor's pilot rotation, though he may not participate in high-risk, envelope-expansion flights. The Army XP provides the government an opportunity to technically assess the capabilities of the aircraft with the contractor early in the development phase. This is the first Army program to allow an Army pilot to fly in a prototype aircraft this soon in the development phase. Once again, efficiencies are gained since the necessity for additional government technical flight test is eliminated or reduced due to the early involvement of the technical test community.

Test Tools. Another area which has proven to be invaluable to the development of the RAH-66 and the success of the test flight program is the program's use of simulation, and of such test tools as the Propulsion System Test Bed (PSTB - below left).

The PSTB — a replica of the aircraft's propulsion, rotor and drive system — except the environmental control system, forward fuselage and landing gear.

The test bed's purpose is to precede the development and testing on the actual aircraft. Propulsion systems and dynamic

components are tested and qualified on the PSTB prior to use or flight on the aircraft. Two-to-one operating time is accumulated on components to ensure a margin of safety for the aircraft. This provides the test team with an opportunity to subject the dynamic components to more severe test conditions than would be feasible on the prototype. The full spectrum of conditions may be tested, and the effects on the dynamic components may be analyzed.

An additional feature of the PSTB is its ability to run for much longer periods of time than are feasible on the actual aircraft. The ability to run the PSTB at high flight loads for extended periods allows test engineers to validate fatigue life and confirm the structural limits of various components within relatively short periods. This approach optimizes actual test flight hours since components are qualified prior to integration on the aircraft.

The PSTB is operated from a set of flight controls and a simulated cockpit inside the PSTB control room. A comprehensive instrumentation system records and displays test data.

The majority of test deficiencies noted in the test flight program have been discovered during testing on the PSTB. Discovering these deficiencies prior to integrating them on the aircraft is the primary reason why the prototype is performing so well in the flight test program. It is attributed directly to this critical developmental test tool.

Simulation. The simulation tools Sikorsky Aircraft and Boeing Helicopter use (above) have also proven to be invaluable in the testing and development of the RAH-66. They include:

- The Engineering Development Simulator (EDS). The EDS is a full motion based simulator which replicates actual system performance, is programmed with comprehensive mathematical models of the RAH-66's airframe, main rotor, FANTAIL, engines and flight controls. These provide the pilot with a realistic sense of the capabilities and constraints of the actual aircraft.

Components of the Comanche's sophisticated Mission Equipment Package (MEP) — such as the Target Acquisition System (TAS), digital map, cockpit menus and displays, night-vision pilotage system and weapons - are simulated in software to provide a true pilot task loading. Aircraft flight controls and switches in the cockpit provide inputs to a variety of aircraft systems. Helmet Mounted Displays (HMD) overlay the out-the-window view with flight, tactical and weapon-information symbology.

The EDS has been used as one of the prime design tools to refine the detailed Comanche design and to support flight testing. This simulator in effect is the "first aircraft" and is where system integration and evaluations are being finalized prior to building expensive aircraft hardware. The EDS provides pilots with an opportunity to test software, cockpit layout, control laws, human factors and so on prior to flying in the actual aircraft.

- Flight Simulation Lab (FSL). The FSL contains one motion-base simulator and one fixed-base simulator. Comanche-representative crew stations provide pilots with controls and displays. The facility is designed to facilitate exchange of cabs (crew stations) between motion and fixed-base simulation devices. Visual scenes are generated by an image-generation system and scenes are projected onto 30-foot domes. A Kaiser Wide Eye wide-field-of-view helmet-mounted display (HMD) with a Polhemus electromagnetic head tracker is also available to display FLIR, LLTV, symbology or a combination thereof. Boeing's flight simulator is being used to support development, integration, and testing of Comanche flight controls, avionics and MEP. The digital link between the flight simulator, flight controls lab and systems integration lab has been and will be a cost-effective means of testing hardware and operational software prior to actual flight.
- Flight Controls Lab (FCL). This lab tests the flight-control hardware, software and 1553 data buses that will be used by the Comanche. Digitally connected with the flight simulator, the lab uses realistically simulated flight to perform rigorous checkout of all the flight control components. This connection allows engineers to evaluate the flight-control system while a pilot performs simulated combat missions.
- Systems Integration Lab (SIL). The SIL tests avionics, mission computers, 1553 data buses, flight displays and other mission equipment. It is also digitally connected with the flight simulator, so that testing is performed with typical activities encountered during combat missions.

"The simulation tools Sikorsky Aircraft and Boeing Helicopter use have also proven to be invaluable in the testing and development of the RAH-66."

These simulation tools are used extensively to test systems prior to integrating them on the aircraft. Many of the deficiencies found in the SILs or on the EDS significantly reduce the number of problem areas encountered on the actual aircraft. This also reduces the likelihood of flight test program delays due to software anomalies.

Test Aircraft. Once the components and subsystems are thoroughly tested in the SILs and on the PSTB the final system-level test is accomplished by integrating the hardware and software into the prototype aircraft.

The prototype's primary purpose is to conduct envelope expansion (structural/vibration, propulsion, performance and acoustics), flight controls and handling-quality test flights. The aircraft's tandem cockpits have full independent mission

capability, and the machine weighs approximately 12,800 pounds with the instrumentation package. The prototype has a triple-redundant, digital fly-by-wire flight control system, an automatic flight control system (AFCS), dual T-800 engines, low-observable exhaust, environmental control system, mission computer cluster, air vehicle interface computer and flight instrumentation.

In addition to the mission systems, the RAH-66 prototype has on-board test systems designed to allow the test pilots to inject predetermined test signals and simulated failures into the flight control system. This allows the test pilots to evaluate the system performance and aircraft response on the ground and in the air. The prototype is fully instrumented with over a thousand special sensors designed to measure every critical aircraft parameter.

"The first Comanche prototype resumed flight operations on Aug. 27, 1997"

This critical information is sent electronically from the aircraft to the telemetry room where it is monitored, collected and recorded by test engineers. All of the test data are stored on a common government-contractor database. An on-board instrumentation package collects backup information in case the electronic data are not transmitted or to supplement the test engineers' post-flight analysis.

With only one test aircraft, deficiencies which require analysis or aircraft modifications result in delays to the test-flight program. Typical programs will have multiple aircraft available for the test flight program so that if a modification is required to an asset the other assets may continue to fly without disruption to the test program. Due to funding restrictions the Comanche program will not acquire a second asset for test until 1998. Even with these limitations the aircraft is making outstanding progress.

Test Flight Status. The first Comanche prototype resumed flight operations on Aug. 27, 1997. The aircraft has been undergoing a scheduled systems update since March 1997 to install an improved transmission, a strengthened empennage, upgraded landing gear attachment points, an expanded software suite and several other small upgrades. The main transmission upgrade includes changes to the tail take-off pinion and the input bevel gears.

The structures supporting the prototype's vertical and horizontal tail surfaces were also strengthened as a result of lessons learned during previous flights and wind tunnel testing. In addition, fairings were added to the main rotor torque tubes to reduce the buffet loads on the empennage surfaces, and the attachment points on the landing gear were beefed-up to provide additional structural support.

Now that the modifications have been completed the aircraft will be able to continue to expand the flight envelope without any flight restrictions. The aircraft has so far completed 47 flights, accumulated 50.9 flight hours, attained a top speed of 167 knots (TAS) and by mid-October is expected to demonstrate a 170 knot dash speed.

The initial envelope-expansion testing is nearing completion and the Army's XP is approved to fly from both the front and back seat of the aircraft. The data from the prototype indicate the aircraft is performing near specification requirement in the areas of aircraft performance, acoustics and infrared signature. The PSTB has currently completed more than 65 percent of the 200-hour Military Qualification Test of the Comanche rotor and drive system.

Future Flight Test Events. The structural and prototype performance effort will continue for the first RAH-66 prototype. The second prototype will conduct the majority of MEP development and is scheduled to fly in next September. MEP systems will be added and tested on the aircraft over the next several years and in FY 2001 the operational test community will conduct a Limited User Test (LUT I) to assess the system's performance. These data will be used to support a Milestone II decision scheduled for October 2001.

The EOC unit will receive aircraft three through eight beginning in early 2003 and will conduct the majority of its collective training at Fort Hood, Texas. During the course of an 18-month field employment phase the EOC unit will conduct several operational assessments to assess the system performance. Low Rate Initial Production delivery of the RAH-66 begins in FY 2005 with the Initial Operational Test and Evaluation (IOTE) scheduled for FY 2006. The IOTE will be conducted with eight LRIP aircraft at the Western Regional Ranges in FY 2006. The Initial Operational Capability (IOC) date is December 2006.

The data from the Comanche flight test program indicate the aircraft will have the requisite tools to truly become the "quarterback" of the digital battlefield. The aircraft performance envelope is expanding, and over the next few years the aircraft MEP will be integrated and tested. These efforts and thousands of hours of future testing will help make the RAH-66 Comanche the world's most capable armed reconnaissance/light attack helicopter. Movement toward that goal has begun, and tomorrow's vision may be seen today flying over the skies of Florida.

* *

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By Maj. Michael D. Parrish

AIR WARRIOR – THE HUMAN AS A SYSTEM

We all understand how difficult it is to perform our missions to standard wearing MOPP gear, body armor and over-water equipment. But very few of us have had to wear it all at night and over water, which makes our mission one of survival versus tactical success. Yet with today's Aviation Life Support Equipment (ALSE) and potential missions, that's exactly the environment we are expected to operate in.

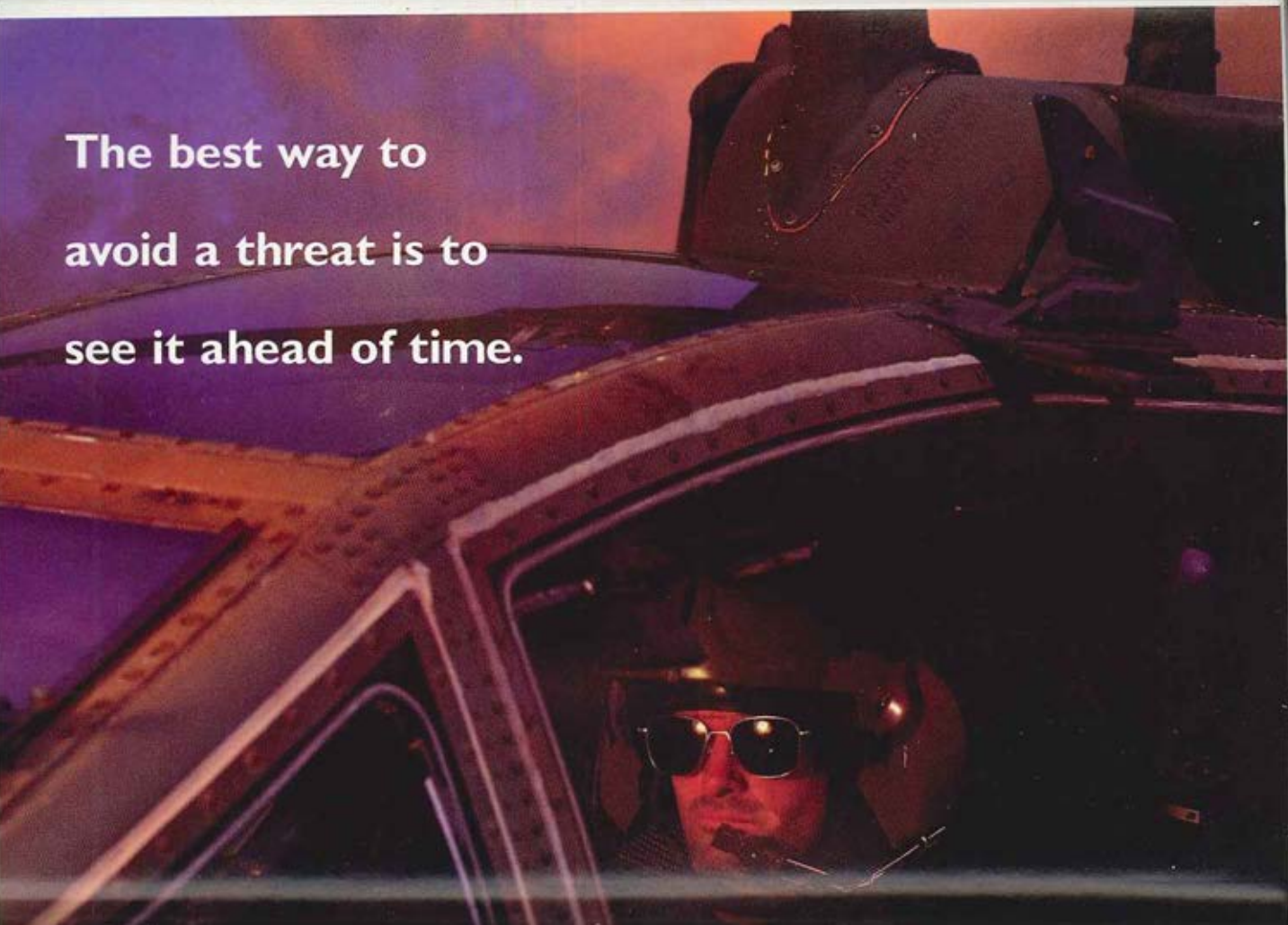
Air Warrior will integrate current ALSE and mission equipment.

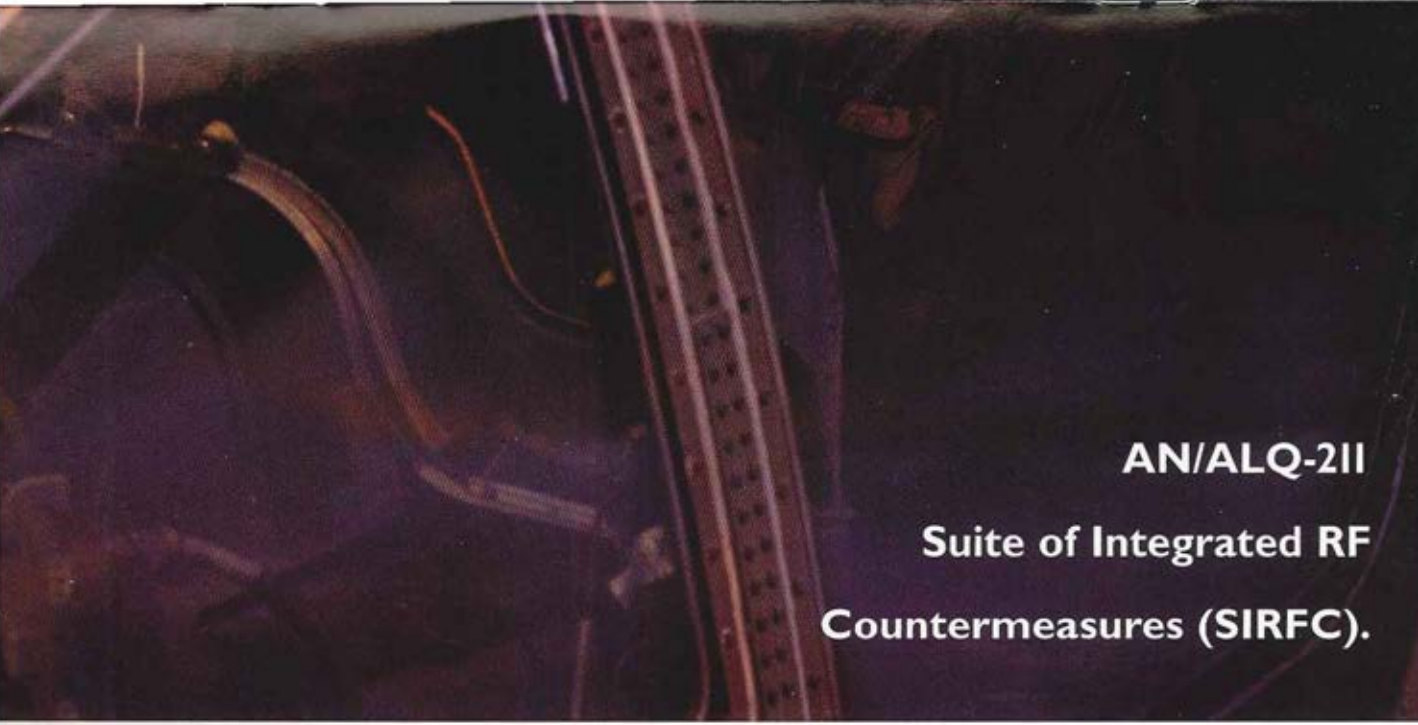
High-technology, high-visibility equipment such as the RAH-66 Comanche, AH-64D Apache Longbow or Improved Cargo Helicopter is so advanced that the weak link has become the aviator in the cockpit, the man in the loop. The systems will only perform to the limits of that aviator. With today's ALSE, we are adding additional burdens which effectively degrade the awesome capabilities of those new systems.

The lack of effective integration of current ALSE has resulted in helicopter crew members being furnished with a volume of personal gear that becomes a physical burden, especially when protecting against worst-case threat scenarios such as Nuclear, Biological, Chemical (NBC), over-water combat, at night. The physical burden imposed by cumbersome personal equipment can degrade aircrew effectiveness by increasing rates of fatigue, reducing mobility, limiting visibility, and restricting their ability to safely fly aircraft and perform mission functions.

The Air Warrior system will fix all that. It will be designed to provide a synergistic approach to ALSE by integrating current ALSE and mission equipment that is worn, carried or kept readily accessible to aircrew members during flight and ground operations.

Background. ALSE has traditionally been upgraded using the bottom-up approach in which the acquisition community has improved or added individual components. Each of these components still works as designed. However, when we put all of this stuff together, we get what's affectionately called the "Christmas tree effect" — we now have 42 individual, heavy, cumbersome components hanging on the aviator or crewmember. Figure 1 (on the left) shows an aviator wearing all current ALSE components, including MOPP IV, body armor, life raft and survival vest. The total weight of those com-


The best way to
avoid a threat is to
see it ahead of time.



AN/ALQ-211

Suite of Integrated RF Countermeasures (SIRFC).

With the ALQ-211 Suite of Integrated RF Countermeasures, you're ready for the demands of the modern battlefield. SIRFC provides the accurate threat warning information and robust countermeasures capabilities you need, and can rely on. It identifies radar detection and threat lethality envelopes. SIRFC also fuses its data with other sensors to give you a complete picture of air defense threats on the battlefield — total situational awareness. With SIRFC, you can fly with confidence in your ability to evade or defeat enemy threats, stay focused on your critical mission ... and get home safely.

ITT Defense & Electronics

Figure 1

ponents is 57 pounds. Figure 1 (on the right) shows the same aviator in the front seat of an AH-64A Apache. Note how close he is to the Optical Relay Tube (ORT) and the digital keypad he is expected to use. We have failed in the integration or systems engineering of the human as a system.

The Air Warrior system will attempt to change the traditional course of ALSE improvements by using a top-down approach in which we design equipment around the human as a system, while also attempting to achieve commonality between services. This effort will ensure that humans can enhance the synergy of the man-machine interface and no longer be the weak link.

Modeling, Simulation and Testing. In order to fully understand how bad the problem of ALSE man-machine interface is, the Project Managers Office, Air Crew Integrated Systems (PM-ACIS), conducted numerous modeling, simulations and tests from 1995 to present. These evaluations were designed to quantify the severity of the problem and focused on using Army crewmembers as test subjects. All of these test results can be found on the Air Warrior web page (http://134.78.26.118; choose "Aircrew Integrated Systems," then "Air Warrior") if you are interested in the details. The two most revealing results came from simulations done at Fort Rucker, Ala., in the spring of 1995. The first was a mission performance evaluation conducted by the Army Research Institute (ARI), which compared the mission enhancement or degradation of AH-64 crews.

The crews were required to perform basic range-of-motion tasks, followed by a basic mission scenario in accordance with the

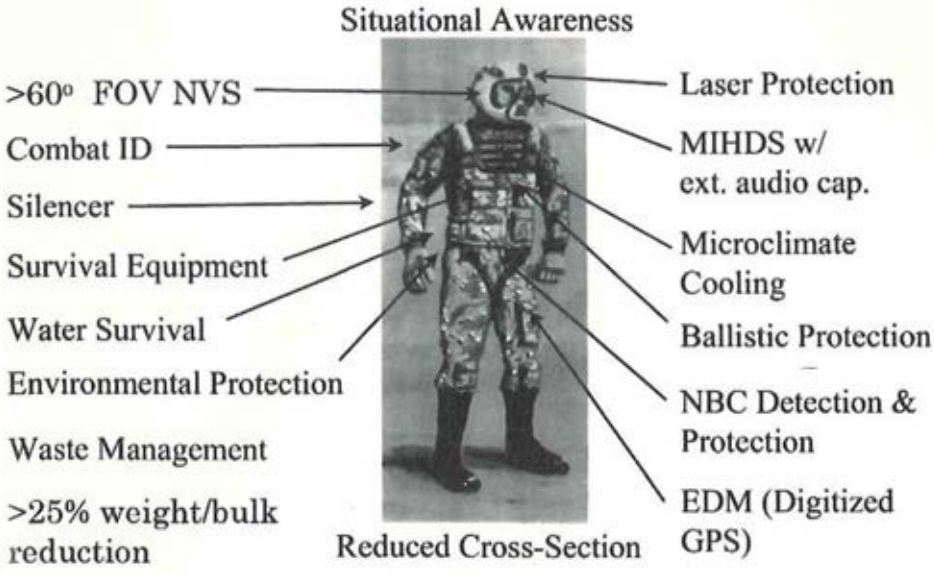


Figure 2

Aircrew Training Manual (ATM) in both the encumbered and unencumbered states. The unencumbered state is the baseline ALSE consisting of flight suit, gloves, survival vest and helmet. The encumbered state is the addition of all potential ALSE for night, over-water, NBC and combat environments. The comparison of the two states showed that there was a doubling of time required to perform such basic tasks as entering the cockpit and tuning radios, as well as a significant reduction in situational awareness and physical range of motion of the cyclic stick and head movement. Weight and bulk were also critical issues.

In the other simulation — conducted at the United States Army Aeromedical Research Laboratory (USAARL), also at Fort Rucker — both active and National Guard crews were evaluated to determine the significance of heat stress in the encumbered state. The crews were expected to perform basic flight tasks in a UH-60 simulator in a 50 percent humidity and 100 degree Fahrenheit tropical environment. The expected duration was two sorties each of two hours in duration, with a simulated refuel operation in between, for a total time of four hours and 10 minutes. The results showed that not a single crew could even get to the refuel point before one or both crewmembers' body-core temperature exceeded safe limits and had to be extracted from the scenario. Heat stress is also a critical issue.

Both of these evaluations were conducted again this past summer using Navy rotary-wing ALSE to compare that service's future upgraded equipment to current Army equipment. The results of that validation test, not surprisingly, were very similar to the earlier

Army test: heat stress and weight/bulk are a problem with our sister service as well. While there are similar problems with Navy ensembles, both services found that each had improvements over the other in various individual components. Because of this, and the underlying ALSE problems that afflict all crews, the Air Warrior program is en route to becoming a joint program across all services. With these results, the Air Warrior established the baseline criteria from which to improve. So, what have we done to fix our problems? The Air Warrior program was established to bring the human as a system into the 21st century like the rest of our aviation equipment.

Air Warrior. Air Warrior is the rotary-wing aviation focus for providing a mission-tailorable system that standardizes and integrates ALSE for Defense Department aviators, crew members and maintainers, during flight and ground operations. The overarching goal of the program is to significantly improve aircrew capability and mission performance to fight and survive in all battlefield environments, including NBC, day or night, over land or water, and in worldwide climatic conditions. The focus of the Air Warrior effort is to complete a top-down systems integration approach to significantly reduce the weight, bulk and heat stress experienced by aircrew in all environments and missions. Digitization of the aviator and technology insertion/upgrades are critical tenets of the Air Warrior strategy. The Air Warrior ensemble will be fielded to FP1, FP2 and FP3 units beginning in FY 2002 and completing in FY 2010. Figure 2 depicts the future components of the Air Warrior system.

The Air Warrior ensemble will be fielded to FP1, FP2 and FP3 units beginning in FY 2002.

The Air Warrior system will provide aircrew with state-of-the-art integrated NBC and noise protection, heat stress reduction, crash and post-crash survivability, concealment and environmental protection, ballistic protection, night vision capability, heads-up displays, nuclear flash protection, directed energy eye protection and flame/heat protection. The Air Warrior design will improve overall aircrew mission performance, aircrew endurance and comfort, aircrew and aircrew station interface, and safety and survivability. It will also provide for the integration of aircrew personal protective gear with such other essential functions as visual enhancement, physiological comfort and hygiene, escape, evasion and survival.

The Air Warrior design uses a modular approach to allow the commander and aircrew to tailor the system to specific missions. The design will also allow for future enhancements and expansion of the system and interfacing equipment. The Electronic Data Manager will act as the brains of the Air Warrior system and will provide aircrew members modernized capabilities such as digitization, GPS, electronic data and moving map displays in a compact platform.

Items such as flight clothing, body armor, NBC equipment and some helmet functions will be designed to protect the wearer against specific hazards associated with crashes, fire and weapons. ALSE items such as flotation gear, anti-exposure suits, signal, shelter and sustenance items, personal weapons and radios will integrate and complement each other to improve aircrew mission capability. The stress of wearing excessive non-integrat-

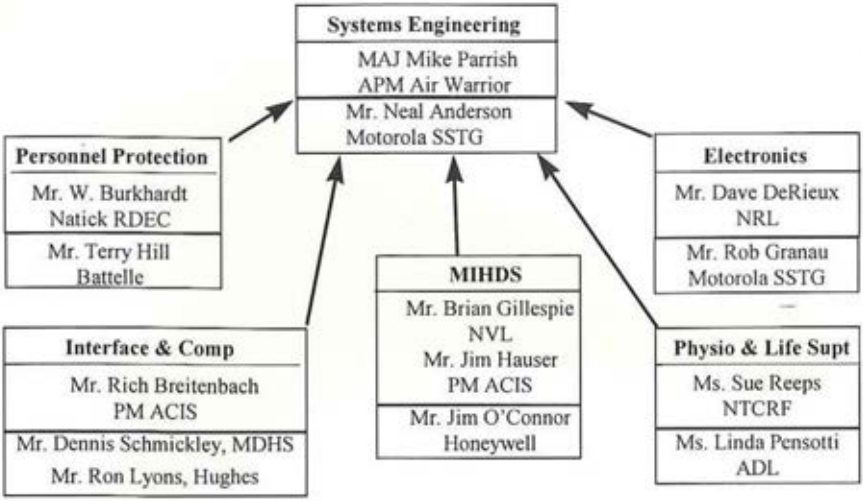


Figure 3

ed ALSE equipment will be minimized. This equipment will be readily accessible to the aircrew to meet various survival, escape, evasion and rescue contingencies following a crash or forced landing.

Acquisition Strategy. The Air Warrior program is currently in Phase I, Program Definition/Risk Reduction. To maximize the performance of the system while reducing the costs and compressing the schedule, Integrated Product Teams with government and contractor support are working closely with the users to ensure all issues and requirements are adequately addressed. The Air Warrior team is a world-class combination of government and contract experts who have significant experience in human performance engineering on such programs as Land Warrior. The Land Warrior Team provides critical support to us as they are about three years ahead in the life-cycle process. We work closely with both Project Manager and TRADOC Systems Manager Soldier to ensure our two warrior systems will be compatible.

The contract team is lead by Motorola with support from organizations such as Arthur D. Little, Battelle, Boeing, Honeywell and Hughes. The government team is lead by PM-ACIS, part of PEO, Aviation, now based at Redstone Arsenal, Ala., and is supported by such government facilities such as the Natick RDEC Laboratory, the Naval Research Laboratory, Navy Air, the Night Vision Laboratory, the Human Research and Engineering Directorate (HRED), and the Aviation Research, Development and Engineering Center.

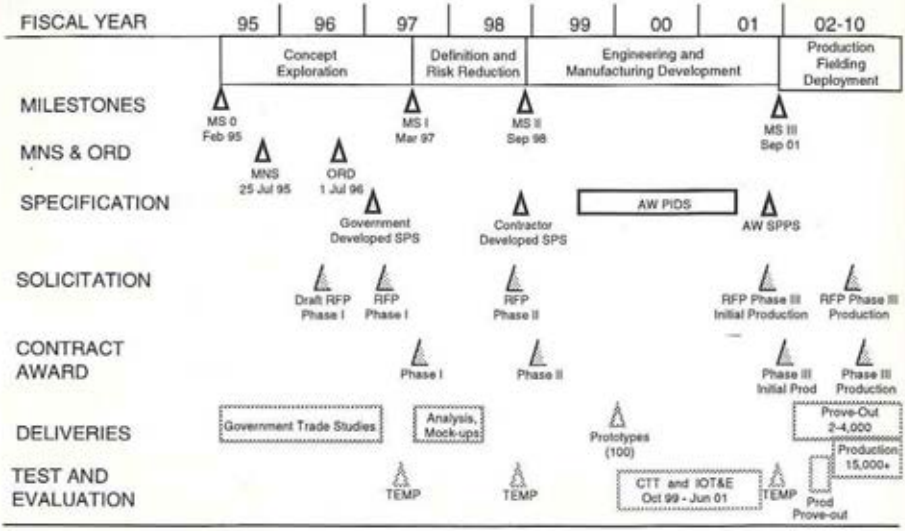


Figure 4

In addition, simulation and modeling efforts such as virtual prototyping are being used to reduce the significant delays and costs associated with the traditional build-test-fix strategies. Phase I will be completed by May 1998 and will provide the Air Warrior program team with four system-level alternatives from which one best system will be selected for continuation into Phase II beginning in FY 1999 [Figure 4 shows the current Air Warrior acquisition schedule]. Current plans are for the Air Warrior program to formally become a joint program with Special Operations Command, Navy and Air Force participation.

User Participation. This past summer the Air Warrior Team went to Fort Campbell, Ky., to get a close-up view of what the aviation community has for current equipment and issues. The members of the 101st Aviation Brigade and the 160th Special Operations Avn. Regiment described their mission profiles and allowed our teammates to look at and wear current ALSE (as well as climb on various aircraft). While some of our government and contractor teammates are former aviators, most had little or no exposure to Army aviation. The Directorate of Combat Developments (DCD) at Fort Rucker provides daily support as the users' representative to the Air Warrior Team. Their main focus is to help us keep the user in the loop while we create the Air Warrior system.

We have also received excellent support from the Western Area Aviation Training facility near Tucson, Ariz., and National Guard crewmembers from around the country. They have participated in baseline simulations for the virtual prototyping model

being developed by HRED and have provided important input and suggestions to the Air Warrior Team. Active crewmembers from Fort Wainwright, Alaska, and Fort Hood, Texas, have also provided great insight into current equipment deficiencies and the best ways to improve our current ensemble.

The Air Warrior Team always encourages comments from the user community and the defense industry. For detailed information, I encourage you to look up our web site (see the address above) and let us know what you think.

Current Operations. As of this writing the Air Warrior Team is conducting a worldwide search for current Army, Navy, Air Force, special operations, foreign and commercial individual components to meet the component-level requirements. In addition, the team is looking to organizations such as DARPA, federal laboratories, universities and corporate research and development efforts to identify future components to meet those same requirements. The individual Integrated Process Teams will evaluate the performance, cost and risk of each component prior to forwarding their suggested component alternatives to the Systems Engineering Team.

The fun begins in January, when the Systems Engineering Team will compile all of the component alternatives and try to synthesize and mold the individual items into four systems-level alternatives. These four alternatives will range from the low-risk, low-cost system to the high-tech, futuristic alternative that is not constrained by cost, schedule or performance limitations. The Air Warrior government team will evaluate these alternatives and down-select to the one preferred alternative that meets as many requirements and programmatic constraints — such as cost and schedule — as possible. From this will also come the future improvements which can be easily incorporated into future Air Warrior systems.

Our main acquisition focus always has been to make the Air Warrior system an open architecture system in which upgrades and improvements can be quickly and efficiently added to the total system without major redesign or rebuild. In essence, any future technologies can be given, hopefully at the unit level, to the aviator who can easily put them into their fielded Air Warrior ensembles. The goal is to use the spiral acquisition process whereby the Army develops and fields a functional, effective baseline Air Warrior system based upon the current state of technology. As technology matures, threats change and aircraft systems change, the Air Warrior team can continue to develop and field new upgrades to improve the baseline system. This approach is evolutionary rather than revolutionary.

The bottom line is that we have a significant problem in the human factors and systems engineering arena for all DOD aircrews when it comes to ALSE. Instead of living with the current acquisition strategies and philosophies when it comes to fielding individual equipment, the Air Warrior Team is aggressively searching for, and finding, new ways to do business and make the human in the loop capable of fully realizing the potential of the aircraft systems we are expecting to operate. Air Warrior is considering the human as a system.

* *

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By Mr. Paul H. Berkowitz

INTEGRATING ARMY ASE INSTALLATION

U.S. Army aircraft survivability equipment (ASE) system installation and integration has historically been done via independent sequential efforts. It was an event-driven approach; each ASE system development and schedule was independent of the others and common milestones were rare.

"The recent MH-47E ASE integration program was an example of a new and better way to install ASE systems."

As a result, ASE installation was performed on a first-come, first-served basis. The first system to be installed got the best location; successive ASE systems suffered from the limitations imposed by the previous systems. As a result, although the first system usually worked fine, overall ASE performance suffered as each successive system's performance was compromised. In addition, interoperability issues had to be solved again and again, as each new system was added. Finally, the piecemeal approach to ASE system installation eliminated those performance enhancements that might have resulted from integrating the various systems.

The recent MH-47E ASE integration program was an example of a new and better way to install ASE systems. It was a simultaneous installation and integration effort in which all installations were coordinated, with the timing of each determined by the system's value to the Army, not by a random schedule. The MH-47E program was a plan-driven effort, with linked schedules and common milestones. Since the installation designs were performed simultaneously, the locations were selected for best overall ASE performance, regardless of schedule sequence. The interoperability issues were resolved once for all systems, and the results were portable to other platforms. The simultaneous integration effort also resulted in performance enhancements, and small incremental modifications to the systems offered big performance payoffs.

The coordinated MH-47E ASE installation was developed by Electro-Radiation Inc. (ERI), working under contract to U.S. Army Communications-Electronics Command NVES for the Advanced System Integration (ASI) program. The ASE systems to be installed included the ALQ-211 SIRFC RF warning and jamming system, the ALQ-212 SIIRCM IR warning and jamming system, and the AVR-2A laser warning system. The AVR-2A sensor and LRU locations had been initiated under another project and were to be coordinated with the new ASE systems. A

potential engine suppressor system then in development, known as Black Ice, was added to the effort. The installation design effort was accomplished in a two-week period at New Jersey's Lakehurst Naval Air Engineering Station, which is also home to the Army Airborne Engineering Evaluation Support Branch.

Support for the installation design effort was provided by government personnel from PM-AEC, NVES, SIMO, TAPO and AATD. Also present were personnel from Electro-Radiation Inc. and from support contractors ITT Avionics (SIREC), Lockheed Sanders (SIIRCM), Hughes Danbury optical (AVR-2A) and AEL (SIRFC antennas).

The objectives of the ASI installation effort included:

- Coordinated location of SIRFC, SIIRCM, and AVR-2A sensors;
- Coordinated location of SIRFC and SIIRCM LRUs;
- Assessment of Black Ice impact on SIIRCM configuration;
- SIRFC intra-system and inter-system isolation tests; and
- SIRFC receive and transmit antenna multipath tests.

All objectives of the ASI installation effort were accomplished. The highlights of the effort included:

- Development of a forward installation that enabled both the SIRFC forward transmitter LRUs and the SIIRCM Jam LRUs to be located in the aircraft's nose behind the radome. This location provided excellent forward fields of view for both systems because of the unobstructed view; maximum RF jamming power on the threats because of short cable runs from the transmitter to the antennas; and growth potential to add the OASYS Obstacle Avoidance System, because of the SIRFC aircraft-centerline boresight location.
- Development of an aft installation that enabled both the SIRFC and SIIRCM systems to achieve required fields of view, avoid blockage by Black Ice, maximize jamming power and maximize use of current ASE installation locations to minimize impact.
- Modification of the previously selected AVR-2A installation location, relocating the aft sensor in order to be compatible with the potential Black Ice installation,
- Establishment of multiple configurations for the SIIRCM, based on quick-look evaluation of potential Black Ice signature reduction. The installations developed were designed to be compatible with any of these SIIRCH configurations.
- Achievement of the required isolation of the SIRFC antenna locations over the entire frequency range. The original locations were found to have problems from the Black Ice aft, and the refueling boom forward. Both problems were corrected.

"The advantages of this truly integrated approach to ASE are immediately apparent..."

The advantages of this truly integrated approach to ASE are immediately apparent in the significant results obtained from the effort at Lakehurst. By coordinating the installation of all ASE simultaneously — even though their delivery schedules differed — an installation was developed which ensures maximum performance of all ASE systems.

For example, with the help of LRU mock-

Integrating Army ASE continued on pg. 56

By 1st. Lt. Johnathan Steinbach

SUPPORT FOR SFOR1

From Mar. 21 to April 2, 1997, Fort Bragg's 1st Corps Support Command led the Port Support Activity (PSA) for the United States' most recent wave of support in Bosnia. The Fort Bragg-based 229th Attack Helicopter Regiment was directed to assemble an aviation task force to augment NATO's Stabilization Force 1, which was to rotate out elements of SFOR then in Tuzla, Bosnia-Herzegovina.

"Task Force Tiger's PSA played an integral part in maintaining the already-short deployment timeline."

Task Force Tiger's PSA played an integral part in maintaining the already-short deployment timeline. The COSCOM gave leadership of the PSA to its only aviation unit, the 4th Battalion, 159th Aviation Regiment. The 4-159th's mission was not a usual PSA. While battalion personnel had experience in such activities, they were going to have to improve on older methods for conducting a port operation if they were going to have the entire Task Force's equipment loaded onto the ship in nine days. The equipment consisted of 50 aircraft, 261 trucks, 63 storage containers and 46 pieces of such general cargo as fuel pods, rotor blade boxes and so on.

The most daunting task during the PSA was the preparation of the 24 Apache and 26 Black Hawk helicopters for transport. The preparation consisted of each aircraft being disassembled to certain levels (specific to aircraft type) and the installation of padding around fragile sections of the fuselage. Finally, each aircraft was shrink-wrapped and moved to the staging area.

Staging consists of moving the aircraft to a designated area and parking them in an order prescribed by a load manifest. The soldiers of the ten units involved in the PSA did this to 50 aircraft in two and a half days. After the aircraft were prepared three and a half days were spent preparing and staging the rolling stock, with two final days devoted to loading the ship. Including the first

day soldiers and equipment arrived to set up for the arrival of the aircraft, the Task Force's equipment was loaded and on its way to Europe in nine working days.

"We did in two days what has taken other units eleven," said Maj. Tim Mays, the PSA officer in charge and the 4-159th's aviation maintenance officer.

The key to such efficient port support was task organization and staffing, Mays said. All of the ten units participating in the port-support efforts agreed to assign individuals to specific tasks, rather than assigning a task to an entire unit.

"When each unit agreed to the new task organization that put 229th mechanics on the same aircraft as 4-159th mechanics, we knew we now had the staffing necessary to do the job right and on time," Mays explained. "In the past, units were reluctant to let their soldiers be task-mastered with soldiers from other units."

With the combined talents of the participating units organized into teams, the average time it took from aircraft shutdown to staging was five hours fifty seven minutes. Done one at a time, had one unit been given the task of aircraft preparation, it would have taken more than 12 days just to get the aircraft into staging. The Task Force Tiger PSA had up to 13 aircraft in the tear-down phase at once. The creative management used with the aircraft preparation was also used for the trucks and storage containers. Containers and the first aircraft were being loaded while the trucks were being prepared and staged.

The benefits of the new task organization didn't end with simply creating new, highly skilled teams and squads. In order to save the Army money, a daily resource-management matrix was planned and updated every evening during the operation. If requirements changed, soldiers and equipment were sent back to Fort Bragg, thereby saving thousands of dollars in operational costs by not keeping the more than 180 personnel on-site for the duration of the operation. The new task organization also created greater operational flexibility. The usual maintenance problems occurred but were easily staffed or deferred so that the tempo of the operation never slowed.

This most recent PSA in support of the Dayton Accord is a good example of the mission-first orientation of XVIII Airborne Corps leadership. Units willingly task-organized their soldiers to fit the time constraints of the mission. The Task Force Tiger outload plan is sure to become the new standard for similar operations. The 1109th Aviation Classification Repair Activity Depot, the National Guard unit whose mission is to assist active-duty units with deployments, has already requested a copy of the plan so planners can rewrite their deployment publications and use Task Force Tiger estimates for equipment, supplies and personnel.

Once in Europe the aircraft and equipment outloaded by Task Force Tiger were reassembled and flown to Tuzla, while the trucks convoyed to Bosnia through Hungary. SFOR 1 will remain in place until ordered to return or until replaced by SFOR 2. Train-up for SFOR 2 has already begun at Fort Bragg and, should SFOR 2 be asked to deploy from that post, it is certain the COSCOM Warriors and their 229th brethren will perform as impressively as they did for SFOR 1.

* *

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THE HILL DRILL: LOW-COST, HIGH-PAYOFF SCOUT TRAINING

Bad information leads to bad decisions. The purpose of this article is to present an inexpensive training tool with which combat leaders can train their troops to accurately report enemy forces to aid the friendly force commander's tactical decision making process. Accuracy of reporting is critical to successfully shaping the battle.

This low-cost training helps improve tactical reporting.

Force XXI digitization attempts to answer three age-old questions: "Where am I? Where are my Buddies? Where is the Enemy?" Imbedded and portable Global Positioning System (GPS) receivers and laser rangefinders on both present and future combat vehicles are much welcomed aids in answering these questions.

Coupled with downlinks from such national intelligence assets as JSTARS, precise location of friendly and enemy forces down to the team and individual soldier level is cresting the horizon. Some hail these incredible advances as a panacea; others label them as a Pandora's Box. The Pentagon acknowledges the reality of strategic-level information warfare and anti-satellite operations. Translate this to the tactical level. The scout living in the Information Age must be able to use the high-tech systems of the 21st century while mastering the low-tech map and compass skills that will keep him and his buddies alive. For the low cost of some HMMWV OPTEMPO mileage, "The Hill Drill" can refine distance estimation and precision location of a target so that friendly forces can rapidly develop the tactical situation.

When my air cavalry troop conducted this training, the mission was simple: train the aeroscout and aeroweapons pilots to accurately estimate the distance of an M-998

AIRCREW TRAINING

TASK: DETERMINE DISTANCE AND LOCATION OF A TARGET AND ENGAGE WITH INDIRECT FIRES

CONDITIONS: FROM A KNOWN POINT AND GIVEN A FT CARSON 1:50,000 SCALE MAP, A LENSATIC COMPASS, A PROTRACTOR, AND BINOCULARS

STANDARDS: (1) DETERMINE DISTANCE WITHIN 250 METERS
(2) DETERMINE TARGET LOCATION WITHIN 400 METERS
(3) TRANSMIT A SPOT REPORT
(4) ADJUST INDIRECT FIRE WITHIN 50 METERS AND FIRE FOR EFFECT
(5) SUBMIT BATTLE DAMAGE ASSESSMENT

Figure 1

SERGEANT'S TIME TRAINING

TASK: NAVIGATE MOUNTED AS A TC

CONDITIONS: GIVEN A FT CARSON 1:50,000 SCALE MAP, A LENSATIC COMPASS, A PROTRACTOR, A HMMWV AND A SIX-DIGIT GRID AS A DESTINATION

STANDARDS: NAVIGATE TO A POINT ON A ROAD WITHIN 100 METERS; NAVIGATE TO A POINT OFF-ROAD WITHIN 150 METERS.

Figure 2

KNOWN SIZE OF OBJECTS

	LENGTH(m)	WIDTH (m)	HEIGHT (m)
M998 HMWWV	4.57	2.16	1.75
	COMPARED TO		
BRDM-2	5.70	2.35	2.31
BMP-2	6.86	3.13	2.15
T-72	6.90	3.46	2.30
T-80	7.20	3.46	2.30

SOURCE: FM 100-2-3, THE SOVIET ARMY TROOPS, ORGANIZATION AND EQUIPMENT

Figure 3

LOSS OF DETAIL OR TEXTURE

ESTIMATION BY APPEARANCE OF TREES

1000 METERS	**TRUNK AND MAIN BRANCHES ARE VISIBLE. FOLIAGE APPEARS IN CLUSTER-LIKE SHAPE. DAYLIGHT MAY BE SEEN THROUGH FOLIAGE**
2000 METERS	**TRUNK IS VISIBLE; MAIN BRANCHES ARE DISTINGUISHABLE; FOLIAGE APPEARS AS A SMOOTH SURFACE. OUTLINE OF FOLIAGE OF SEPARATE TREES IS DISTINGUISHABLE.**
3000 METERS	**LOWER HALF OF TRUNK IS VISIBLE; BRANCHES BLEND WITH FOLIAGE. FOLIAGE BLENDS WITH ADJOINING TREES.**
4000 METERS	**TRUNK AND BRANCHES BLEND WITH FOLIAGE. FOLIAGE APPEARS AS A CONTINUOUS CLUSTER. MOTION CAUSED BY WIND CANNOT BE DETECTED.**
5000 METERS AND BEYOND	**WHOLE AREA COVERED BY TREES APPEARS SMOOTH AND DARK**

SOURCE: FM 6-30, TACTICS, TECHNIQUES AND PROCEDURES FOR OBSERVED FIRES

Figure 4

HMMWV without the aid of electronic devices (Figure 1). The concept of the operation was to concurrently train the enlisted soldiers to navigate the HMMWV to a specified six-digit grid using only a map and a compass (Figure 2), and to then submit a tactical report over a SINCGARS radio upon reaching their checkpoints. The HMMWV then became the "target" for the pilots to pinpoint on the map and engage with notional indirect fires.

To conduct "eyeball calibration", the pilots were given their exact location on top of a hill that overlooked both main post and a road to the small arms ranges. The HMMWV started out four kilometers away, traveled down the range road toward the pilots (like an advancing enemy force) and stopped at one kilometer intervals. Army aviators undergo annual flight evaluations where they must demonstrate a working knowledge of distance estimation techniques based on visual cues as described in FM 1-301, "Aeromedical Training for Flight Personnel." This exercise was a practical application of the known size of an object to aid them in estimating its distance (see Figure 3 for size comparison of the M-998 to common threat vehicles). Field artillery observers are also trained to use visual cues based on the detail and texture of foliage near the target and meteorological and geographic considerations to accurately determine target distance (Figures 4 & 5).

After the aviators established a mental picture for the target at known distances

OTHER CONSIDERATIONS FOR DISTANCE ESTIMATION

OBJECT APPEAR NEARER WHEN:

- IN BRIGHT LIGHT
- IN CLEAR AIR AT HIGH ALTITUDE
- THE OBSERVER IS LOOKING DOWN FROM A HEIGHT
- THE OBSERVER IS LOOKING OVER A DEPRESSION, MOST OF WHICH IS HIDDEN
- THE OBSERVER IS LOOKING OVER WATER, SNOW OR A UNIFORM SURFACE
- THE BACKGROUND IS IN CONTRAST WITH THE COLOR OF THE OBJECT

OBJECTS APPEAR MORE DISTANT WHEN:

- IT IS IN POOR LIGHT OR IN FOG
- ONLY A SMALL PART OF THE OBJECT CAN BE SEEN
- WHEN OBSERVING FROM A KNEELING OR SITTING POSITION ON HOT DAYS ESPECIALLY WHEN THE GROUND IS MOIST

SOURCE: FM 6-30, TACTICS, TECHNIQUES AND PROCEDURES FOR OBSERVED FIRES

Figure 5

VEHICLE CHECKPOINTS

KNOWN DISTANCE TRAINING FROM OP 1 (EC19038646)

CHECKPOINT	GRID	DISTANCE	NEARBY FEATURE
1	EC195825	4000 meters	RGE 49 TURNOUT
2	EC195835	3000 meters	RGE 55, BLDG F
3	EC190845	2000 meters	FRONT SLOPE OF HILL
4	EC193855	1000 meters	BUTTS RD/BROWN RD INTERSECTION

DISTANCE ESTIMATION PRACTICAL EXERCISE FROM OP 2 (EC19088650)

CHECKPOINT	GRID	DISTANCE	NEARBY FEATURE
5	EC212874	2300 meters	HILLTOP
6	EC209879	2250 meters	TANK DITCH
7	EC204875	1550 meters	RGE 28 YELLOW/BLACK RAILS
8	EC198884	2000 meters	ROAD ON HILLSIDE
9	EC193872	600 meters	SOUTH OF RUNNING TRACK
10	EC193887	2200 meters	ROAD

Figure 6

from the first OP, a pair of HMMWVs moved to locations throughout the local training area that were observable from a second OP which was close by and faced a different direction. The pilots were then required to estimate the range to the target, and to use their compasses and maps to plot its grid and then conduct an audible call for fire on the target. Distances varied from 2,300 meters to 600 meters danger close (Figure 6). By the end of the training, each pilot accurately located the target and achieved "artillery" effects with one adjustment or less.

Distance-estimation training should be conducted whenever combat forces are introduced into a new environment. In the desert environment of the National Training Center at Fort Irwin, Calif., objects can appear up to a few kilometers closer than they actually are. Under such conditions premature calls for indirect fire or a direct-fire engagement that falls short of the target can have disastrous results. Even using laser rangefinders or designators on targets that are beyond weapons range is foolish in an age where threat forces are employing laser detectors.

Compromising your position or intentions can be prevented by unaided distance-estimation techniques. A reliance on electronic equipment without a redundant backup is equally unwise. This simple drill pays big dividends to the commander in protecting his forces while shaping the battlespace to destroy his enemy.

* *

Capt. Patrick L. Matthews was the Commander of P Troop, 4th Squadron, 3rd Armored Cavalry Regiment, when this article was written. He is currently the Army Aviation Project Officer for the Joint Suppression of Enemy Air Defenses Joint Test Force at Nellis Air Force Base, Nev.

Integrating Army ASE cont'd. from page 49

ups the SIRFC and SIIRCM LRUs were collocated in the tight nose area, enabling both systems to share that valuable real estate and optimize both systems' performance. Aft SIRFC antennas were shifted to enable SIIRCM sensors to move to avoid Black Ice blockage. The AVR-2A blockage from Black Ice was identified and a solution was easily implemented when the SIRFC and SIIRCM sensors were moved in concert. Finally, by temporarily installing SIRFC antennas with duct tape and modelling clay, isolation and multipath tests revealed problems that were solved by moving antenna locations a few inches. It was a trivial effort on the mockup and precluded an expensive aircraft modification that would have been necessary if the conflict had been discovered after actual installation.

One additional key to the success of this coordinated ASE installation effort that should not be overlooked was the exceptional cooperation among all the personnel involved. All the players deserve a salute for the outstanding results they achieved — in a very short time — under some very harsh New Jersey weather conditions.

* *

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1997 DAC PACK

The professional-personal roster of Department of the Army Civilian members of AAAA that returned their questionnaires by October 1, 1997

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Powers, Shawn A., 1825 Cedarview Drive, Killeen, TX 76543.

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McClure, John E. Mr., ATTN: AMSAM-MMC-LS, US Army AMCOM, Redstone Arsenal, AL 35898.EM: mcclure-je@exchange1.army.mil

ARMY AVIATION

U.S. ARMY AIRCRAFT SINCE 1947

Since 1947 - An Illustrated Reference

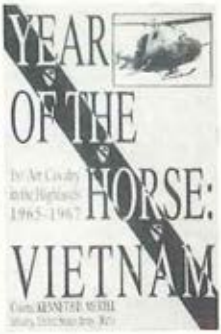
Stephen Harding

U.S. Army Aircraft Since 1947 is the only comprehensive, up-to-date guide to the 124 types of helicopters, fixed-wing aircraft and experimental flying machines used by the U.S. Army since 1947. After a concise yet thorough introductory history of U.S. Army Aviation, the author discusses each aircraft type used by the Army's air arm, which is the largest, most technologically advanced and most combat experienced force of its kind in the world today. Within each chapter the author includes information on aircraft serials, markings, weapon systems, operational history and other technical data. Illustrated with more than 220 color and black and white photographs, *U.S. Army Aircraft Since 1947* is the definitive reference source on its subject and a must-have volume for all military aviation historians and enthusiasts. [Schiffer Publishing Ltd. Size: 8 1/2" x11", 264 pages, hard cover; ISBN: 9-7643-0190-X]

YEAR OF THE HORSE: VIETNAM

1st Cavalry in the Highlands 1965-1967

COL Kenneth D. Mertel (USA, Ret.)

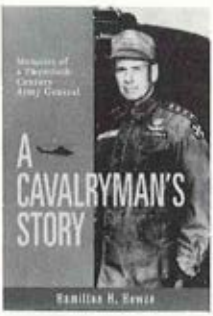


Year of the Horse: Vietnam is the day-to-day story of the Jumping Mustangs - 1st Battalion, Airborne, 8th Cavalry, of the 1st Air Cavalry Division. After describing the activation of this then revolutionary airmobile division at Fort Benning, GA on 1 July 1965, COL Mertel gives a vivid picture of the building of his own Jumping Mustang Battalion, the rigorous training of officers and men, and, finally, the long voyage across the Pacific to Vietnam. Now the test. The answer came quickly and dramatically in a rapid succession of search and destroy operations. COL Mertel pays tribute to the many acts of heroism of his men, who lived, worked and fought together in some of the world's most inhospitable conditions. He also writes movingly of those who never came back. [Schiffer Publishing Ltd. Size: 6"x9", 384 pages, hard cover; 59 color photographs, 9 maps; ISBN: 0-7643-0138-1]

A CAVALRYMAN'S STORY

Memoirs of a Twentieth Century Army General

Hamilton H. Howze



A Cavalryman's Story is the memoir of a professional soldier, born into the lineage of West Point and recognized today as the father of U.S. Army Airmobile tactics and doctrine. With understated charm and humor, GEN Howze writes of his polo-playing years in a 1930s Army that still relied on horses, and then of the sudden, almost remarkable transition to armored divisions, when the U.S. entered WWII. It was in the mid-1950s that GEN Howze emerged as one of a handful of perceptive Army officers who recognized the potential of a sky cavalry. As the first director of Army Aviation GEN Howze promoted the concept to industry, the government, and the public. His vision came to fruition in the 1960s when he presided over the U.S. Army Tactical Mobility Requirements Board, known as the Howze Board, which proved the viability of sky cavalry in combat. *A Cavalryman's Story* provides an authoritative look at the forging of the modern Army and a wry perspective on the perennial absurdities of military life, whether in peace or war. [Smithsonian Institution Press. Size: 6"x9", 316 pages, hard cover; ISBN: 1-56098-664-6].

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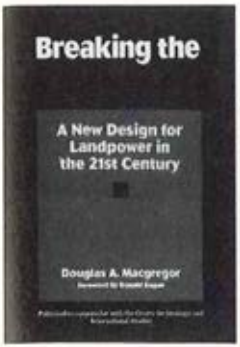
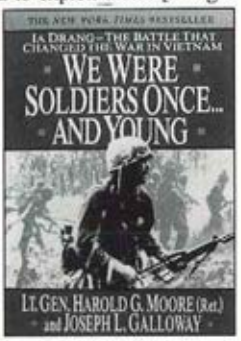


BREAKING THE PHALANX
Douglas A. Macgregor

This work proposes the reorganization of America's ground forces on the strategic, operational and tactical levels. Central to the proposal is the simple thesis that the U.S. Army must take control of its future by exploiting the emerging revolution in military affairs. The analysis argues that a new Army warfighting organization will not only be more deployable and effective in Joint operations; reorganized information age ground forces will be significantly less expensive to operate, maintain, and modernize than the Army's current Cold War division-based organizations. And while ground forces must be equipped with the newest Institute weapons, new technology will not fulfill its promise of shaping the battlefield to American advantage if new devices are merely grafted on to old organizations that are not specifically designed to exploit them. [Praeger Publishers. Size: 6"x9 1/8", paperback, 283 pages, ISBN: 0-275-95794-2]



WE WERE SOLDIERS ONCE... AND YOUNG
Harold G. Moore and Joseph L. Galloway

We Were Soldiers Once ... And Young brings the war back home with unforgettable stories of those who lost family members to combat. This devastating account rises above the specific ordeal it chronicles to present a picture of men facing the ultimate challenge, dealing with it in ways they would have found unimaginable only a few hours earlier. It reveals to us, as rarely before, man's most heroic and horrendous endeavor. [Harper Collins Publishers, Size 5 1/2"x8". 483 pages, paperback. ISBN: 0-06-097576-8

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The AAAA Scholarship Foundation, Inc. (AAAASFI) is now part of the Combined Federal Campaign (CFC), a workplace charitable fund drive conducted by the U.S. Government for all federal employees. It is the single largest workplace fund drive in the country, raising approximately $195M in pledges annually.

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The AAAA Joseph P. Cribbins Product Support Symposium/ATCOM Advance Planning Briefing to Industry

The 24th Annual Joseph P. Cribbins Product Support Symposium (PSS) will be held in Huntsville, Alabama, at the Space and Rocket Center Marriott Hotel on 28-30 January 1998. This year's Symposium is hosted by the Tennessee Valley Chapter of AAAA for both the Aviation and Missile Command and the PEO, Aviation, now settled in at Redstone Arsenal, Alabama. The Symposium examines logistics support requirements in the near term and serves as the AMCOM Aviation Advanced Planning Briefing to Industry (APBI) where business opportunities will be covered by briefers from both organizations. The symposium is also designed to address issues of interest to all industry attendees.

The theme of this year's symposium, "Aviation Logistics: New Home, New Partners, Same Mission", will focus on the synergism that will be gained from the combining of two of the Army's most potent weapons systems commands while maintaining the distinctive and distinguished legacy that accompanies the Army's Aviation Logistics mission.

On Thursday, the CG, AMCOM, MG Emmitt Gibson, the AMCOM Systems Acquisition Director, BG Robert Armbruster, and their supporting directors and program managers will address specific aviation system requirements in the near term. Friday morning will be filled with briefings from MG Jim Snider and the PEO Aviation Program Managers. As impacts of the Quadrennial Defense Review continue to be revealed between now and the symposium dates, it is expected that many questions, answers and opinions on this subject will be presented for discussion at the PSS this year.

You are encouraged to take advantage of the early registration form (at right). A block of 225 rooms have been reserved on a first come, first serve basis at the Space and Rocket Center Marriott Hotel. The hotel is conveniently located on I-565, 5 minutes from the Huntsville Airport and Redstone Arsenal. Next month's issue will contain more information concerning the agenda, the CASL and a possible golf tournament on one of the many beautiful courses in Huntsville.

1998 AAAA Joseph P. Cribbins Annual Product Support Symposium/ ATCOM Advance Briefing for Industry Advance Registration Form

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100% of Donations DO go to Scholarships!

By Maj Gen. Dave Robinson, President AAAA

As you know, the Combined Federal Campaign (CFC) allows federal employees to make donations from their pay checks to the charities of their choice. The AAAA Scholarship Foundation, Inc., (AAAASFI) joined the campaign for the first time last year.

Recently, some of our members have called the National Office with concerns about a statement that appears in the current CFC brochure describing the AAAA Scholarship program. Specifically, the CFC published that the annual overhead cost divided by the annual revenue of the AAAA Scholarship Foundation is 17.4%. This implies that only 82.6% of your donation will benefit the Foundation. This is NOT accurate!

The first reason that this is misleading is that the AAAA picks up **ALL** costs of operating the AAAA Scholarship Foundation, Inc. (paper, postage, printing, accounting, etc.). The AAAASFI has no employees, an all volunteer board, and the administration is done by AAAA staff. 100% of AAAA's "in kind" donation goes to overhead, so that 100% of the money received from you goes to the scholarships and loans that so benefit our AAAA members and their families.

The second reason that the CFC number is misleading is that two thirds of all reported expenses are from the AAAA Life Member Program. When you join AAAA as a life member, your entire $300.00 life member fee goes directly to the AAAA Scholarship Foundation, Inc. From that point on, AAAA itself underwrites all your membership services, magazine, meeting notices, etc. The IRS requires that these AAAA underwritten expenses be reported annually as expense to the Foundation. As crazy as it sounds, if AAAA was not so generous in underwriting Life member expenses, our reported ratio would plunge to around 6%! But even this lower number would have no impact on your donation because the AAAA picks up all the remaining expenses...all of them.

We are all very grateful for your donations and assure you that thanks to AAAA, not one dime of the money AAAA Scholarship Foundation, Inc. receives from you goes to overhead costs. Spread the word!

VET GETS FLYING CROSS FOR HEROISM IN 1965

After more than 30 years, CWO4 Walter J. Schramm, Ret., was awarded the Distinguished Flying Cross on 1 Aug. 1997 in Bad Kreuznach, Germany for actions during the Vietnam War.

Maj. Gen. Larry R. Ellis, Commander, 1st Armored Division, presented the award to Schramm before an audience that included Mr. Joseph L. Galloway, co-author of "We were Soldiers once...and Young". Galloway was a UPI war correspondent who reported on the battle in the Ia Drang Valley and spearheaded the effort to get recognition for outstanding soldiers who were not nominated for awards at the time of the action.

Schramm, a member of AAAA since 1959, was reportedly overwhelmed by the show of appreciation by the 1st Armd. Div. In a recent article in Stars and Stripes, Schramm is quoted as saying, "I was calmer during the battle than I am now standing before all these soldiers."

"I'm very pleased that someone took the time to acknowledge my efforts, although you don't stick your neck out and do these things to earn medals. All we knew was that our buddies were in trouble and we wanted to help."

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AAAA Aviation Soldiers of the Month

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

Sgt. Alex Benitezburgos
September 1997
(North Country Chapter)

Sgt. Neil P. Moran
September 1997
(Narragansett Bay Chapter)

Spec. Lori J. Rossi
October 1997
(Narragansett Bay Chapter)

AAAA Aviation Soldiers of the Quarter

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

Spec. Amy R. Price
4th Quarter 1997
(USAAVNC Chapter)

Sgt. David Gonzalez
4th Quarter 1997
(USAAVNC Chapter)

New AAAA Sustaining Members

GEICO Direct

New AAAA Industry Members

Corrosion Technologies Corporation
Dallas, TX

Aces

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

CWO5 James F. Wise
CWO3 Don L. Brown

In Memoriam

Lt. Col. Raymon D. Henley

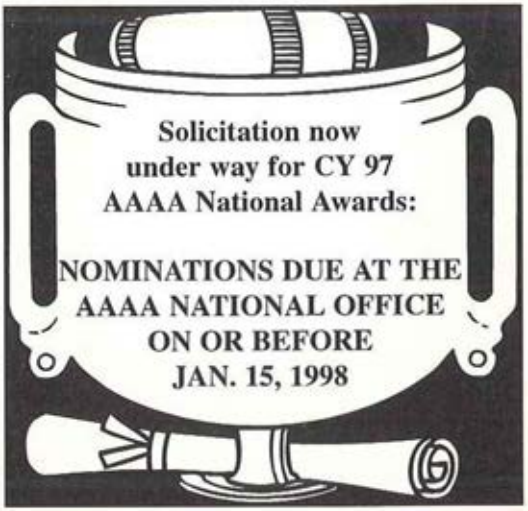
During four days of fighting in the Ia Trang Valley in November 1965 over 234 Americans were killed. Schramm was cited for heroism while operating as a UH-1D pilot assigned to the 1st Cavalry Div. and flying troops, ammunition, supplies and evacuating dead and wounded under heavy fire. Despite the commander of the besieged unit's twice stopping flights into the area, Schramm and many other pilots in his unit volunteered to continue the resupply and relief missions.

In one instance, after already flying four air assault missions that day, Schramm's pilot in command left to join another mission. Schramm took it upon himself to assemble an available crew, took command of two aircraft and flew three more missions into hot Landing Zones before the day was over.

As further reported in the Stars and Stripes article, war correspondent Galloway also made remarks to the young soldiers gathered to honor Schramm.

"It's been my privilege and honor to march and stand with American Soldiers in the heart of many battles," he said. "I've never seen a soldier who liked war. Those who have seen war's true face up close hate it."

Reflecting on current peace-keeping missions in Bosnia versus his experiences in Vietnam, Galloway remarked, "How much more satisfying it must be to save lives, not take them." ■



Class of 1997 Aviators in the U.S. Army War College, Carlisle, PA. Front Row: COL Salley D. Murphy; LTC Oliver H. Hunter IV; LTC Michael C. Flowers; LTC Ammon A. Sink, III. Second Row: LTC Christopher L. Sargent; LTC James R. Mitcham III; LTC Richard B. Bowman; LTC Melvin A. Roberson. Third Row: COL Kerry M. Brown; LTC Craig B. Hanford; LTC Terry M. Peck. Back Row: LTC Benny G. Steagall; LTC David P. Brostrom. Missing from photo: COL James A. Herberg; LTC Mark S. Landrith; LTC Maureen K. LaBeouf; LTC William J. Partridge; LTC George A. Quinn; COL Thomas M. Ryan; LTC Arthur J. Sosa (ARNG); LTC Davis D. Tindoll, Jr.

ANCOC/BNCOC Noncommissioned Officer Course, Fort Rucker, AL

ANCOC Class 97-04, 67T40, UH-60 Hel Rep Supv: Distinguished Grade: SFC David L. Huntington, D-Co 160th, APO AA, Panama; Honor Graduate: SFC Patricia A. Stoker, D-Co 2/1st Avn Regt. APO AE, Germany; Commandant's List: SFC Matthew Shoemaker, D-Co 2-25th Avn Regt., HI.

ANCOC Class 97-03, 93P20, Avn Operations Sgt: Distinguished Graduate: SSG Philip L Pierce, JROTC, Avn Div, Ft. Polk, LA; Honor Graduate: SSG Patricia L Mainard, 1107th AVCRAD, Springfield, MO.

BNCOC Class 97-03, 93P20, Avn Operations Sgt: Distinguished Gradute: SGT Charles W Leppert, Military Dept. of Indiana, Detachment 10 OSACOM; Honor Graduate: SGT Jeffrey A Roth, B-Co 304th MI Bn, Ft. Huachuca, AZ.

BNCOC Class 97-03, 93C20, Traffic Control Operator: Distinguished Graduate: SGT Tony Jones, E-Co 58th APO AE, Germany.

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.

I am interested in locating some members from my Class of 58-4 (6 Feb 58 - 24 Apr 58), which graduated from flight school at Ft. Rucker, AL. I would like to see if there is enough interest to have a 40th reunion in April 1998. Below is a list of the class members of that class that I have not yet located.

Eaton, Loren D.
Humphrys, James G.
Angier, John F.
Bauer, Arthur S.
Beale, Rudolph W.
Bronson, Russell A.
Gerald J. Corr
Faurot, Billie C.
Ferguson, Kenneth W.
Fonshell, William R. Jr.
Frendenburg, Frank W.
Fry, Peter M.
Garner, Houston H.
Gordon, Marvin E.
Graham, Robert L.
Guidroz, Evans J.
Hamberlin, Lee V.
Harvard, Thomas P., Jr.
Huskey, James E.
Johnson, James C.
Kilpatrick, Wiliam A.
King, Martin D. L.
Larson, Kay R.
Linquist, Kenneth C.
Littleton, Walter M.
Mark, James C.
Martin, Alfred L., Jr.
Miller, Frederick t.
Moseley, Robert L.
Nakajo, Mas M.
Nave, Donald L.
Noyer, Gary R.
Paredes, Robert
Phillips, Howard E.
Phillips, John C.
Watke, Frederic W.
Winzenried, Frederick D.

If you have any information in regard to locating any of the above individuals, please contact Dan S. Hagood, Jr., 230 Highway 12, Hayneville, AL 36040, Tel: (334) 563-7584

NEW PLEDGE BRINGS CORPORATE MATCHING FUND DONATIONS TO $60,000!!!!

International Health Waters, Inc. has become the latest contributor to the AAAA Corporate Matching Fund Program. This new AAAA Scholarship Program matches corporate donations of $10,000 to establish perpetual, fully funded scholarships in a name chosen by the corporation. Mrs. Ruth Luce, (below right), President of International Health Waters, donated the first $5,000 check of a $10,000 pledge to the AAAA Scholarship Foundation Inc., President, MG Robert S. Frix, Ret. (below left) at the recent AAAA National Executive Board Luncheon in Washington, D.C. The donation establishes "The Donald F. Luce Scholarship" in memory of Ruth's late husband who played an integral part in the establishment of three AAAA chapters, co-founded the AAAA Product Support Symposium and served on the Board of Governors of the AAAA SFI.

The establishment of this scholarship brings to six the total number of Corporate Matching Scholarships since the program began earlier this year. Other companies who have signed up to have their $10,000 donations matched by the AAAA SFI include: Westar Corporation, Dyncorp, Sikorsky Aircraft, Army Aviation Publications, Inc., and Raytheon Aerospace. These scholarships will fund at least a $1,000 award per year through perpetuity depending on prevailing interest rate returns. The scholarships may be funded beyond the initial $20,000, but only the first $10,000 will be matched by the AAAA SFI. For more details, contact the AAAA National Office.

In 1997, the AAAA SFI awarded 81 scholarships and loans totaling $176,500 to AAAA members and their dependents including many Enlisted, Warrant Officer, and Company Grade Officers.

William T. Butts' Award for Leadership

The SFC William T. Butts' Award for Leadership has been awarded to Sgt. Lan M. Norris, E-Co 58th, APO AE, Germany. This award is named in Honor of Sergeant First Class William T. Butts while a member of HHC, 2nd Battalion, 229th Attack Helicopter Regiment, Fort Rucker, AL. During the period 16 January 1991 through 27 February 1991, SFC Butts participated in cross forward line of troops (FLOT) combat operations and numerous violent attacks as part of the 128th Airborne Corps attack in the heart of Iraq. SFC Butts distinguished himself on 27th February 1991 while engaged in combat operations against Iraqi Forces F-16 pilot near Al Basrah, Iraq. SFC Butts was a doorgunner on a UH-60 helicopter Black Hawk which came under heavy anti-aircraft artillery fire during the rescue attempt, resulting in the destruction of his aircraft and his death. SFC Butt's heroic actions and bravery were above and beyond the call of duty and keeping with the finest traditions of military service, reflecting great credit upon himself, the Non-commissioned Officer Corps, and the United States Army.

As a result of this action, SFC Butts was posthumously awarded the Purple Heart, Air Medal with "V" device, and the Distinguished Flying Cross.

AAAA CALENDAR

A Listing of Upcoming
National and Chapter Events

January 1998

Jan 22. AAAA Aviation Center Chapter Banquet, Fort Rucker, AL. Awards Presentations: AAAA Aviation Trainer of the Year, Air/Sea Rescue Award, Aviation Fixed Wing Unit Award, Aviation Medicine Award, ROTC Award, and Air Traffic Control Awards Presentations. Contact: CPT Darryl Doberstein, 334-255-2313.

Jan 28-30. AAAA Joseph P. Cribbins Product Support Symposium, sponsored by the AAAA Tennessee Valley Chapter, and the AAAA Logistics Support Unit Award and AAAA Industry Awards Presentations, Marriott Space & Rocket Center, Huntsville, AL.

Jan 30. AAAA Scholarship Board of Governors Executive Committee Meeting, National Guard Readiness Center, Arlington, VA.

Jan 31. AAAA National Awards Selection Committee Meeting, National Guard Readiness Center, Arlington, VA.

February 1998

Feb. 2-6. Aviation Leader's Training Conference (ALTC), U.S. Army Aviation Center , Ft. Rucker, AL.

Feb 6. Army Aviation Center Chapter Spring Classic Golf Tournament, Ft. Rucker. Contact: CW2 Jim Kennedy, 334-255-3411

Feb 20. Army Aviation Center Chapter General Membership Meeting and Member Appreciation Night, Ft. Rucker O'Club. Contact LTC Tom Young, 334-255-5712.

Feb 21. AAAA Morning Calm Chapter Winter Formal, Grand Hyatt, Itaewon, Seoul, South Korea. Guest Speaker: LTG Randolph W. House, Commanding General, Eighth United States Army. Contact: CPT Jennifer J. Manzo, HHC, 17th Avn. Bde., Unit 15270, APO AP 96205-0043. E-mail: eaav-ap@emh2.korea.army.mil.

The Association recognizes members and chapters dedicated to membership growth through a variety of membership programs.

NEW SPONSOR PROGRAM - Each member who sponsors a new member each year receives an AAAA coin as a small token of our appreciation and credit toward recognition as an "ACE".

"ACES" PROGRAM - Each member who sponsors a total of five new members each year receives an AAAA Coffee Mug in appreciation of the effort and is eligible to win the AAAA's **"TOP GUN"** Contest.

"TOP GUN" CONTEST - The member who sponsors the greatest number of new members during the contest year ending December 31 wins an expense paid trip to the AAAA Annual Convention, including airfare, hotel accommodations, registration, tickets to all the social functions, and **a $300 cash award.** The winner also receives a plaque presented at the AAAA Annual Convention. Cash prizes will also be awarded to runner-ups as follows: **2nd Place - $400; 3rd Place - $300; 4th Place - $200; and 5th Place - $100**

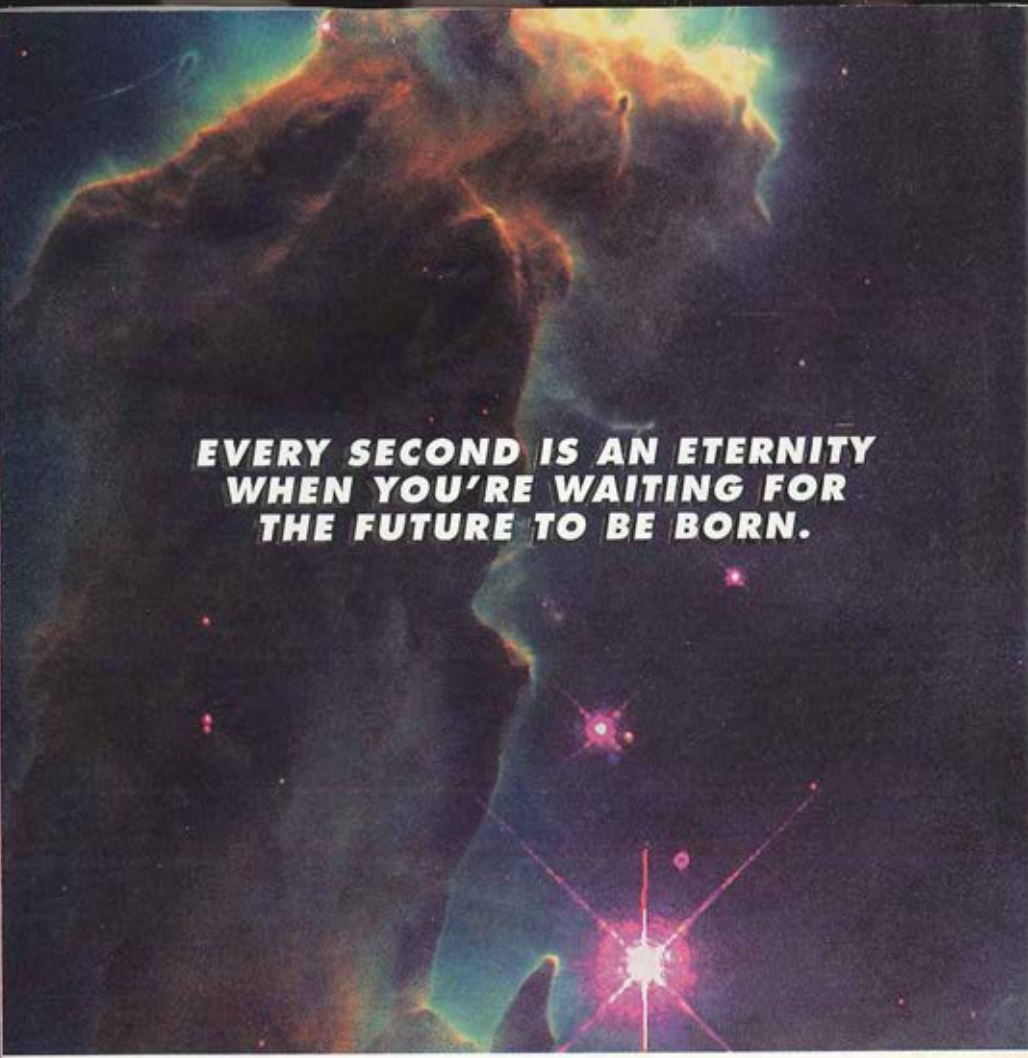
The AAAA is your partner--working together for ***"Excellence in Army Aviation"***

For The First Time, You're Covered. Even In Combat.

Now it's available: AAAA Loss of Flight Pay Insurance—and it pays even if you're grounded as a result of combat injuries. In other words, now you're covered if you're an active flight crew member (pilot, co-pilot, crew chief, flight surgeon, physician's assistant) in the U.S. Army, Army Reserve or National Guard. This brand-new program is available exclusively through AAAA, and your premiums are paid through payroll allotment. The plan offers monthly disability pay, and lump-sum payment of $25,000 or $50,000, tax-free. And monthly premiums are very low. Just think what that means if you're grounded: cash flow to keep you going while you're temporarily off flight status; or, if you're permanently grounded, enough to help you pay off those big financial commitments. Sign up now. Coverage for existing AAAA members is available for a limited time.

For information and an enrollment kit, contact: Harvey Watt & Co., P.O. Box 20787, Atlanta, Georgia 30320. Phone: 1-800-241-6103. Fax: 404-761-8326. Internet: www.harveywatt.com

Harvey Watt & Co.



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