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ROTARY & FIXED WING HARDWARE UPDATES

ARMY AVIATION

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FORTHCOMING ISSUES

December 1995 — Comanche First Flight and Vietnam: 20 Years Later.

January 1996 — Maintenance and Product Support.

Dear Reader:

Army Aviation Publications, Inc., (AAPI), under contract to AAAA, administers AAAA's programs and activities, including the provision of ARMY AVIATION Magazine to every AAAA member and the provision of an appointee to serve in the position of Executive Director of the AAAA and the AAAA Scholarship Foundation. Terrence M. Coakley, AAPI's designated Executive Director, has left the employ of our firm, and we are now involved in a search for a successor.

Time permitting, our schedule is to conduct our screening and/or on-site interviews through the end of December, 1995, and submit our choice to the AAAA President in time for approval of the appointment by the National Executive Board at its January 9 Board meeting at Fort Rucker, AL. We then look forward to having the approved candidate join our firm as soon after the completion of the decision process as possible. I will be working closely with members of the AAAA Executive Group and utilizing association industry standards throughout the selection process.

Until such time as the vacancy is filled, William R. Harris, Jr., AAPI's Vice President of Operations and Editor of ARMY AVIATION Magazine, will serve as the Acting Executive Director and will maintain full liaison with the AAAA and AAAASFI Boards, various committees, and the Chapter activities.

Prominent among the general qualities we seek are good conceptual thinking and, foremost, the ability to possess both oral and written skills; and the ability to draft, secure approval, and execute with full AAPI support such plans and programs as the AAAA leadership may direct. The applicant must also have the ability to translate new concepts into workable action papers, to deal with change, to manage specific AAAA programs for which AAPI is and will be responsible, to oversee budgets as directed, to exercise leadership in motivating volunteers, and to be a presence who will — as an aviation professional — represent AAAA within the Army, Army Aviation, and world communities.

Ideally, our requirements call for the candidate to be a retired Army Aviator with at least twenty years of aviation or aviation-related experience, and be in possession of a bachelor's degree or equivalent. Familiarity with the management of non-profit, professional associations is desirable. The position requires residence in Connecticut and entails moderate travelling, and a negotiated salary with benefits based on experience and performance.

If you know of a likely candidate (or candidates), please do not hesitate to have them send their resumes to my attention at AAPI, 49 Richmondville Avenue, Westport, CT 06880-2000.

With my good wishes,
Lynn Coakley
President & Publisher

VOLUME 44 ARMY AVIATION NUMBER 11

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DEPARTMENTS

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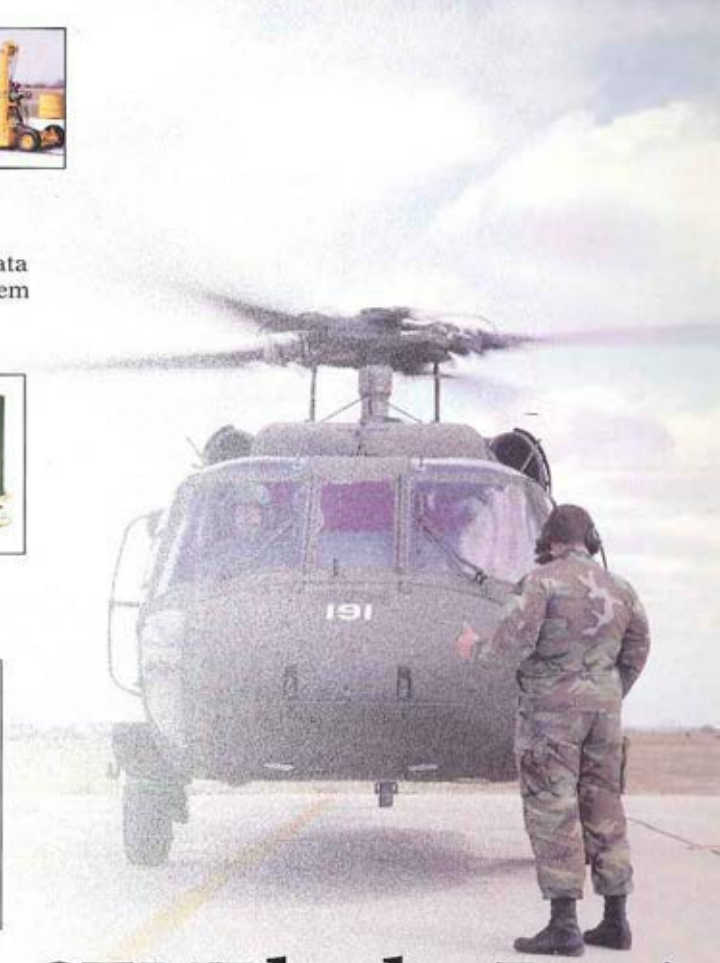

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■ GUEST EDITORIAL BY GEN WILLIAM W. HARTZOG
with MAJ NEVILLE S. VANDERBURG

ARMY AVIATION — CONTINUITY AND CHANGE FOR FORCE XXI

"Therefore I say, know your enemy and know yourself; in a hundred battles you will never be in peril."
— SUN TZU, ***The Art of War***

"Knowledge must become capability."
— CLAUSEWITZ, ***On War***

Army Aviation has come a long way since June 6, 1861. Although the beginning of modern Army Aviation is generally traced to 1942, it can be said to have begun that day in 1861 when Thaddeus S. C. Lowe brought his observation balloon to Washington D.C.

After a successful demonstration to the assembled political and military leaders he was asked to ascend near Falls Church, VA, to determine the location and movement of Confederate forces threatening the Capital. From his aerial vantage point he reported that the Confederates were not moving on Washington. The Balloon Corps was added to the Army of the Potomac on 25 September 1861, and Army Aviation has been an integral part of the force ever since.

The rapidly changing strategic environment, kaleidoscope of new technologies, and shrinking resource pool have generated a period of unparalleled change in our Army. The challenge is that there are more questions than answers. Today, the Training and Doctrine Command is at the beginning of all these questions that don't have answers, and for over a year has been leading our Army on an audacious march into the future. What is different today is that we have taken charge of the process of change. We have no other choice. The scope and pace of external change have compelled us to act now. To do otherwise would almost assuredly provide a force on the ground in 2010 structured for the requirements of 1995.

"Army Aviation is vital to our success..."

The aim of Force XXI is to redesign the total Army, taking full advantage of the information available across the battlefield thus maximizing versatility and flexibility. Army Aviation is vital to our success and is fully involved in this process of change. In order to prevent the traditional, incremental approach to change, we embarked mentally on a staff ride to 2010. We wanted to see what the world might look like and then ensure that our process of change was geared to those future requirements. This is a bold approach. Our efforts are manifested in TRADOC Pamphlet 525-5, *Force XXI Operations*, and serve as a beacon to illuminate what might be.

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This glimpse of the future provides a framework to describe change and begin the process of experimentation. As the title of this editorial indicates, the future is a mix of one part continuing what we are doing and another part changing the established order. The mix is not exact and much of our current effort is focused on finding what works, what doesn't, and what must change in order to fulfill the Chief of Staff's vision:

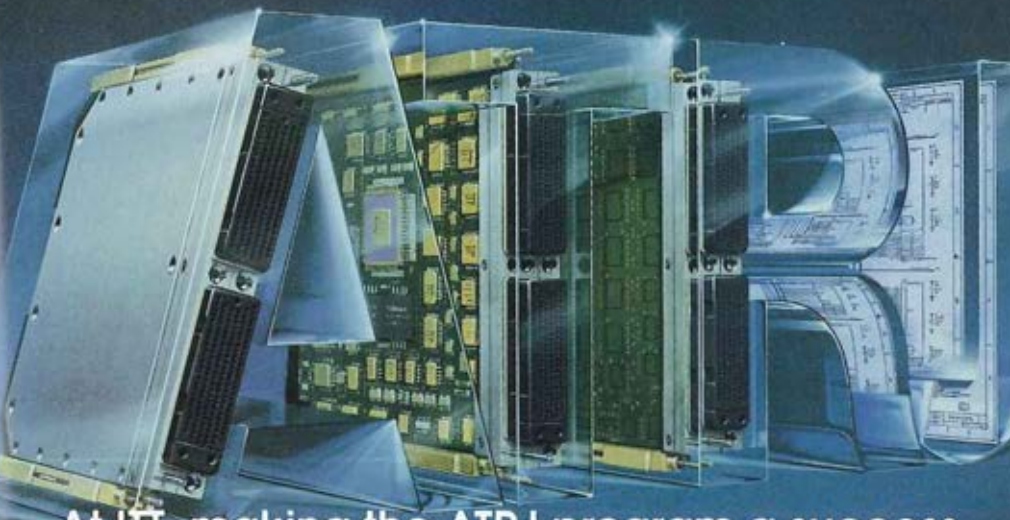
The world's best Army — Trained and ready for victory. A total force of quality soldiers and civilians. A values-based organization, an integral part of the joint team; equipped with the most modern weapons and equipment the country can provide, able to respond to our nation's needs. Changing to meet the challenges of today...tomorrow...and the 21st Century.

So, what's changing? The question on your minds must be, "What does it mean to me, today, right here in the orderly room, on the flight line, or in the field?" Let me outline some of our efforts for you. First, in the doctrine arena we are making a major effort to think about the future then write down the doctrine and Tactics, Techniques and Procedures (TTP) necessary to operate in that environment. We have already published digital TTP for infantry squad through armored brigade operations — and those units don't exist yet. Additionally, the draft digital TTP for aviation task forces has been published. We are also about to publish several key manuals for operations in the emerging strategic environment. Joint Pub 3-09, Doctrine for Joint Fire Support, will address issues such as fire support coordination, Joint Targeting, and inter-service relationships. A new field manual, FM 100-6 Information Operations, is our capstone manual on how to win the information war. In addition, FM 100-8, The Army in Multi-National Operations, and FM 100-18, Space Support to Army Operations, are about to be published and address considerations for planning, command and control structures, and operations from the tactical through strategic levels of war. Finally, we have the second draft of FM 1-100, Aviation Operations, in the field for review. As the keystone manual for Army Aviation, this is being updated to fully address considerations for full dimensional operations.

Wherever the Army is, you will find Army Aviation. Accordingly, it is a key component of Force XXI. As we look at aviation for the early 21st century we see many challenges as well as opportunities ahead. The Army is equipping the aviation force with a fleet of aircraft that will be vital to the success of Force XXI. Additionally, we are making profound changes to the way we train, both at the institutional level as well as the individual and organizational levels. Key initiatives that we are pursuing focus on developing a seamless linkage between the schoolhouses and the tactical Army, at home as well as abroad. In fiscal year 1994 almost three-quarters of the active Army passed through a TRADOC institution. In contrast, the technology available today enables us to conduct professional development courses such as BNCOC by linking the school to locations as distant as the Sinai. This is expensive up front but promises long-term efficiencies.

Change in the combat developments process centers around a shift from a paper-based to an experiment-based requirements generation. This, combined with early linkage of the user, combat developer, and industry promises to significantly shorten acquisition timelines. We are implementing the Aviation Restructuring Initiative to standardize attack and assault companies, provide a separate

COMMITMENT TO SUCCESS.



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aviation support battalion, fix identified aviation sustainment weaknesses, and retire old aircraft. Some of the key aviation modernization initiatives underway are the Kiowa Warrior, Apache Longbow, Comanche prototype and aircraft non-destructive test equipment.

Just as the Industrial Age changed military forces, so too will the Information Age. Information-based societies will organize, train, and equip their armies differently than before. Digital and Information Age technology is the foundation of Force XXI. Our vision of joint and coalition forces operating with a common and relevant situational awareness has never been closer. As a maneuver arm, Army Aviation will help set the pace of future battle and is central to attaining this vision. The Apache Longbow and Comanche are key systems we need in order to be successful. Apache Longbow, with its advanced millimeter-wave fire control and all weather fire-and-forget capability guarantees quantum improvement in battlefield effectiveness. Likewise, the Comanche will bring unprecedented Information Age capability to the battlefield. With its advanced sensor suite, sensor-to-shooter linkages, and enhanced mobility and survivability it will be a central piece on the digital battlefield, collecting, processing and distributing command and control information.

Force XXI Aviation must have unprecedented firepower, available in minutes to strike hardened and mobile targets at long ranges. The key is continued improvement in the sensor-to-shooter-to-battle damage assessment chain, ensuring that sensors, sensor processing, and fire control capability let us strike within the enemy's maneuver period. Army Aviation will play a large role in Force XXI due to improved agility, strategic deployability, advanced sensors, and mobility for adverse weather operations, precision strike capability, and increased survivability through digitization and reduced signatures. These attributes, coupled with increased reliability and reduced maintenance make Army Aviation increasingly versatile and immensely important to our early entry forces.

This technological impact is not new. Throughout history, military doctrine, organization, and strategy have undergone profound changes due to technological discovery and invention. History is replete with examples where new weapons, propulsion, communication, or other technologies have provided a basis for advantageous shifts in doctrine, organization, and strategy. Each of these changes in turn enabled contemporary military organizations to conduct operations more decisively than their predecessors. What is different today is the dawning of the Information Age. Technology is advancing at a relentless pace — a pace that is faster than our current system for change can handle.

While the future looks bright indeed, it is important to pause and consider what of our past and present is valuable to take with us on our journey. Thinking about the future of warfare is a veritable cottage industry, with journals, periodicals, and books overflowing with references to cyber-war, net-war, info-war, or any of a variety of terms being used to describe the future battlefield. As I look to the future I am reminded of Homer's *Odyssey*, not so much for a glimpse of battle, but for a lesson in what we must not forget.

To some, Homer's story is a simple tale of adventure describing the journey of the Greek hero Odysseus. However, it's more than just an adventure story. Simply put, it is a story about the role of memory in our development. In the story, Odysseus

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and his men find themselves in a strange land and encounter the unknown lotus plant. When some of Odysseus' men go on a reconnaissance party and fail to return, he goes looking for them. He finds them feasting on the sweet-fruit of this lotus plant. Homer tells us that "as soon as they tasted that honey-sweet fruit, they thought no more of coming back to us with news, but chose rather to stay there." Quite simply, they forgot — their past and their present. The lotus fruit was so good that it became their past, present, and was potentially their future.

Likewise, the dawn of the Information Age tempts us with technologies that have only previously been imagined. We cannot — and I will not — let technology become the lotus fruit of today. We must boldly look into the future, but always remember our past. Warfare in the 21st century will be different — that much is certain. From the mountain top we envisioned in TRADOC Pam 525-5, a future emerges in which information plays a central role in battlefield success. In this future we expect that technology will provide nearly perfect common situational awareness simultaneously to all. What we have envisioned indicates that perhaps we will be able to know almost everything about our forces as well as those of our adversaries at any time during any type of operation.

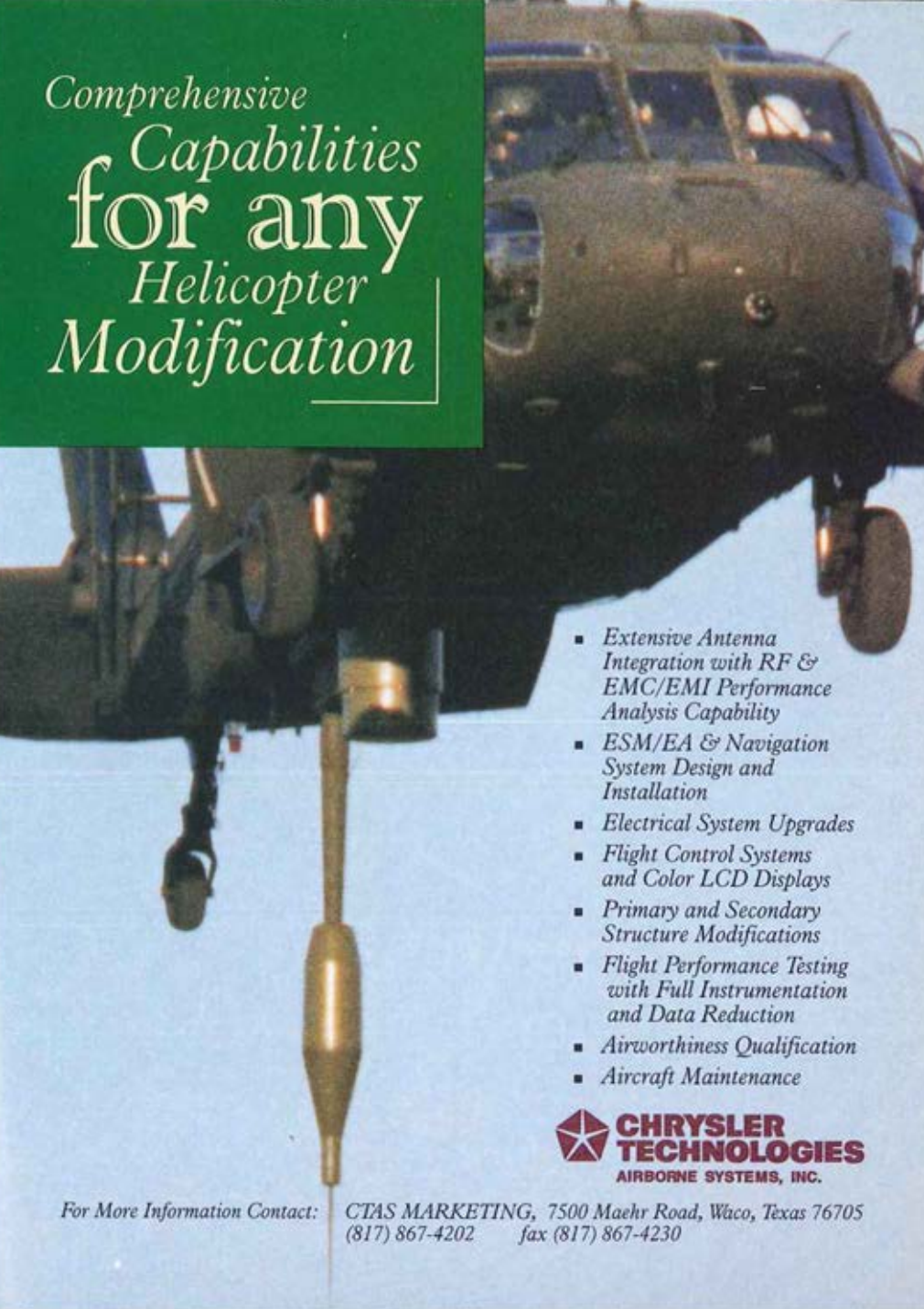
Between now and October, 1997, we will equip and train an experimental force — the EXFOR, at Fort Hood, Texas — and conduct warfighting experiments using a mix of live, constructive, and virtual training exercises. The results will serve to inform the Army's senior leadership as we then make the final decision on the Force XXI division design. Ours is a time of rapid change. Embrace it. Learn from it. Adapt to it. Success in the future will go to those who can rapidly scan their surroundings, focus on what needs to be done, and then have the courage to act. In 2010 our mission will be the same as it has been since 1775 — to fight and win our nation's wars, to serve America, and to gain decisive success at whatever we are asked to do. We must do our part now to create Force XXI — our 21st century Army.

So, those are the challenges we face as well as some of what we're doing to prepare for the future. It's important that we get it right. Our 21st century Army is forming now. Let me conclude by reassuring you what will not change as we continue toward fielding Force XXI. First and foremost, we will not lose the warrior ethos. Soldiers serving their nation are the centerpiece of our Army — today, tomorrow, and into the 21st century. Our view — my view — of Force XXI rests on the belief that changes in warfare are as much about warfighting concepts and organizations as they are about pure technology. I cannot envision the emergence of a cyber-warrior or of an army where machines reign supreme. Second, we will retain and strengthen our doctrinal foundation. Operations and training will continue to be doctrinally based and conducted in accordance with established tasks, conditions, and standards. Our training will continue to be rigorous and realistic, fully exploiting the combat training center experience. Finally, we will develop and incorporate new technologies that enable soldiers to be successful. No matter how future operations unfold one thing will not change: they will all be conducted by soldiers, the centerpiece of our Army.

★ ★

GEN Hartzog is the Commanding General, U.S. Army Training and Doctrine Command (TRADOC), Ft. Monroe, VA.

MAJ Vanderburg is the Special Assistant/Speechwriter to the CG, TRADOC, Ft. Monroe, VA.



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ARMY AVIATION SIMULATION: ONE MISSION, ONE VOICE

"Simulations are the basis for the Army's future training strategy."
— U.S. ARMY POSTURE STATEMENT FY96

In recent years, resource challenges created the need, and advanced simulation technologies developed the capability, to conduct collective netted training via simulation and simulators. Simulation is a major force multiplier, and we in the Aviation community must capitalize on the advantages of simulation as we move into the 21st Century.

To meet this challenge, the Aviation community completed a Capstone simulation strategy which consolidated aviator simulation training requirements. This strategy ensured cost and training effectiveness while integrating the Aviation Combined Arms Training Strategy and Force XXI training capabilities. Now more than ever we see the Aviation Combined Arms Tactical Trainer is the centerpiéce of Aviation's training simulation strategy. Used in conjunction with constructive and live simulations, it will enable aviation commanders to prepare for the multiple operations, environments, and organizational structures characteristic of Force XXI. Our goal is to operate in a "netted world" capable of seamlessly joining live, virtual, and constructive simulations.

The results of the first Aviation Training Simulation Conference.

The U.S. Army Aviation Center, the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM), and the Program Executive Office (PEO), Aviation are conducting a series of Aviation Training Simulation conferences to update our strategy for Training Aids Devices Simulators and Simulations (TADSS). It is essential that we have a fully integrated plan that addresses individual through collective training to ensure we are providing the most effective array of training approaches, as well as ensuring that Army Aviation has a coherent and competitive approach for scarce resources.

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The first conference was held in Orlando, FL, 25-26 September 1995. It was hosted by BG Pete Franklin, Commander of STRICOM. The theme for this first conference was, "Army Aviation Simulation, One Mission, One Voice". Here we pulled the senior Army Aviation leadership together to refine the aviation simulation vision and collectively establish a strategy to secure Army Aviation's place at the vanguard of the Army's training simulation program.

This conference focused on two goals. First, to coordinate an Aviation Combined Arms Tactical Trainer (AVCATT) Memorandum of Agreement to secure a clear path for future work and initiate a coordinated staffing for the AVCATT Operational Requirements Document (ORD). The ORD is the critical first step in the development and acquisition programs for the AVCATT. The second goal was to develop a coordinated Training Aids Devices, Simulators, and Simulation (TADSS) strategy addressing concurrency, worldwide quality assurance, budgeting, and several other imperatives critical to a sound and proactive plan.

Attendees covered the spectrum of the major aviation simulation players at ATCOM, PEO Aviation, STRICOM, Deputy Chief of Staff, Operations (Force Development and Training), Training and Doctrine Command, Combined Arms Center, and the National Guard Bureau. The agenda called for two working group sessions. One to work the AVCATT ORD, and one for the TADSS. Each working group took advantage of the assembled expertise producing truly outstanding results. COL Bill Powell, USAAVNC's Director of DOTDS, chaired the AVCATT working group which established an aggressive plan to secure a fully staffed and approved document, ready for signature by 1 November 1995.

Additionally, the group established a plan to use VTCs to coordinate a completed AVCATT ORD by mid-January 1996. This capability will provide a seamless training environment in which to train all aviation soldiers.

LTC Clem Greek, XO for CG, STRICOM, led the TADSS working group in developing an aggressive plan for completion of the TADSS strategy. The timelines include presenting a coordinated strategy to a general officer steering committee made up members within USAAVNC, PEO Aviation, ATCOM, STRICOM, DCSOPS, TRADOC, and NGB by mid-January 1996.

"With everyone's continued efforts, Aviation will once again be at the vanguard of the Army's training simulation program."

All participants agreed that our first conference was a huge success. A special thanks goes to BG Franklin and his STRICOM team. Additionally, I want to congratulate all the attendees for helping in the process to secure our simulation goal. The next conference is planned for mid-December 1995 — again at STRICOM. With everyone's continued efforts, Aviation will once again be at the vanguard of the Army's training simulation program.

★ ★

MG Adams is the Aviation Branch Chief and Commanding General, USAAVNC and Ft. Rucker, AL, and Commandant, U.S. Army Aviation Logistics School, Ft. Eustis, VA.

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BLACK HAWK MODERNIZATION

The UH-60 Black Hawk has a service life of 30 years versus the normal 20 year service life span to which most helicopters were assigned in the past. However, some of the first UH-60s produced in 1977 are already close to reaching 20 years of age.

"Some of the first UH-60s... are already close to reaching 20 years of age."

During the past two years, the Utility Helicopters Project Manager's Office (UH PMO) has structured a framework for a UH-60 modernization program which will address both older UH-60As and newer UH-60Ls. This fleet modernization program would begin sometime after the year 2000 and would build upon the current modernization efforts already underway in the UH-60Q MEDEVAC program, the UH-60A Refurbishment/Standardization program, and the Army Airborne Command and Control System (A2C2S) being developed by PM Aviation Electronic Combat (AEC) for installation in the Black Hawk.

MEDEVAC Modernization. The UH-60Q MEDEVAC forms the foundation of a future fleet modernization program. During the past 18 months the UH-60Q program has progressed through a refinement of the planned configuration, validation of the requirements document, and funding approval for an integration/qualification effort to be accomplished over the next 24 months.

The Army National Guard provided Dedicated Procurement Program funds to perform integration, qualification, and modification of four UH-60As assigned to the Tennessee National Guard to the UH-60Q configuration. One of the principal products of the contract, which is scheduled for award to Sikorsky Aircraft in Oct-Nov 95, will be a technical data package and installation instructions suitable for award of future competitive contracts for production and installation of UH-60Q modification kits. A requirement exists for up to 87 additional UH-60Qs but these remain unfunded.

The UH-60Q will be equipped to support up to six critical litter patients, seven ambulatory patients or a combination thereof. The medical package includes an oxygen generation system, nasal pharyngeal suction, patient monitoring equipment, medical equipment storage and an

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environmental control system for patient stabilization. The intercom system will allow hands-off communication between medical attendants and will allow for crew communications during externally-mounted rescue hoist operations.

The UH-60Q features MIL-STD-1553B data bus management of an enhanced avionics and navigation package which includes: multi-band, HF, and Have Quick radios, Improved Data Modem, and integrated Global Positioning System/Doppler. In addition, TACAN has been added to assist in locating Naval hospital ships and in navigation during operations in support of the Air Force.

To aid in safe navigation, improve reduced visibility operations and locate downed crew members and personnel on the ground, the UH-60Q features Forward Looking Infrared (FLIR), Storm Scope, and Personnel Locating System (PLS).

The UH-60Q MEDEVAC program funds the nonrecurring costs for integration and qualification of components that will be the basis for a future utility modernization program. Principal among the components potentially having an application to fleet modernization is the digital avionics architecture which incorporates a minimal data bus and digital avionics available today. This digital avionics architecture allows for expansion to incorporate the technology of advanced avionics architecture currently being developed in Comanche, A2C2S, and in the commercial world.

Production Upgrade. Production incorporation of modifications which enhance sustainability, survivability, safety and performance has been a strategy of the Black Hawk program since its inception. Some of the most significant improvements over the past 18 years of production include External Stores Support System (ESSS) hardpoints, Hover Infrared Suppressor System (HIRSS), Improved Durability Gearbox (IDGB) and the upgraded T-700-701C engine along with improved flight controls which defined the new UH-60L configuration. Numerous additional improvements have been developed and tested but have not been available in time to incorporate into the current production contract (FY96). This fifth and final year of the Multiyear IV contract is scheduled to complete delivery in June 1997.

Production beyond FY 96 is now virtually assured based on current Congressional and Department of Defense support. As the UH PMO begins evaluation of a new, five year multiyear contract, we will also evaluate the affordability of production line changes for which the nonrecurring cost effort has been paid by other programs. Examples include:

- SINCGARS, which is presently only being applied as a field retrofit.
- Improved spindle, which is being developed as an Independent Research and Development program by Sikorsky.
- Advanced Automatic Flight Control System (AFCS) Computer, another Sikorsky/Hamilton Standard IR&D program.
- Embedded GPS/Doppler AN/ASN-128B being developed by PM AEC.
- ARC-220 HF radio also under development by PM AEC.
- Transition section avionics door for which the nonrecurring effort has been accomplished in the SOA program, in the EH-60 and in Foreign Military Sales (FMS) programs.
- Data bus being qualified in the UH-60Q program.
- Operation and Sustainment (O&S) cost improvements including elastomeric rod end bearings for pitch change links and improved high speed shaft, both developed/evaluated by Team Hawk; improved battery system, being evaluated as a

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Some of these improvements to the production line will also be procured as retrofit kits; however, the significant advantage of incorporating the modifications during production is cost avoidance. Retrofit modifications require investing in a new component as opposed to simply the delta cost between the old and new component.

Refurbishment/Standardization (R&S) Program. The R&S Program is one effort aimed at modernizing older UH-60As which are being redistributed to Army National Guard units. The program is designed to standardize the oldest 300 UH-60As to the 1989 UH-60A configuration. This involves application of 160 modifications, 130 of which were incorporated in production but never applied as retrofit kits. The effort also includes replacement of all the old, unreliable Kapton wiring. The refurbishment portion of the R&S Program completes the next PMS-2 inspection, replaces time change components, applies special corrosion prevention coatings, and strips and repaints the aircraft.

The R&S Program is being performed primarily by Corpus Christi Army Depot (CCAD) with additional production by the Connecticut and California Aviation Classification Repair Activity Depots (AVCRADs). Approximately 100 aircraft have been completed with another 75 aircraft in work. Although the R&S Program initially targeted only the oldest 300 UH-60As, an additional 250 UH-60As require the Standardization Kit to be compatible with the 1989 configuration; however, this effort remains unfunded.

Advanced Avionics Architecture. Commercial digital electronics developments, the Comanche program, and the A2C2S program being developed for installation of improved command and control capability in the Black Hawk offer exciting new technologies with potential application to the UH-60 fleet. The Joint Communication Interface Terminal which replaces numerous avionics components is the centerpiece of the A2C2S program. Instead of many separate receivers/transmitters, each radio's capability is embedded in a circuit card. This technology promises significant savings in weight, space and cost. Another potential candidate for this advanced avionics architecture is the Integrated Communication Navigation Identification Avionics currently being developed for application to the Comanche and other programs.

Lift Study. A study was initiated in 1994 to identify the Army's total lift requirement for the utility and cargo helicopter fleets and to substantiate the basis for developing new Operational Requirements Documents (ORDs) for both systems. The Utility and Cargo Helicopter Lift Requirements Study was chartered by the Army Aviation Warfighting Center in coordination with PEO Aviation and ATCOM. The objectives called for review of existing literature, surveys of field personnel, and working group meetings with proponent groups.

The Lift Study was completed in July 1995, and the Army Aviation Warfighting Center's Directorate for Combat Developments has been working to refine modernization/sustainment strategies for both the cargo and utility fleets. The recommended plan is to use the Lift Study results to support developing the ORD for the Improved Cargo Helicopter. Work on an ORD for a modernized Black Hawk fleet will begin sometime in the future. This strategy assumes that some of the requirements for both UH-60 and CH-47 may be the same, e.g., advanced avionics

(UTILITY — continued on page 55)

LONGBOW UPDATE: FOCUS ON TESS

Longbow is finally in production, following one of the most successful operational tests in OPTEC history. IOTE Gunnery and Force-on-Force tests were completed in March 1995, at test sites in China Lake and Ft. Hunter Liggett, CA. Hats off to the Longbow Test Team, and in particular the 229th Flying Tigers!

The Tactical Engagement Simulation System begins testing this month.

Results were excellent. The Longbow Apache outperformed the AH-64A in all areas. Four times more lethal, seven times more survivable with no incidents of fratricide, and 92% operational availability.

One of the most challenging facets of the Force-on-Force testing was the "live-simulation" of the Longbow threat target engagements. The TEXCOM Experimentation Command (TECOM) resolved the problem in some very innovative ways. The simulation of Laser Hellfire Missile Engagements was fairly simple. "Hot" or tactical lasers were used on the battlefield. Those lasers activated laser sensors on the ground-force players, which set off smoke and "Kill lights" much like at the National Training Center. Apaches and Longbows were engaged with a Multiple Integrated Laser Engagement (MILES) like System from the ground forces. Ground test players wore laser protective goggles to eliminate any risk to the soldiers.

The more complex task to simulate was the fire-and-forget weapon system on the Longbow Apache. How did we satisfy this challenge? Longbow Aircraft were equipped with special recorders called Programmable Bus Monitors (PBMs). These PBMs read signals directly off the Longbow Multiplex Data Bus and transmitted the engagement information via telemetry to "Computer Hill" where Real-Time Casualty (RTCA) assessments were run on a large computer. First, geometric-pairings of shooter and targets were made, then monte-carlo simulations assessed missile hits and damage assessments. That RTCA information was sent by telemetry to the target players to notify them if they were hit and the level of damage. Damage from scored hits was assessed as mobility-kill, firepower-kill or total kill. At the end of each trial, TECs computer analyzed RTCA data, reduced it and

matched it with recorded audio and video to confirm that all engagements could have taken place and corroborate firing times with exact target and shooter locations at the moment of engagement.

This type of simulation was excellent for a company of attack aircraft and a reinforced tank battalion in a controlled test environment. But how does the Army solve the fire-and-forget engagement problem at the National Training Center? This is exactly the challenge the folks in Apache PM are working for Longbow's Collective Training requirement, and it is called TESS. TESS (Tactical Engagement Simulation System) is envisioned to provide the same weapons engagement simulation functions for the Longbow Apache as the MILES-AGES II does for the AH-64A, only better.

TESS begins development in November of 1995. The development is expected to take two years with a prototype system available for testing between October 1997 and August 1998. There are essentially three parts to the design concept. The "A-Kit", embedded in the AH-64D will provide the pilot with the controls and displays to function the aircraft weapons systems in the "Training Mode" when TESS is installed. The "B-Kit" is expected to be a pod-like system that will attach to the wing pylon or directly to the Longbow Hellfire Missile Launcher. The B-Kit will contain the transmitters to interface with the ground players suite via radio signals that will identify who was engaged, at what location, by which weapon at a precise time. Since the Longbow Fire Control Radar can detect so many targets and the aircraft can rapidly engage them, the B-Kit pod is expected to contain the computers, modems, and recorders to keep track of the rapid pace of the battle.

Perhaps the most difficult part of TESS will be identifying and configuring the ground players and ground relay stations to receive, process, and identify those target players that have been engaged. For this reason the TESS development will require a concerted effort on the part of the PM as well as those subject matters experts who designed and operate the line-of-sight engagement systems now in use at the Major Training Centers.

As the Army moves toward a digitized force, the simulations used to conduct realistic training must keep pace. It is imperative the Army simulations include many fire-and-forget systems such as NLOS, MLRS, Javelin, and the rapid engagement capabilities of the Advanced Field Artillery System.

No longer will line-of-sight laser-based simulation engagement systems effectively meet our current or future training needs on a digital battlefield. For this reason, the Apache Project Office is consulting with the Major Training Centers in CONUS, and USAREUR, the SMEs at STRICOM who developed the equipment now in use, and the TEXCOM Experimentation Center, who modeled the Longbow Fire-and-Forget System during Operations Testing. In concert with Ft. Rucker's TRADOC Systems Manager's Office, we are optimistic we can meet the exciting new challenges TESS will bring. The Army has significant challenges to meet to insure our most precious training assets remain compatible with Force XXI. As in the recent past, Longbow will lead the way to the future.

Our Former Chief of Staff summed it up best at last year's AAAA convention when he said, "This [Longbow] is not amateur sport."

★ ★

LTC Gunning was the Product Manager for the Longbow Apache Aircraft when this article was written.

■ HARDWARE

BY LTC LAURENCE E. THOMAS, JR.
and MAJ DEREK PAQUETTE

RELIABILITY IS NEVER "GOOD ENOUGH": TADS/PNVS IMPROVEMENTS

As many of you know, the Army will remanufacture the AH-64A and revitalize the Mission Equipment Package to produce the D model aircraft. As the Army was planning for the D model improvements, it was also evaluating those TADS/PNVS improvements that had the highest potential for reducing O&S costs.

A review of eight ECPs that are on contract right now.

Lockheed Martin (LM) personnel reviewed a year's worth of performance data from all fielded TADS/PNVS systems, interviewed corporate and Army field maintenance personnel, and analyzed hardware in the various TADS/PNVS laboratories. LM was tasked by the Army to identify ways to improve the rates for Mean Time Between Failures (MTBF) and Mean Time Between Maintenance Actions (MTBMA).

The goal of the reliability improvements was to increase the TADS MTBF by about 35% and the PNVS MTBF by 79%, with the TADS MTBMA forecasted to improve by 20% and the PNVS MTBMA to improve by 33%. The team focused on improvements to wire harnesses, TV cameras, electromagnetic noise, and lasers, among others.

The outcome of this year-long review of performance data was the submission of eight Engineering Change Proposals (ECPs) by LM. These ECPs are on contract and we will start implementing the changes via the Mesa induction facility and other Special Repair Activities (SRAs) over the next couple of years.

ECP EX-0419 Improve FLIR Video Quality. Video noise in the 400-Hz and 27-kHz range was experienced in the TADS night sensor assembly and the PNVS night sensor assembly. To overcome this problem, a new electromagnetic interference (EMI) shield was designed for the TADS night sensor cooler cavity. For the PNVS, a new EMI shield was designed for the cooler motor and the cooling fan. The PNVS was further changed by adding an additional shielding layer to the existing electrical shield assembly. These shields reduce the 400-Hz noise problem considerably and eliminate the 27-kHz noise, which looked like a dead channel. The end result is clearer videos for both the pilot and

copilot/gunner.

ECP EX-0420 Add Coating to the Camera Capacitors. Premature failure of the dielectric variable capacitor in each camera decreased the field reliability of the sensors. The cause of this capacitor failure was determined to be metal migration across the sapphire dielectric that resulted in video shifting, tearing, and blanking. The existing capacitors are not sealed externally to prevent this metal migration. Parylene coating was determined to be the best material to prevent this migration since it has a high temperature rating, has a lack of outgassing, has a low moisture permeability, and is easy to work with in the retrofit effort. The new Parylene-coated sapphire dielectric variable capacitors will be used in the TADS night sensor electro-optical (E/O) multiplexer, the TADS day sensor TV sensor assembly, and the PNVS night sensor E/O multiplexer.

ECP EX-0421 Reduce Focus Regulator Circuit Card Assembly (CCA) and High Voltage Power Supply Failure. There has been a high failure rate for the Q3 resistor and a large number of failures of the VR7 and VR8 zener diodes in the high voltage power supply. To correct the focus regulator CCA failures due to a high current problem on the resistor, the existing Q3 Darlington transistor was replaced with a HEXFET transistor. Additionally, two other resistors were changed, one resistor added, and two capacitors changed. To correct the overstress condition on the TADS heads-out display (HOD), the VR7, VR8, and VR9 zener diodes were replaced with Trans Zorbs (transient voltage suppressors) in the high voltage power supply. The results of these changes reduce the loss of video on the HOD by compensating for normal tube arcing from one anode to another, which in turn prevents burning of the diodes.

ECP EX-0422 TADS W-1 Harness Improvement. The W-1 harness located in the TADS azimuth drive assembly has a history of being a high maintenance item with broken and chafed wires which cause intermittent servo and video problems along with power supply burn-up. The design changes for the W-1 harness included a new wire coating with greatly improved durability, new molded transitions with better wire protection and repair access, changing the flexible belt encapsulant to a tear-resistant silicon, and new environmental "Grommet-D" connectors that are easier to repair. These changes provide the new harness with a capability to access/replace any single wire without depotting the connector, reduce the volume of the wiring encased in the molding, and result in fewer wire breakages due to increased flexibility and durability. All of this results in improved maintainability and reliability. The pilot will experience fewer servo and video problems.

ECP EX-0423 PNVS W-10 Harness Improvement. The PNVS W-10 harness presented the same high maintenance problems exhibited in the TADS W-1 harness. The design changes were the same as for the W-1 harness, but also included an induced spiral twist so as to balance torsional forces imposed on the harness as the PNVS slews left and right, and a new base plate clamping mechanism designed to reduce wear. The harness was also slimmed down to improve flexibility.

ECP EX-0424 Laser Improvements. The TADS laser transceiver unit (LTCU) was also selected for design changes to improve reliability and maintainability. The primary design change was replacing the silver reflector that is subject to tarnishing, causing low power operation

(RELIABILITY — cont. on page 30)

■ FEATURE

BY LTC STAN M. NIEMIEC

AIRBORNE RECONNAISSANCE LOW (ARL)

ARL is the primary airborne intel system for OOTW.

The ARL program was born in October 1990, when Congress mandated the merger of the former Grisly Hunter (now ARL-IMINT) and Airborne Radio Direction Finding (now ARL-COMINT) aircraft into a single program of nine multi-intelligence (IMINT and SIGINT) mission aircraft. In a little over two years after contract award, three interim capable ARL systems were fielded to support the SOUTHCOM requirements. These fielded systems are in two different configurations: two aircraft perform Communication Intelligence (COMINT) missions (ARL-C), and one aircraft performs imagery intelligence (IMINT) missions (ARL-I). Subsequently, fielded systems will consist of a multiple mission configuration (ARI-M) — each platform having the capability to perform both IMINT and SIGINT missions. The interim systems will be brought back to the production facility to retrofit them into the ARL-M configuration.

ARL-M is a Joint operations capable, Army, rapidly deployable, day/night, all weather RISTA asset. The system maintains a low profile by utilizing a commercial airframe and paint scheme, and sensors which retract into the airframe when not in use. The ARL-M can perform multi intelligence (IMINT and SIGINT) missions with its signals direction-finding and intercept subsystem, infrared (a Forward Looking InfraRed camera and an InfraRed Line Scanner), and electro-optic imaging sensors for day/night, all weather reconnaissance and target reporting. The complete data collection payload is controlled by four on board computer work stations. The system is capable of providing target position and identification reports, near real time freeze frame imagery, and real time flat motion video, via line of sight to forward deployed tactical users, and satellite links to decision makers and commanders worldwide. The ARL-M can rapidly self deploy and arrive ready to immediately join the fight, is self-sustainable for seven to ten days, and is authorized to carry Host Nation/Coalition force personnel on board during the mission.

The ARL airframe is a commercial De-

Havilland DHC-7 multi-engine, dual pilot aircraft modified to operate for extended ten hour missions. The ARL has been officially Mission Design Series designated as the RC-7B. The RC-7B provides greater than 1,600 nm range mission capability, operates at a cruise speed of 220 knots, and can loiter at a speed as low as 110 knots, and is capable of Short Take Off and Landing (STOL) from an unimproved runway when the ARL is fully loaded and under high temperature conditions. The RC-7B can climb to a maximum altitude of 20,400 feet MSL (without supplemental oxygen for crew) and 25,000 feet MSL (with the crew on supplemental oxygen), and carries a maximum of eight crew members. The RC-7B has 100,000 cycles remaining over its life (under a current annual OPTEMPO of 1,920 flight hours per aircraft — this equates to approximately a 75 year life cycle). The RC-7B is equipped with an Aircraft Survivability Equipment (ASE) suite suitable for countering the threat expected in its theater of operation.

Technical risk on the program has been reduced through use of a surrogate platform and two System Integration Laboratories (SILs). The Product Manager (PM) for ARL retained the services of Ft. Rucker's Army Technical Test Center (ATTC) for the operation of an airborne test bed to conduct system level operational performance comparisons and implement a "fly-before-you-buy" approach for major components and associated software/firmware. A SIL at the prime contractor's facility is used to verify subsystem modifications and integration issues while the second SIL at the ARL program office is used to investigate data link and interoperability issues.

An open architecture design and philos-

ophy are employed to accommodate rapid system reconfiguration and technology upgrades for mission/theater specific requirements. The open architecture is ideal for Horizontal Technology Integration (HTI) as it allows the platform to quickly integrate new technologies with minimal modifications to the RC-7B or the proposed sensor. As a result, the ARL platform possesses the flexibility for virtually any tactical to national level use, and theater of operation (i.e. medium-, low-intensity, civil assistance, OOTW, and Counter Narcotics).

Because of ARL's open architecture and low operational cost, it is cost and time efficient for integration of on-going Army advanced technology initiatives. For this reason, the platform has been identified for insertion of several prototype systems including an automatic target recognition system, hyper- and multi-spectral imagers, and second generation infrared sensors being developed by the Army's Night Vision Laboratory. The ARL was also considered for initial use of an Advanced Research Project Agency (ARPA) sponsored foliage penetrating Synthetic Aperture Radar (SAR). Statement of Need requirements for ARL that are quickly added (once funded) to the platform's sensor suite are precision SIGINT targeting, ELINT, MTI/3D Interferometric SAR, sensor remoting in X and Ku bands, low light TV, and acoustic sensors.

The ARL development has emphasized the incorporation of existing government or commercial off-the-shelf technology. ARL has demonstrated this concept in the use of a commercial aircraft, digitally automated glass cockpit (which already meets all Airspace 2000 requirements), off-the-shelf mission payloads, and can potentially upgrade its propulsion system with a new engine like the Comanche T-800 engines — a future improvement possibility that has drawn very favorable Congressional comment.

The engine upgrades (if funded) would permit the ARL system to meet or exceed Force Projection proposed changes in full range and endurance requirements.

Front end planning and consideration of national standards has also served to broaden the utility of the ARL platform among other potential U.S. Government users (both DoD and non-DoD). During Operation UPHOLD DEMOCRACY (Haiti), ARL was deployed within two days after receiving the tasking and served to minimize troop vulnerability during beach landings, airfield seizure, and crowd control operations. ARL continually provided tactical intelligence (live video freeze frame imagery) during all phases of the operation. In addition to being used for Force Protection "Intelligence Overwatch" purposes, it was simultaneously used in a command and control role by the JTF commander on the U.S.S. Mount Whitney and at the lowest forward deployed, tactical echelon (i.e. patrols, convoys, and battalion S-2s).

As was proven on a daily basis in Haiti, ARL's direct down linking of imagery, robust communications, and operators on board were the key to responding to dynamic retasking in a rapidly changing tactical situation. This was critical for providing timely tactical intelligence. ARL provided continuous 98% availability during 210 days of operations in Haiti without any RTB deferred maintenance (DA Form 2408-13/14).

Airborne Reconnaissance Low (ARL) has proven to be an invaluable asset in drug interdiction and Low Intensity Conflict (LIC) surveillance efforts in the Southern Command theater. ARL is the Army's primary rapid force projection airborne intelligence system for Opera-

tions Other Than War (OOTW).

In the aftermath of destruction caused by Hurricane Marilyn in September 1995, the Federal Emergency Management Agency (FEMA) requested the ARL system for disaster assessment and relief. Within 24 hours, the ARL system arrived at the disaster area and immediately flew missions (with FEMA personnel onboard conducting dynamic retasking) over the Virgin Islands and Puerto Rico. Live, flat motion video was pumped down in real-time directly to the key FEMA decision makers on-site, where it was then sent over a satellite to the FEMA Headquarters in Washington, DC. The ARL product was key to FEMA decision makers, and other U.S. government agencies are now requesting the ARL Reconnaissance Intelligence Surveillance Targeting Acquisition (RISTA) product.

This represented the first time FEMA units received real time imagery of the disaster area from airborne support assets. Other formerly used assets required post mission processing which delayed imagery up to two weeks and sometimes longer.

By closely coordinating and working in concert with these other DoD agencies as well as FEMA, State Department, DEA, etc., and the theater commands, ARL has institutionalized design flexibility as an integral part of its ability to ensure rapid support joint tactical and national requirements. The product management office has proven the feasibility of an RC-7B serving as an airborne work station for optional command and control of UAVs. This concept would extend the coverage and utility of both platforms and decrease the time line and logistics requirements for UAV theater deployments.

★ ★

LTC Niemiec is the Product Manager, Airborne Reconnaissance Low, Vint Hill Farms Station, Warrenton, VA.

RELIABILITY

(Continued from Page 26)

over time. The new reflector is gold plated, helping the LTU maintain the proper power level over time.

ECP EX-0425 TADS Electronic Unit Improvements. The TADS electronic unit (TEU) was selected for numerous design improvements. The design changes included the digital tracker processor CCA, the digital tracker central processing unit CCA, and the memory CCA. The changes require cutting conductors, adding EPROM with double memory capacity, and new software. These improvements resulted in correcting 18 software trouble reports (STRs), added a Pechan motor saver (to prevent DVO image rotation problems), and checked the outputs of the pitch and yaw on the rate gyro CCA. The maintenance personnel will realize improvements with fewer no-evidence-of-failure (NEOF) problems.

ECP EX-0407 Day Sensor Shroud. During removal and installation of the day sensor shroud, the gyro CCA has numerous incidents of damage from interference with the anti-ice CCA. The design change selected involves relocating the anti-ice CCA to another position within the shroud and lengthening the anti-ice CCA harness. This change will result in less gyro CCA maintenance, and the copilot/gunner will experience fewer problems in aiming the chain gun.

As Commanders continue to rely on the AH-64A to perform more demanding operational missions, these ECPs will insure you can complete the mission more effectively.

★ ★

LTC Thomas is the PM, Apache Modernization, St. Louis, MO. MAJ Paquette is the TADS/PNVS Assistant Program Manager.

OH-58D: BRIDGE TO THE FUTURE

The premier armed reconnaissance helicopter continues to serve as a "Bridge to the Future" until the RAH-66 Comanche is fully fielded. Since initiating Kiowa Warrior fielding in mid-1991, deliveries have stayed on or ahead of the Department of Army Priority List (DAMPL) sequence schedule. The Project Manager has fielded 214 Kiowa Warriors through FY95. We are close to wrapping up the retrofit turn-in program in which unarmed AHIPs are upgraded to Kiowa Warriors.

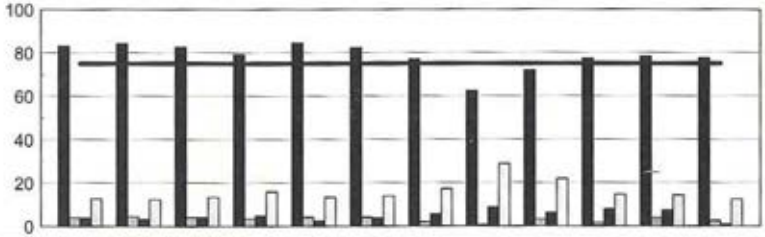
Warrior improvements are crucial to the demonstration of a Digitized Battlefield.

Kiowa Warrior readiness rates have averaged above the DA standard of 75% Mission Capable (MC), although a distinct dip occurred in the 3rd Qtr FY 95 due to tailboom cracking problems. This dramatizes how the problem surfaced, was recognized, and corrected through responsive action by the entire Kiowa Warrior community. Bell Helicopter has reskinned over 60 tailbooms and is in the process of overhauling an additional 30 booms.

A problem of this magnitude could have pushed our readiness into a deep hole; but, due to a total team effort, downtime was kept to a minimum. We are currently going through validation/verification of the Modification Work Order (MWO) for a tailboom fix. Application will begin in October 1995 by OLR teams. Additional fleet sustainment MWOs which include ALQ-144 mounting frames, night vision position lights, and copilot Air-To-Air Stinger missile tone are being fielded to ensure maximum system availability and improved war fighting capability.

Planned Improvements to the Kiowa Warrior. This is a very exciting time for the Kiowa Warrior program as a large number of Mission Equipment enhancements are being made to the aircraft. One of the first new additions, the Embedded Global Positioning System (GPS) and Inertial Navigation System (INS)(EGI), improves the aircraft's navigation and targeting accuracy and eliminates the need to periodically update the navigation system in flight. The EGI is in flight test and will be incorporated in production

KIOWA WARRIOR READINESS SEP 94 - AUG 95



	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
MC	83.15	84.24	82.61	79.22	84.40	82.43	77.11	62.41	71.99	77.46	78.31	77.52
PMC	3.98	4.45	4.08	3.44	4.14	4.14	2.00	0.64	3.24	1.49	3.89	2.52
NMCS	3.91	3.27	4.03	4.84	2.30	3.68	5.65	8.74	6.11	7.91	7.36	1.03
NMCM	12.70	12.29	13.36	15.94	13.30	13.89	17.25	28.85	21.90	14.63	14.33	12.46
DA MC GOAL	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00

DATA DOES NOT INCLUDE TRADOC AIRCRAFT

AVG FLIGHT TIME 16 HOURS PER AIRFRAME

aircraft delivered after September 1996, concurrent with installation in the existing fleet through field retrofit.

Another major enhancement in the works is a new mission computer, known as the Improved Master Controller Processor Unit (IMCPU). The current mission computer is now running at over 90% of its capacity. The IMCPU provides the enhanced memory capacity and speed viewed as absolutely essential to the digital battlefield. The IMCPU will include the added capabilities of a digital moving map display and an image transfer system. The moving map display reduces the pilot's workload and improves situation awareness, while the image transfer system enhances the Kiowa Warrior's capabilities as a scout by allowing images from the Mast Mounted Sight to be transferred to other aircraft or the ground. The IMCPUs, currently in test at Bell Helicopter's System Integration Lab, will be included in all aircraft produced after February 1997.

Digital radio communications will be improved by replacing the existing Airborne Target Handover System (ATHS) with the Improved Data Modem (IDM). The IDM provides a faster communication rate (16,000 versus 1,200 bits/sec) and permits operation within Multiple Joint Message Protocols.

Additionally, the IDM is capable of transmitting on two or receiving data on four radios simultaneously. Integration of the IDM onto the Kiowa Warrior was recently begun. The current ARC-201A Single Channel Ground and Airborne Radio System (SINCGARS) will be replaced with the ARC-201D SINCGARS System Improvement Program (SIP) radio. This SIP embeds communications security devices and data rate adapters

into the radio and increases data communication speed and range in high noise or jamming environments. The IDM and SINCGARS SIP will also be included in all aircraft delivered after February 1997 with field retrofit beginning in FY 97.

The Warrior's Mast Mounted Sight (MMS) is being enhanced through a processor upgrade, the Improved MMS System Processor (IMSP). It provides increased tracking and targeting performance by allowing the operator to simultaneously track up to six targets, detect moving objects as potential targets, track targets behind small obstacles without breaking track, and display both TV and IR sensor images on a split screen format. The IMSP will be in all production aircraft delivered after February 1997.

Paralleling mission equipment upgrades, another exciting enhancement is the addition of a Full Authority Digital Electronic Control (FADEC) to the ongoing engine performance improvements. The FADEC provides a number of significant benefits by reducing the possibility of rotor droop, anticipating engine power requirements, increasing compressor surge margins, and improving engine starting in both hot and cold conditions. All of these benefits work to greatly reduce the pilot's workload and improve the performance and safety of the aircraft.

Army Warfighting Experiments (AWEs). The Kiowa Warrior has been selected for a series of AWEs that will demonstrate the Army's concept of the digital battlefield of the 21st century. The current production configuration Kiowa Warrior, with the addition of an image transfer interface, will be flown by soldiers from the 3/17th CAV in the Warrior Focus, exercise 96-02, at the Joint Readiness Training Center, Fort Polk, LA, 4-23 November 1995. Warrior Focus establishes a baseline for the digitization of the dismounted soldier in a light-heavy-Special Operations task force.

The 2/1 CAV with sixteen Kiowa Warriors equipped with EGI navigation systems and prototype MILES/AGES II will participate in National Training Center (NTC) rotation 96-10 in July 1996. This rotation will provide the Task Force XXI Experimental Force (EXFOR) their first opportunity to use the Kiowa Warrior in an operational environment. The lessons learned from this exercise will roll directly into Task Force XXI.

Immediately following the NTC 96-10 rotation, eight of the 2/1 CAV's Kiowa Warriors will be modified to include all of the mission equipment enhancements described above. The eight modified aircraft will have one unique enhancement that will not initially be present in production aircraft - software that allows them to communicate using Variable Message Format (VMF) messages. VMF, compatible with ground forces appliqué hardware, will be the standard message format used throughout the Task Force XXI exercise to maintain Situational Awareness and provide digital communication with air and ground elements both horizontally and vertically across the battlefield — making the aircraft a true "Information Warrior". Situational Awareness on the Kiowa Warrior will be provided by VMF messages containing friendly and enemy positions displayed on the aircraft's moving map display.

The Warrior-equipped Task Force XXI exercise in February 1997 will demonstrate how this information technology can lift the fog of war, increase operational tempo, and enable the flexibility that will be required in the Army of the 21st century.

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Mr. Van Kirk is Technical Director, Kiowa Warrior PMO.

BY LTC(P) RICHARD T. SAVAGE
and VERNON GREENWOOD

TACTICAL ATC EQUIPMENT — THREE YEARS LATER

The whys and wherefores of ATC acquisition slippage.

Although cutbacks, downsizing, and base closures affect everyone, the need for new state-of-the-art ATC systems has not diminished. In fact, the age of the older, more difficult to support, systems has grown by three and a half years and the need continues to grow.

In December 1991, the office of Product Manager Air Traffic Control had an article published in ARMY AVIATION that discussed the program plans to update four Army tactical ATC systems. The systems highlighted by this article were the Tactical Terminal Control System (TTCS), the Air Traffic Navigation, Integration, and Coordination System (ATNAVICS), the Tactical Airspace Integration System (TAIS), and lastly the Forward Area Shelterized Terminal (FAST). It goes without saying that as long as aviation exists, the need for ATC exists. The two are inescapably linked, and as long as aviation progresses, the ATC element must keep pace.

Where are these systems today and what progress has been made in providing the soldiers with these modernized systems?

A casual glance at the air traffic service modernization milestone schedule published in the December 1991 article will show that these four systems have suffered, what is known in the acquisition community, as slippage. How bad is the slippage and just when, if ever, will this new equipment be available to the troops who need it? Let's look at each system and provide an acquisition update beginning with the TTCS.

TTCS. For those new to Army ATC and ATC equipment, the TTCS is a highly mobile ATC communications facility mounted in a High Mobility Multi-Purpose Wheeled Vehicle (HMMWV). This system will provide ATC and air traffic services (ATS) to aviation assets conducting reconnaissance, maneuver, medevac, logistics, and intelligence operations across the battlefield area. It will also provide ground-to-air communications between ATS units and Army, other DoD services, and allied aircraft as well as ground-to-ground communications inter-

nal to ATS units and between ATS units and other ground units. The TTCS total requirement still exists but has been reduced in scope to 62 systems. The good news is that TTCS contract was awarded to the Magnavox Electronics Systems Company, Fort Wayne, Indiana on 1 July 1994 and is presently in production with the first of these systems scheduled for first article test (FAT) in October 1995. If testing is successful, the field should see the first of these systems delivered in 2nd Qtr FY96.

ATNAVICS/FBPAR. The second of the systems is the ATNAVICS. In January 1992, a decision was made to combine the acquisition of the ATNAVICS with the Fixed Base Precision Approach Radar (FBPAR) program. The combining of these two radar programs would accomplish a number of things. It would provide a single contractor that would hopefully reduce overall costs by providing economies of scale and at the same time provide two different yet similar systems, for use in the appropriate environment, tactical or fixed base. It would also require the manufacturer to maximize equipment control location and function. The purpose of this is to ease transition of the user from fixed base to tactical systems and vice versa. The controller will now be able to learn the location of his equipment controls for one system instead of many, depending on his location. This same concept holds true for the maintainer.

The Acquisition Decision Memorandum that approves the program movement into the engineering, manufacturing, and development (EMD) phase of the acquisition cycle was signed by MG Cowings, then Commander, ATCOM, on 23 December 1994. EMD phase is where the contracting for the building and testing of the prototype systems, prior to full rate production, takes place. The solicitation and statement of work, which is a request for proposals, went to industry in May 1994. Bids to manufacture these systems were evaluated by the Source Selection Evaluation Board (SSEB) and the contract for the ATNAVICS/FBPAR was awarded to the Raytheon Company, Marlborough, MA on 28 April 1995. Manufacturing and testing of the first systems will be a two year process. Installation and test of the first FBPAR will be at Fort Campbell. Fielding of the first ATNAVICS system is slated for 1st Qtr FY99. This is a slip of approximately three years over what was projected in the 1991 milestone schedule. The total number of units to be acquired has been reduced to 38 ATNAVICS systems and 28 FBPAR systems.

TAIS. The Mission Needs Statement for the TAIS, the document that actually initiates the program, was signed by the Commander TRADOC in May 1994. The Operational Requirements Document (ORD) has been finalized by the U.S. Army Air Traffic Control Activity (USAATCA) Requirements Division at Fort Rucker and was recommended for approval by the Counsel of Colonels in March 1995. The ORD has been endorsed by the Commander, U.S. Aviation Center and sent to TRADOC for final approval.

When fielded the TAIS will replace the AN/TSC-61B and be employed at Division and Corps levels to perform airspace command and control functions for aircraft operating in or through airspace, flight following, flight advisory, and coordination areas controlled by or delegated to the Army. The TAIS will interface with other airland battlefield elements and will play an important role by providing the integration center for

Army Aviation Command and Control (A2C2). TAIS will be lightweight and highly mobile. TAIS will use a modular system approach so that modules can be connected to increase the overall capability and still maintain individual item integrity. Twenty-six TAIS systems will be procured with first fielding now estimated for early 2002.

MOTS (Formerly FAST). MOTS stands for Mobile Operations Tower System. The MOTS is a two position tactical control tower system with C-130 roll-on/roll-off capability. It will provide secure, anti-jam communications in the VHF AM/FM, UHF-AM, and HF-SSB range. This system will be a highly mobile air traffic control tower that will be the lifecycle replacement for the AN/TSQ-70A and the AN/TSW-7A. There is a present requirement for 38 of these systems. The Mission Needs Statement was approved by TRADOC on 31 December 1994 and is presently in Washington awaiting DA approval. It is estimated that fielding on this system will begin in 2002.

How the Acquisition Process Works. There are a lot of users out there that are asking the question, "What is taking so long?" So this seems like a good time to explain that the acquisition process is controlled by DoD Directive 5000.1, "Defense Acquisition", DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures", and DoD Manual 5000.2-M "Defense Acquisition Management Documents and Reports". The DoD acquisition regulations are also supplemented by Federal Acquisition Regulations. Adherence to the acquisition regulations is a mandatory process and one that is necessary for the best interest of the Army.

While the documentation process for the program is ongoing, a request for proposal (bids) is sent to industry. The solicitation for bids is open for a given period of time. This could be anywhere from a couple of weeks to several months depending on the complexity of the project. When the bids are received and the solicitation closed, then the Source Selection Evaluation Board process takes place.

The SSEB is comprised of subject matter experts who look at the proposals from technical, cost, logistics, and past performance and any other areas deemed appropriate. The length of the SSEB again is dependent on the complexity of the program plus the number of bidders involved. The winner is not restricted to the lowest bidder, there are various factors to be considered and evaluated. Is the bidder technically competent and do they have the facility to produce what they bid? Does their proposal fulfill the requirement and at a cost that is within reasonable independent estimates? Do they have a past performance history? What is their proposal for use of small business subcontracting if subcontracting is used? These are a few of the issues that are looked at in the source selection process.

Basically, what we are looking for is what is the best value for the Government. When a winning bidder has been approved, a contract is then signed to produce the required item. Unless the item to be procured is a pure nondevelopmental item (NDI) there is also a period required for engineering, manufacturing, development, and testing. All this takes time.

This program update is presented with knowledge that various external forces both within and outside the acquisition process can affect final procurement. As

(ATC — continued on page 54)

SUSTAINING CHINOOK ANOTHER 30 YEARS

The Improved Cargo Helicopter program is on the way.

The CH-47D Modernization line at Boeing Helicopters is nearing completion. By the time this article is published a total of 453 CH-47A/B and C aircraft will have been modernized to the D model configuration with two new CH-47Ds procured and delivered to the U.S. Army. To date there have been 13 losses to the fleet. Currently, there is a requirement for 488 and an inventory of 442. The CH-47D fleet flew 50,886 hours from 1 October 1994 through 15 July 1995 while maintaining a mission capable rate of 71%.

The Chinook modernization program has been very successful and cost effective especially with the utilization of multi-year contracts. The Program success can be attributed to all the personnel at the Boeing Helicopters Plant in Ridley Park, PA, from management to the personnel on the assembly line. It has been a team effort among Boeing Helicopters, the Defense Plant Representatives Office and the U.S. Army. Our thanks go out to all who have been involved and supported the program over the last 20 years. The T55 engines manufactured at the Stratford Army Engine Plant have been very reliable which can be contributed to the excellence of their personnel.

Fielding of the CH-47D began in 1982 to Fort Eustis, VA, as a Category B Trainer, followed by Fort Campbell, KY, with all active CONUS Units being fielded first. This effort required the induction of CH-47 aircraft from all the Army Reserve and National Guard Units which at times placed significant burdens on these units because they were down to as few as five aircraft on hand.

The OCONUS fielding success can be attributed to the men and women of the Army Reserve Technician Program ASF #37, Olathe, KS, and C Company, 2/158th Aviation Regiment. These motivated, skilled maintenance and flight crews prepared the aircraft for shipment to OCONUS units, received the retrograde aircraft and flew them to Boeing Helicopters. Thanks to their support of the program, all the fieldings were on schedule and cost effective while allowing them to gain valuable training

experiences.

The CH-47D Modernization Program was initiated to extend the life of the CH-47 for an additional 20 years. The CH-47 PM is currently looking at alternative solutions to again extend the life and reduce O&S costs to the Chinook fleet until its retirement starting in approximately FY 2015. At that time the Joint Transport Rotorcraft is tentatively scheduled to begin fielding as a replacement aircraft.

The current fleet of CH-47D cargo helicopters consists of modified earlier models whose airframes are as much as 31 years of age. Under the current Army Aviation Modernization Plan, development of a new start cargo helicopter program will not begin until FY 2006 at the earliest. This new development will take more than 10 years. The CH-47Ds will therefore need to be used at least for another 30 years from now. Utilization even beyond that may be desirable in order to provide adequate lift capacity and mix of size.

While the CH-47D has been an excellent aircraft, there is an urgent need to modify it to keep maintenance costs stable as its age increases. The Army has therefore established plans for an upgrade program referred to as Improved Cargo Helicopter (ICH) which will be based on sustaining and improving the CH-47D to permit its operation until at least FY 2025 and beyond.

The Army Aviation and Troop Command (PM, Cargo Helicopters) is proposing an ICH initiative based on internal technical design studies and Boeing Helicopters R&D programs. Also, the PM is conducting a series of critical R&D studies in support of an upcoming sustainment analysis to be accomplished by TRADOC (DCD, Fort Rucker). The sustainment analysis, with the results of the R&D studies, and Boeing Helicopters Division's R&D work will support the preparation and approval of a new Operational Requirement Document (ORD). New features are intended to extend fleet life, reduce sustainment cost and regain performance loss due to gross weight increases. The ICH would therefore maintain and exceed the performance specified by the existing CH-47D Requirement for Operational Capability (ROC) which dates back to 1975.

Potential major new features include active vibration suppression system, fuselage strengthening/tuning, an upgrade in avionics/electronics architecture to assure digital compatibility with the digital battlefield, and improvements in the T55-L-714 engines to include the Full Authority Digital Electronic Control (FADEC).

The CH-47 Product Managers Office hosts an annual Chinook Users Conference. The 1995 session was held 6-8 June in St. Louis, MO with over 220 attendees. These annual conferences highlight field problems, recommended solutions, and report status of Engineering Change Proposals (ECPs). This year there were 95 new action items assigned as a result of the conference. The next User Conference is tentatively scheduled for 4-6 June 1996 in St. Louis, MO.

The CH-47 Product Managers Office looks forward to the challenges that lie ahead and will strive to achieve maximum support to the Chinook units. Again, our thanks go to all the government and contractor personnel who have made this one of the Army's most successful modification programs.

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Mr. Huston is the Acting Chief, Logistics Management Division, U.S. Army ATCOM, St. Louis, MO.

BY LTC RANDALL W. CASON

THE FIXED WING CONTRIBUTION TO THE FIGHT

Where is the Army Fixed Wing Fleet going? The answer: Straight into the 21st Century as a versatile, affordable, and supportable element of "Force XXI".

As the Army Doctrine changes from "Forward-Based" to "Force Projection" the mission and material requirements of the Operational Support Airlift Command, General Support, and Airborne Reconnaissance aircraft are also changing.

The PM's efforts in materiel development, readiness, cost reduction, and communicating with the field.

The Training and Doctrine Command (TRADOC) is busy defining system requirements that will provide the "War Fighters" with the lethality, speed, protection, and versatility needed to make Force XXI a fully matured reality. The Program Executive Officers (PEOs) are ensuring the materiel solutions are interoperable and compatible with the existing and emerging systems of our sister services and international allies.

So how does the Aviation and Troop Command (ATCOM) and the Fixed Wing Product Manager's Office (FW-PMO) fit in this picture and what are we doing? ATCOM plays four major roles in these activities:

- Materiel Development — Identify and procure aircraft that best meet the needs of the field Army.
- Readiness — Ensure that aircraft systems are maintained and supported throughout their life cycles to the readiness levels required by the war fighters.
- Cost Reduction — Identify innovative approaches to accomplishing acquisition and readiness tasks which reduce costs and maintain or increase readiness levels.
- Communications With the Field — Listen to the users and keep the users informed of ongoing and upcoming projects.

Materiel Development. As a Materiel Developer, we have several major projects in progress. Each of these programs are based on procurement strategies and plans to reduce Military Standard and Specification requirements and meet the Acquisition Streamlining Act mandates of procuring commercial-off-the shelf (COTS) items when practicable. These procurements and projects are not in any particular order of precedence.

Here are a few of the major on-going procurement projects.

C-XX (MR) — The C-XX (MR) will fill the medium range gap (600-1800 NM) that currently exists between the Short Range aircraft (C-12 and U-21) and the Long Range aircraft (C-20 Gulfstream). Team C-XX (MR) has been working feverishly since early April to develop an acquisition package that will result in a contract award in December 1995, with delivery of the first aircraft in October 1996. Pending budget approvals; the Army will procure 35 C-XX (MR) aircraft over the next five years.

C-23B+ — The C-23B+ program is an exciting and challenging endeavor to convert commercial (Shorts SD3-60) commuter aircraft into utility aircraft, equipped with rear ramps and cargo handling subsystems. ATCOM recently exercised a contract option for eight more aircraft, which brings the total fleet size to 28. The C-23B+ provides the Theater Commander with organic inter- and intra-theater general aviation support across a broad operational front. According to the current production schedule; the first aircraft will be delivered to the National Guard during January 1996.

ASA — The "Alaska Support Aircraft" program is a replacement program for the UV-18 (Twin Otter) serving in Alaska. The Twin Otter has been a real work horse; however, requirements change. The Alaska National Guard mission of supporting the U.S. Pacific Command creates range and payload requirements that the UV-18 cannot meet. The FW-PMO has been working closely with the National Guard Bureau to ensure that the Purchase Description (Technical Specification Document) satisfies each critical element of the Operational Needs Statement. The total requirement is for eight aircraft. Contract award is expected in early 1996.

C-12R — The FW-PMO is continuing to procure the newest version of the venerable C-12 family. The C-12R is a sterling example of a COTS procurement. The C-12R is virtually identical to the commercial Beech Super King Air 200. The aircraft are equipped with state-of-the-art commercial avionics systems, which include: Five tube Electronic Flight Instrument Systems (EFIS), vertical profile radar, KFC-400 digital autopilot systems, GNS-XLS Flight Management System (FMS) with integrated Global Positioning System (GPS), S-Mode transponder, and latest generation King Gold Crown radios. Current procurements are systematically replacing the aging U-21 aircraft.

Readiness. As the responsible Command for Aircraft Readiness, ATCOM has numerous initiatives in-progress to support the fixed wing fleet.

C-12/U-21 LCCS — The largest readiness task the FW-PMO has tackled. This is a unique program because it is a Tri-Service (Army, Navy, and Air Force) effort to consolidate Life Cycle Contractor Support (LCCS) for all Department of Defense (DoD) C-12 and U-21 aircraft under a single contract. The Army has the lead on this re-competition initiative.

However, each of the services dedicated hundreds of professional hours and operational funds to develop a comprehensive Statement of Work that meets the Services' common and unique requirements. This was a complicated task because of the diverse locations, missions, and regulations of the individual services. After nearly a year of hard work, we have a Request for Proposal "on the street".

Words cannot express my thanks and

gratitude for all of the hard work and cooperation that went into this effort. We are confident that this effort will result in improved operational efficiencies and millions of dollars in cost avoidance.

Aircraft Condition Inspection (ACI) — The ACI is an integral part of fleet safety and sustainment. The purpose of the ACI is to conduct a thorough structural inspection of the airframe at periodic intervals. During the ACI, the aircraft is completely depaneled and all the areas not normally inspected during routine maintenance are inspected and repaired as necessary. ACIs are the key to ensuring the quality and integrity of the Army fixed wing fleet well into the 21st Century.

KLN-90B Installation — The installation of the KLN-90B Global Positioning System is well underway. The KLN-90B meets the standards established in Technical Standard Order (TSO) C-129-A1 and is certified by the FAA for IFR enroute and approach execution. This system will be installed in all C-12 aircraft and selected U-21 aircraft. To expedite the process and reduce down time; we have established four installation facilities; two are in CONUS, one in Korea, and one in Germany. All installations are scheduled to be completed by June 1996.

WX-1000 Stormscope Installation — The addition of the WX-1000 Stormscope to the cockpit of the U-21 and C-12 aircraft is another step in modernizing the fleet and enhancing safety. The Stormscope used in conjunction with the weather radar will provide the flight crews with the weather information necessary to avoid lightning strike "high risk" areas. We fully expect the addition of the Stormscope to reduce the rate of lightning strike occurrences.

Fleet Configuration Standardization — This issue is a major task. This FW-PMO is responsible for more than 300 aircraft in the fixed wing fleet, with nearly as many different configurations. There are three major subelements to this issue:

- Cockpits and Avionics;
- Interior;
- Exterior Paint Schemes.

The most pressing issue is the lack of standardization of cockpits and avionics configurations. Multiple configurations directly impact on safety and maintenance support costs; therefore, the situation must be corrected as soon as possible. We have established a standard configuration and are working to that end. Minor modifications will be accomplished in the field and more complex modifications will be accomplished at the Depot Facility in Selma, AL as the aircraft undergo scheduled Aircraft Condition Inspections (ACI). The plan is in place and the schedules are established. Modifications to cockpits and/or avionics must be strictly controlled and approved in advance.

Standardized aircraft interiors are the next priority. Non-standard configurations are extremely expensive to maintain and virtually unsupportable under the LCCS maintenance concept. Standardized interiors will reduce the maintenance and refurbishment costs, and allow spare components to be purchased in bulk quantities.

Exterior paint schemes are as diverse as the cockpits and interiors. As the aircraft undergo ACI, the exterior will be painted in accordance with TM 55-1500-345-23. Individual unit/command insignias are authorized and will be in compliance with the guidelines stated in our quarterly news letter for September 95, *The Fixed Wing Flyer*. These guidelines are available upon request.

Automated Engine Trend Monitoring

System (AETMS) — The AETMS collects engine performance information directly from the engine sensors through the Flight Data Acquisition Units. This direct reading alleviates gauge error, parallax, and misinterpretation.

The information is stored in core memory and is accessible. This information is then transferred to the Pratt & Whitney approved software for review and analysis. The software is written with acceptable thresholds and provides an alert when an engine exceeds any of the programmed parameters. In addition to gathering engine performance information, the system incorporates an embedded air data sensor that is capable of providing heading and altitude information to the long range navigation system. The AETMS data will be used to effect fleet management decisions that will improve operating efficiencies and reduce maintenance support costs.

Fixed Wing Data Base — Under contract to the Army, Science Applications International, Inc. (SAIC) developed the fixed wing management database. This database contains nearly 200 data fields for all U-21s and C-12s in the inventory. The database provides information on flight hours, cycles, avionics and interior configurations, and ACI schedules and scores. My staff and I use this information to develop budgets, plan ACI and refurbishment activities, and monitor the location of all fixed wing aircraft.

This is a "real time" system. Each of the Contracting Officer's Representatives (COR) provided the basic information about the aircraft for which they are responsible. The maintenance contractor provides the status on each aircraft on a monthly basis. This information is entered into the database as it is received. Phase II of the database maintenance process is to collect monthly updates via the Fixed Wing Product Management Office Bulletin Board System (FW-PMO BBS). Electronic transmission of data to the FW-PMO BBS will ensure that all information is current and immediately accessible by this office. Near term plans include the development of databases for all fixed wing aircraft.

Cost Reduction. Our primary tool for developing cost reduction initiatives is the Value Engineering (VE) process. In VE, cost reduction ideas are formalized and tracked by the ATCOM Value Engineering Office. Issues are evaluated for cost of implementation and the cost savings that will be realized after implementation. ATCOM is actively seeking VE suggestions from all sources and the FW-PMO is no exception. If you have any ideas that may save money, increase readiness rates, or make the fixed wing fleet better, please contact us through the Fixed Wing Bulletin Board System.

Communications With the Field. I have tasked our support contractor (SAIC) to develop and manage the Fixed Wing Product Management Office Bulletin Board System (FW-PMO BBS) for the exchange of information among the Contracting Officer's Representatives, Users, and the Product Management Office.

This system is up and operational at **(334) 598-6755 or 1-800-587-FWPM (3976)**. I encourage each of you to use the system to communicate fixed wing issues to each other and this office.

In addition to the FW-PMO BBS, this office publishes a quarterly newsletter to keep users abreast of ongoing activities. I would like to expand the scope of the newsletter to include a "Letters to the PM" column. I envision this column **(FIXED WING — continued on p. 54)**

SURVIVAL, EVASION, RESISTANCE, AND ESCAPE (SERE): WORDS TO LIVE BY

Over the past several years the United States Military has experienced numerous incidents involving aircraft being forced down over enemy or potentially hostile territory.

The threat of being fired upon is real. As the OPTEMPO increases, the exposure to this threat continues to grow. To counter the radar and infrared threat we employ Aircraft Survivability Equipment (ASE), such as the ALQ-144, APR-39, M130 etc. However, this equipment like anything else is subject to failure and cannot counter small arms fire. Therefore, we must become SERE smart.

A non-traditional approach to crewmember SERE training.

The Army is getting better at it. In the past, only those in high risk of capture (AR 350-30) were sent to the SERE school at Ft. Bragg, NC with few exceptions. Now, aviation commissioned and warrant officers receive some SERE training in conjunction with the Officer Basic Course (OBC) and Warrant Officer Basic Course (WOBC). This training is essential to the development of the well rounded aviator. But perhaps this training should be considered an introduction to SERE. After all, is one or two weeks of SERE training going to be enough for the career soldier? What about the enlisted crew members who don't receive formal SERE training and the officers that graduated flight school prior to the SERE program being implemented.

Few would disagree that more time must be given to this type of training, but where does the funding for a program that doesn't produce immediate, tangible results, come from? This question was asked by A Co, 3-25 Assault Helicopter Battalion (AHB), Ft. Drum, NY. After research three methods of training were discussed:

- The first and most preferred method would be to send crewmembers to Ft. Bragg, NC for the nineteen day course. The cost would include transportation to and from Ft. Bragg and per/diem for the first and possibly last night depending on the mode of transportation. During the course, the soldier would stay in the school barracks and eat in the mess hall on a field meal card at no cost to the unit, making SERE school very inexpensive.

• The second method gives a unit better flexibility. Coordination can be made with the SERE school to send instructors for two days for an on sight assessment of the unit's facilities to determine suitable training areas. At a later date, eight instructors would return for about twelve days and could train up to fifty crew members for phase one. The cost of phase one would consist of purchasing the appropriate number of animals to be used during training and the transportation, lodging, and feeding of the instructors. This cost could be absorbed by other participating units. After completion of phase one, six months is given to send soldiers to Ft. Bragg to complete the field portion consisting of ten days.

• If your unit cannot fund the first two methods, there is an alternative. However, prior to conducting this exercise, Army Regulation (AR) 350-30 must be consulted to avoid any restrictions to local training. A Co, 3-25 AHB constructed a six day Evasion exercise in which numerous local assets were utilized. Due to the shortage of training areas, Range Control allowed us to jointly use an area approximately ten kilometers by 25 kilometers with other units, on a non-interfering basis. The existing units were treated as enemy and therefore avoided, thus not interfering with their training.

Day One. Ft. Drum Legal gave a class on the Code of Conduct, which also met annual requirements. A Co, 2-22 Infantry gave classes on small unit movement techniques, land navigation, pace count, and survival. One of their medics gave a class on the medical hazards of survival. Graphic Training Aids (GTA) were obtained from Training Support Center (TSC). Crews and the Observer Controllers (OCs) were assigned and trained in the use of the Personal Locator AN/ARS-6(V) and the AN/PRC-112 radio.

Day Two. Spent on the range with OPFOR detachment. After receiving a class on foreign weapons, aircrews were allowed to fire them. This gave each soldier an in-depth understanding on how to use various weapons such as the AK-47, RPK, UZI, AK-74, etc. At the end of the day, the aircrews were given their mission, a cross Forward Line Of Troops (FLOT), Long Range Surveillance Detachment (LRSD) insertion. After crossing the FLOT, their aircraft would be forced down by simulated enemy fire, killing all but the crew. Authorized equipment consisted of only those things normally carried on board the aircraft: Aviation Life Support Equipment (ALSE) vest and cold/hot weather kits.

Days Three and Four. On day three, A Co, 2-22 IN began to set up their patrol base. Their instructions were to search for and engage a group of aviators that were shot down somewhere to their south. Two MP dog teams waited at the patrol base to respond to sighting called in by the infantry. At 0600 hrs, team one was dropped off at an area along their assigned route approximately twenty-five kilometers across FLOT. They used resection, a land navigation technique learned on day one, to determine their current location. Throughout the next two or three days they were forced to evade infantry, MP dog teams and coincidental training units. At the halfway point, the team had to make contact with a partisan for help. This partisan point served useful in another way. An engineer unit was conducting demolition training in the middle of our exercise which was called a mine field. The partisan guided the team safely around it. Team two and three were inserted later that day at 1200 and 2100 hours, followed on day four by the remaining teams.

Days Five and Six. By this time, the teams started making it to the second downed aviator pickup point, the first pickup point happened to be occupied by enemy forces. According to our Standard Operating Procedure (SOP), a CSAR aircraft would fly over the pickup points a half hour before and after sunset, so if the teams didn't make it there in time they would have to wait about 12 hours. Once the crews met the location and time requirements the extraction would begin. During this phase, we validated the use of the Personal Locator system and the AN/PRC-112 radio. The bearing and distance information given to the pilot by this equipment reduced the loiter time needed to find the exact location of the downed aircrews, therefore reducing exposure to enemy fire.

Safety considerations were as follows:

- Each team was accompanied by an OC for safety and AAR purposes only. The OC carried a SINCGARS manpack to give reports to the company Tactical Operations Center (TOC) and a Global Positioning System (GPS) as back up navigation to prevent straying onto a hot range or off the training area. The OC also carried the MEDEVAC frequency.
- Most teams had an internal Combat life saver to supplement the medic that was co-located with the company TOC.
- A spare change of clothes and sleeping bag was located at the TOC for emergencies.
- Water deeper than waist high was avoided.
- Chemical light sticks were given to each person for emergencies.

Some of the Lessons Learned were as follows:

Day versus night movement. Towards the end of the exercise one team in particular was approaching the extraction point. After spending one night without the luxuries of home, the crew decided to move during the day to avoid another unpleasant night. In their haste, they also took a short cut across an open field. After making it through the entire exercise undetected, a poor decision sent them into an ambush, killing them all. Moving during the day saves a lot of time, however moving at night reduces the exposure to enemy units. Consider your present discomfort with the discomfort of being captured or killed.

Rally points. On another team a soldier was sent to observe a danger area. At some point the soldier was spotted and began to run. He ran back to the rest of the team, leading his pursuers to an easy target. Rally points should always be identified in the event the crew is separated.

Navigation. Navigating at 120 knots at tree top level is very different than navigating on the ground. Remember your pace count and learn Resection/Intersection.

This article was written to show another way to train crewmembers when funds are not available for traditional schools, not to suggest a replacement. The bottom line is, this training saves lives. The information provided on the SERE school was based on a telephonic conversation with MSG Bill Joyner, the school NCOIC. MSG Joyner can be contacted at DSN 236-2977/1720. Information desired on the training conducted at Ft. Drum can be obtained from CPT Reginald Fullwood, Jr., Commander, A Co., 3-25 AHB, DSN 341-7890, C: (315) 772-7890 or CW2 Shannon D. McAteer, Evasion Course Coordinator, DSN 341-9354, C: (315) 772-9354.

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CW2 McAteer was the Evasion Course Coordinator, Ft. Drum, NY when this article was written.

BY COL EUGENE H. GRAYSON, RET.

TACTICAL AIR RECONNAISSANCE: ARE WE LOSING TOUCH?

"In the more distant future looms the probability of large, completely airmobile units—sky cavalry. The possibilities for its employment in the fluid phase of the ground struggle excite the imagination, as covering forces operating in front of heavier ground elements, protecting long, vulnerable flanks of main forces of the field Army striking enemy formations from unexpected directions with maximum surprise."
— MG HAMILTON H. HOWZE, 1957

During the recent Gulf War, there is no question Army Aviation units played a major role that resulted in a dramatic and rapid victory over Iraqi ground forces. However, some lessons learned may have been overlooked when reviewing the after-action reports.

Only the Air Cavalry has all the tools to do the job!

Intelligence gathering, during both Operation Desert Shield and Desert Storm, was viewed, in effect, as a monumental effort from national through operational levels to tactical systems. Unquestionably, an overabundance of enemy information was available before the initiation of the ground war. But is this a realistic scenario that might be expected to occur during the next war?

If one examines the facts, obviously anything that moved north of the Kuwaiti border was seen and reported — by one platform or another. Whether by satellites, high-performance aircraft, or Unmanned Aerial Vehicles (UAVs), etc., these systems provided an inordinate amount of intelligence which allowed U.S. and coalition commanders an unprecedented picture of what lay across the border.

The question examined here is, "What was the role of Army Aviation in this massive intelligence-gathering process?" The response probably would be, "Not much." With the primary emphasis on destroying Iraqi armor and mechanized forces by fast-moving units of the VII and XVIII Airborne Corps, tactical intelligence missions by Light Observation Helicopter (LOH) units — air cavalry squadrons and troops — were few and far between.

Reviewing After Action Reports reveals first sightings were generally made by AH-64 Apaches, M2 Bradley fighting vehicles, and M1A1 Abram tank crews, resulting in rapid engagements and swift destruction. Thus, we must ask ourselves, "Have the lessons of past days as far as the most superb and capable tactical intelligence systems gone by the wayside and out of the planning process?"

Vital role of the helicopter in observa-

tion/reconnaissance. The history of aerial reconnaissance by rotary-wing aircraft began with Marine Squadron VMO-6, organized with HOS-3 helicopters, which sailed from San Diego, Calif., for Korea in July, 1950. Although the Marines also employed HRS-1 troop-lifting helicopters, the light observation HOS-3 that supported the First Provisional Marine Brigade, and later the First Marine Division, was the key asset.

Both BGen Edward Craig, Commanding General (CG), 1st Brigade, and LtGen Lemuel Shepherd, CG Fleet Marine Forces, Pacific, praised this system as one of the most important innovations to reach the battlefield. In particular, LtGen Shepherd elaborated on the vital role this helicopter played in reconnaissance and observation, screening flanks, providing rear area security, and rescuing downed flyers in enemy territory.

The Army came onboard using helicopters for reconnaissance during the mid- to late 1950s when the Sky Cavalry Squadron was organized at Fort Rucker, AL. During the extensive testing, which was designed to determine what type of unit configuration was required, it readily became apparent that some type of aerial observation/reconnaissance capability was a definite requirement.

In 1954, GEN James Gavin, during a discussion, referred to the Army's intrusion into an area guarded by the Air Force. He pointed out the agreements with the Air Force in 1951 had made the Army responsible for conducting aerial observation to amplify and supplement other methods in locating, verifying, and evaluating targets; adjusting fire; studying terrain; or obtaining information on enemy forces not obtained from other services.

Importance of air cavalry squadrons/troops. This article does not provide a litany about operations in Southeast Asia; however, air cavalry squadrons and troops, irrefutably, were the only systems, within the inventory, that the ground commander had at his immediate request to provide those innumerable, up-to-date, and accurate information bits he required to best prosecute the land battle.

At the tactical level on today's battlefield, a division commander's highest priority is to gain a clear picture of the opposing force. This is certainly not a new requirement. Back in 1862, during the Civil War, the V Corps Commander MG John Porter went up in Thaddeus Lowe's hot air balloon to observe Confederate positions. What an unparalleled opportunity this presented — to look down and sketch enemy positions located in a chessboard arrangement from such an advantageous position. This was the beginning whereby commanders realized the vital importance of augmenting ground reconnaissance with other means.

Introduction of Air Cavalry units. In 1962, during the extensive Howze Board tests, the introduction of air cavalry units was a significant innovation. This new concept meant commanders, for the first time, were not totally dependent on foot patrols or jeep-mounted reconnaissance platoons to provide badly needed intelligence information to keep one step ahead of the enemy force. Following the Howze Board, during the two years of intensive training and development during fielding of the 11th Air Assault Division, considerable emphasis was directed toward LOHs whose primary mission was locating the enemy.

The resultant Table of Organization and Equipment (TOE) produced the formation of the 9th Air Cavalry Squadron. During the subsequent 1st Cavalry Division's initial year in Vietnam, that unit was, unquestionably, the most vital unit in the

division as far as intelligence, reconnaissance, and observation were concerned. In fact, most of the division's major fights started as a result of enemy units being located by the air cavalry units. This success precipitated the quick integration of other air cavalry squadrons and troops into other division TOEs. Those units that did not have organic air cav units assigned quickly turned to the 1st Aviation Brigade groups for support.

Aircraft systems in intelligence collection. Other systems — such as the OV-1 Mohawk, a great aircraft at Fort Benning, GA, — would soon join the Army inventory to enhance intelligence collection; however, in Southeast Asia, where ZSU-23s and 37mm weapons were located, most of these systems met untimely misfortunes and were shot down. The same painful lesson was learned all over again, during Lam Son 719 and the 1972 Easter Offensive, when the skies were cleared of OV-10 Broncos in I Corps, and Air Force Forward Air Controllers (FACs) had such a difficult time around An Loc and Kontum.

Great strides were made during the 1970s with a number of major systems added to the inventory. These systems include QuickLook; GuardRail, SOTAS [Stand/Off Target Acquisition System] (a real classic, flying slow at 8,000 feet behind the Forward Line of Own Troops (FLOT) and hoping not to be picked up on Soviet radar); various Side-Looking Airborne Radar (SLAR) systems: ARDF (Airborne Radio Detection Finding), LeftJab, QuickFix, TrailBlazer; and today, the RPV — a great system on a clear day and in a desert environment.

Likewise, the F/A-18 is a great reconnaissance airframe over a sand table. While flying at "mach knocker" speed, it can see all sorts of targets on the sandy floor. Unfortunately, 60% of the world's surface is not brown but green. Whether in a European/Balkan environment, or in Southern or Southeast Asia, the multitude of systems used are not as effective, or as responsive as the air cavalry units because of terrain restrictions.

Reduction in cavalry units. With all of these historical lessons, a real fear exists that recent budget cuts and force reductions may have gone overboard in some areas, *to include the reduction in cavalry units*. The superbly organized armored cavalry regiments such as the 11th and 2d Air Cavalry Regiments (ACRs) have gone by the wayside. Left is the 3d ACR as the only true cav regiment on the books. The new light ACR is still questionable as to its combat capability and must be proven before its effectiveness can be determined.

The Aviation Requirements for the Combat Structure of the Army (ARCSA) IV reorganization removed the division's air cav troop. It became the second attack helicopter company in the newly formed combat aviation battalion. One must question whether the LOH scout platoon in the Alpha Company structure provided the same capability as the air cav troop in seeking out and engaging the enemy along or out beyond the FLOT.

Emphasis on killing Warsaw Pact armor may have influenced this reorganization to the point where AH-1S Cobras, with improved tube-launched, optically tracked, wire-guided missile (TOW) systems took priority over tactical reconnaissance units. Without question, the Cobra offered the division commander his greatest tank-killing capability. However, without air cav units to locate the enemy armor before its arrival at the FLOT in great numbers, or to accomplish those vital missions previously done by the air cav troop, the validity of such a reorganization seems flawed.

While the division cavalry squadron lost its traditional high-priority reconnaissance capability, at least some capability was maintained by the aero-scout platoon with the new division organization. This capability took over the tactical intelligence role for the division.

Reduction in air cav capability. Another disadvantage was that the ground cav platoon no longer had organic UH-1 Huey support, which hindered deep patrolling operations plus a variety of other missions normally performed by cav units. Now we have aviation brigades organic to the divisions, but we may be lacking a true air cav capability with the proper emphasis to accomplish those missions General Gavin espoused back in 1954!

At the Marine Corps Command and Staff College (CSC), during both the offensive and defensive operations phases, students consistently look for the attached Army division's air cavalry unit to support the covering force as a result of a lack of similar capability within the Marine Expeditionary Force (MEF). Whether the assigned missions are to screen, guard, protect, or watch a particularly worrisome flank, the CSC students are quick to employ this invaluable capability and incorporate it into the ground commander's scheme of maneuver. Once the Amphibious Objective Area is secured, Army air cavalry units are immediately introduced into the fight and perform a myriad of "eyes and ears" missions for the MEF commander.

Need for continued tactical reconnaissance capability. From the Army perspective, it is unsettling to think that the tactical reconnaissance capability within the aviation side of the house is diminishing. The following questions are being asked:

- Is the new structure TOE or PLL [prescribed load list] driven?
- Is there a push for more AH-64s to replace OH-58 Kiowas?
- Is there really a need for an air cav troop or squadron in the light, mechanized, airborne, or armor divisions?

Such questions lead to the penultimate question, "Has the emphasis on killing enemy armor become so important that the designers of Force XXI are overlooking one of the most critical elements in any ground unit?"

It is difficult to imagine any modern ground force — whether infantry, mechanized, or armor — fighting an offensive or defensive fight without fully incorporating an air cavalry element of some type into the planning early on! During a movement to contact, no assigned or attached unit can provide the critical information that an air cav unit can!

When conducting such a maneuver, this capability will keep one from being surprised and potentially preclude a disaster. If tucked inside the forward elements of the ground cav, or in a Nap-of-the-Earth (NOE) movement out front, these eyes and ears should ensure a first report and identification of the enemy unit facing the division.

If supporting a rapid penetration of the enemy Forward Edge of the Battle Area (FEBA), cav units moving with the lead element of the penetration will provide the same information, plus bring to bear the first anti-armor fires against an enemy force. Additional benefits include a responsive forward observe role as well as FAC missions from an altitude safe from enemy air defense systems.

In a defensive scenario, the roles for air cav units are unlimited. Whether screening, protecting, guarding, or locating attacking enemy formations, without such a unit — and one that is well trained — a division commander could very well find

himself reacting to the enemy plan rather than dictating the tempo of the fight.

Realistic air cav unit training within the division. This article asks, "What is going on in the field as far as conducting realistic training between air cav units and the rest of the division? When planning for the National Training Center (NTC), is the organic air cav unit plugged into every aspect of the scenario? Or has the NTC cycle become so redundant that one knows how to defeat the opposing force as a result of an almost intimate knowledge of the California training area?"

Have we reached the point where emphasis is totally on the aviation brigade, and its anti-armor capability, without regard to the importance of locating the enemy force first? What commander would want to conduct a deep attack without an air cav unit performing a last-minute reconnaissance of the landing zone and ensuring no potential disaster awaits the landing force? What other unit in the division is as well suited to support such an operation?

One need only review history to discover how critical tactical reconnaissance by cavalry units has been in determining the outcome of some of the world's great battles. During our own Civil War, a primary reason for the Confederate Army's defeat was GEN Robert E. Lee's lack of tactical reconnaissance by his cavalry before the epic Gettysburg battle. Had GEN Jeb Stuart's cavalry kept GEN Lee informed of the position of the Union Army during the march north into enemy territory, there may never have been a fight at Gettysburg — or if so, it may have not resulted in the disastrous third day attack by GEN James Longstreet's Corps.

Consequences of lack of tactical reconnaissance and inadequate training. One of the great tragedies of the Korean War was the near total lack of tactical reconnaissance by the Eighth U.S. Army, which resulted in both the North Koreans and Chinese selecting the time and place of most battles — and in most cases achieving surprise. What would have been the difference had GEN Walton Walker deployed cavalry elements in a screen role in front of each division as they moved south and later northward?

In today's Army, lightly armed cavalry soldiers with anti-armor weapons, moved by air cav helicopters and supported by organic attack helicopters, will prove an invaluable asset to the division or corps commander. Operating at great distances, with an inherent mobility that no other unit can match, such a unit is well worth any TOE modifications necessary to ensure its position in each division. Ground cav tracked vehicles, if the same as in mechanized or armor units, lose much of the flexibility and rapid mobility required for cavalry missions. Only the air cavalry has all of the tools required to perform a role of this nature. Those who promote AH-64s over the OH-58 Kiowas to conduct traditional cavalry missions are dreaming...and moreover, have ignored the lessons learned from the past.

The bottom line, however, is unless an active training program is ongoing within the unit, it won't matter what happens at the NTC, or in combat, for the division will not know how to employ one of its most responsive assets. We cannot afford to get into another battle on some far off battlefield, and following its conclusion ask, as GEN Gavin did over 30 years ago, "Where was the cavalry?"

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COL Grayson is a retired Army aviator and Professor of National Security Affairs, Marine Corps Command and Staff College, Quantico, VA.

BY CPT WENSLEY BARKER, III

DIGITAL ARMED RECONNAISSANCE AT THE NTC

How the OH-58D Kiowa Warrior proved itself in 94-07.

In April of 1994 the Army conducted Exercise Desert Hammer VI at the National Training Center to experiment with digitizing the battlefield. During this rotation, six Armed OH-58Ds from O Troop, 4th Squadron, 2d Armored Cavalry Regiment performed reconnaissance and security as part of the aviation task force from 24th Infantry Division. The exercise marked the first use of the Kiowa Warrior at National Training Center (NTC), and provided many new insights regarding integrating armed reconnaissance into the combined arms fight.

The OH-58D is not new to the NTC. Unarmed versions in Target Acquisition and Reconnaissance Platoons (TARPS) have been deploying on NTC rotations for years. The advent of the Kiowa Warrior, however, significantly changes the way in which the aircraft will be employed. Warrior crews now bring to the fight the ability to deliver area and precision weapons. More significantly, Warrior units are now organized as cavalry squadrons, with TOEs and METLs tailored to perform traditional reconnaissance and security as outlined in FMs 17-95 (Cavalry Operations), 1-117 (Air Reconnaissance Squadron), 1-114 (Regimental Aviation Squadron), and 1-116 (Air Cavalry Troop).

There are several distinct differences in employment between a TARP and a cavalry troop. TARPS traditionally task organize into two-ship flights, operating under the direction of either the Division G-2 or DIVARTY. Cavalry troops are trained and equipped to fight as a unit, working in flights of between four and eight aircraft to provide extended station time or coverage on a specific mission. As with any cavalry unit, they are a maneuver force which should be integrated into the combined arms scheme of maneuver from the beginning of the planning process. In order to maximize the effectiveness of the unit, the cavalry troop or squadron works for the maneuver commander who has the fight, whether that be the ground maneuver brigade commander or an aviation commander. Employed in this

manner, screening Named Areas of Interest (NAIs) before dawn, O Troop was able to repeatedly find the enemy very early in the battle and report his location and disposition to the commander, providing a critical read.

During this rotation, O Troop was attached to 1-24th Battalion "Vipers", the AH-64 equipped attack battalion. This close working relationship with the attack unit provided some unique opportunities for forming an integrated aviation force. During deliberate attacks, the troop would normally be tasked to screen a Decision Point (DP) that had been identified during the IPB process. Rotating on station, Warrior crews found and destroyed Combat Reconnaissance Patrols (CRPs) and reported the arrival of the Forward Security Element (FSE) at the DP, triggering the employment of the attack companies. The ability to rapidly acquire the OPFOR at night while remaining undetected enabled the commander to time the arrival of the attack crews in their battle positions as the enemy was moving into the engagement area, maximizing station time at the critical point and minimizing the risk of compromising the BPs.

When working for the ground brigade, the troop was most often given the mission to reconnoiter in zone, providing critical information to the commander concerning location and disposition of the enemy and his obstacle plan. On at least one occasion, reports passed by the Warriors caused the ground commander to switch to an alternate course of action in order to bypass the enemy's main defensive effort.

Several lessons learned during the course of the rotation need to be highlighted. First, as mentioned earlier, it is imperative that cavalry units be integrated into the scheme of maneuver early in the planning process. Furthermore, all key elements on the battlefield must be aware of the presence of air scouts, know their planned OPs, and be prepared to communicate with them at any time during the fight. This eliminates duplication of effort, accelerates the flow of vital information to the commander, and helps to prevent potential fratricide incidents. In the likely event that communications become muddled, the commander must he ready to receive and process spot reports from any of the scouts on the battlefield, not just the cav commander.

Another issue meriting consideration is the question of when to employ scouts. In order for cavalry to be of use to the commander, it must be able to locate and report the enemy early enough that the commander can respond to spot reports and alter his plan as necessary. Reconnaissance is a deliberate, not a hasty, mission. The ability of the Warrior to provide an accurate picture of the threat at night allows the commander to get the information he needs early in the fight, and track the enemy until his main effort makes contact. The OH-58D Kiowa Warrior is unique as a scout platform because it can destroy reconnaissance elements organically, and it can operate at night, remaining undetected. This allows the commander to maximize his reconnaissance effort without having to be concerned about compromising the mission by telegraphing his intentions. The arrival of the RAH-66, with its longer station time and heavier ordnance loads, will provide even greater benefits to the commander in this area.

Technology in aviation is progressing at a staggering pace, and nowhere is this more evident than in the area of battlefield intelligence collection and distribution. DESERT HAMMER VI saw

of Mast-Mounted Sight (MMS) imagery and the Airborne Target Handover System (ATHS), which transmits messages via digital data burst over any radio, perform this function.

For this rotation, three Warriors were also retrofitted with the Phototelesis image relay, which enables the crew to transmit a digitized image taken from the MMS over a SINCGARS radio. All of these systems show great potential for improving the commander's picture of the battlefield. We must take great care, however, to develop a viable plan for the use and dissemination of imagery. Scouting is a demanding and dangerous mission, and aircrews must remain unfettered by redundant reporting requirements and overly directive missions. The worst-case scenario has the Warrior crew serving as a manned RPV, moving about the battlefield under the direction of an analyst in a TOC, and spending an inordinate amount of time heads down in the cockpit in order to send an endless stream of imagery to various users.

The solution to this potential problem lies in the age-old adage "Give me the mission and let me figure out how best to execute it." Technology upgrades incorporated into helicopters must benefit the aviator first. The aviator on the screen line is best able to determine which piece of hardware at his disposal will best convey his report. Under no circumstances should we allow imagery to replace the use of the verbal spot report. It is also imperative that distribution of intelligence be addressed during the orders process to ensure that it gets to the right people rapidly and without the need for redundant transmission. As the aviation community and the Army as a whole become increasingly digitized, tactics, techniques, and procedures will undoubtedly address these concerns, resulting in never before seen increases in command situational awareness and information flow.

Armed reconnaissance is not a new mission at all. It has been the basis for all cavalry operations throughout history. What is new to Army Aviation is the existence of a single platform which can conduct safe and effective reconnaissance at night and kill limited targets using organic firepower. This is the role filled by the OH-58D Kiowa Warrior. NTC Rotation 94-07 demonstrated that this combination works well in the combined arms arena and provides the commander with an unparalleled combat multiplier.

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CPT Barker was the Commander, O Troop, 4th Squadron, 2nd Armored Cavalry Regiment, Ft. Bragg, NC when this article was written.

ATC
(Continued from Page 36)

the Army downsizing continues required quantities can change. The biggest single factor affecting the acquisition process is the budget and funds availability. As funds are cut, program cutbacks become necessary. The dollars that are there today to support the program acquisition process may not be there tomorrow. That doesn't mean that the program is killed but it would most certainly affect the acquisition timetable. PM-ATC is dedicated to the task of providing the soldier with the tools necessary to accomplish the ATC and ATS mission with the highest amount of safety, speed, and efficiency available anywhere in the world.

Postscript. To assist the ATC community in gaining answers to ATC problems and/or questions that may not be available using the normal day to day process, the Product Manager ATC office has installed the number **1-800-872-8619** that can be used for a final source solution. In lieu of the 1-800 in OCONUS locations a dedicated DSN number **693-2003**, is also available. These two numbers coupled with the E-mail address **(amsatwat@st-louis-emh4.army.mil)** will provide access to world wide locations with PM ATC. The PM does not expect this media to be used as a substitute for gaining answers through normal channels but rather as a "when all else fails" solution. If resident subject matter experts do not have a ready answer, a return call, with appropriate answer, will be made.

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FIXED WING
(Continued from Page 42)

containing questions and concerns from the field and the PM's response. If you have any burning issues regarding fixed wing aircraft please send them to:

Mr. Mike Fitzpatrick
Science Applications
International, Inc. (SAIC)
807 Donnell Blvd., Suite I
Daleville, AL 36322

or use the FW-PMO BBS.

As always, we will continue to take phone calls from the field on any issue concerning the operation, maintenance, and future of the fixed wing fleet.

As you can see, we are continuing to develop the Fixed Wing Fleet into the efficient, affordable, modern, and versatile Aviation assets needed to support Force XXI development. We are actively looking for ways to increase the utility of the Fixed Wing Fleet while reducing costs and increasing efficiency.

We are proud of our achievements in streamlining procurement, eliminating unnecessary "red tape", and improving communications with the field. However, we cannot rest on our laurels; technology is changing too rapidly to stand still. We must keep our ears to the ground, our minds open, and our eyes to the future.

As we move into a new Fiscal Year, I foresee a challenging year of opportunity and change. Keep an eye on fixed wing fleet — "The only constant is change!" Managing that change is our challenge.

★ ★

LTC Cason is the Fixed Wing Product Manager, Fixed Wing PMO, U.S. Army ATCOM, St. Louis, MO.

UTILITY

(Continued from Page 22)

architecture. Thus, the modernization programs will maximize the benefits of a leader-follower approach where developmental/nonrecurring effort for the CH-47 will be used to reduce the costs for the UH-60.

While no formal requirement has yet been developed for UH-60 modernization, the Lift Study survey overwhelmingly identified desired improvements in avionics. Other areas include increased lift capability, improved cargo hook and increased range.

The Lift Study also surveyed proponent Directorates for Combat Developments throughout TRADOC to define the frequency that their equipment would most likely be moved. More than 35% of the items required to be moved most frequently fall within the weight ranges clustered at the maximum allowable capability of the utility and cargo helicopters. The extremely high frequency of expected loads in the 8,000-10,000 pound range provide some basis for considering a requirement for additional lift capability, especially given that the UH-60 is the only organic divisional lift asset.

Future Challenges. In summary, the future of the Black Hawk program looks bright. Funding support for the MEDEVAC program and a new multiyear contract helps fuel future modernization efforts. With more and more user support generating for a fleet wide modernization program, we can only make this great workhorse better.

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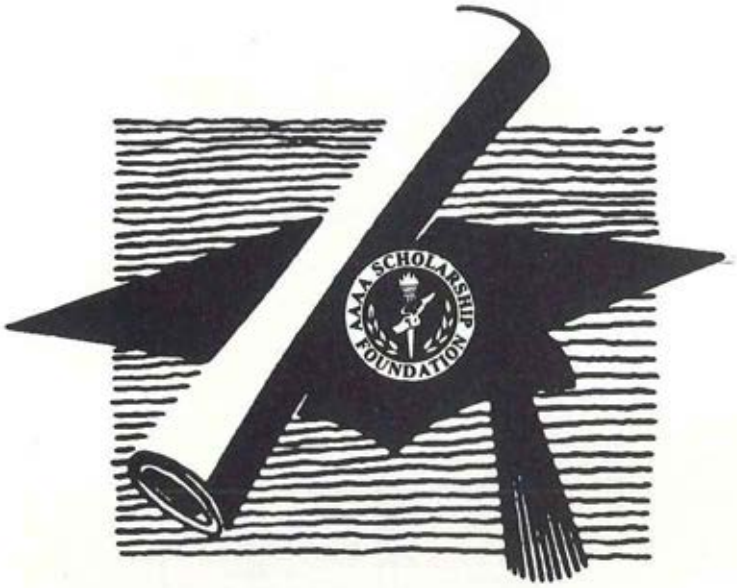

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SFC Rafael S. James
2LT Timothy W. Johnson
CPT Mark D. Miles
CW4 Luis M. Rivera
LTC Harold G. Walker

LINDBERGH
ST. LOUIS, MO
Mr. Joseph C. Dettmer
Mr. Edward P. Knierim

MID-AMERICA
FORT RILEY, KS
CW2 Johnnie R. Myers

MONMOUTH
FORT MONMOUTH, NJ
MG Gerard P. Brohm
SSG Christopher W. Chapple
Mr. Frederick K. Gorgas
Mr. George R. Oliva, Jr.

MORNING CALM
SEOUL, KOREA
CPT L. Scott Fellows
CW2 Michael S. McManus

NARRAGANSETT BAY
N. KINGSTOWN, RI
SSG Todd L. Provost
CW4 Peter A. Young

NORTH TEXAS
DALLAS/FORT WORTH
LTC Thomas A. Grant, Ret.
SSG Bethurel Griffin

NORTHERN LIGHTS
FORT WAINWRIGHT/
FAIRBANKS AK
CW2 Kevin L. Crumpler

OREGON TRAIL
SALEM, OREGON
CW3 Michael C. Cataldo
CW2 John K. Fordyce
Mr. John C. Helm
SSG Jack W. Reeves

POTOMAC
ARLINGTON HALL STN, VA
CW4 Raymond L. Benda
BG William C. Bilo
MG John R. D'Araujo, Jr.
LTC Phillip S. Makowka, Ret.
Mr. William F. Moran, Jr.
Ms. Karen Ann Sycks

SAVANNAH
FT STEWART/HAAF, GA
2LT Darren L. King
CW2 William W. Usry
CPT Norman M. Wade
CW2 Leslie K. Wells
CPT Peter R. West

SOUTHERN CALIFORNIA
LOS ANGELES, CA
MAJ Lester A. Daugherty
Dr. Gerald J. Stiles

TALON
ILLESHEIM, GERMANY
2LT John W. Jones

TARHEEL
RALEIGH, NC
1LT Brian C. Pierce

TAUNUS
WIESBADEN, GERMANY
PFC Miriam C. Beltran
SPC Christopher J. Washack

TENNESSEE VALLEY
HUNTSVILLE, AL
LTC John S. Lawrence, Ret.

WASHINGTON D.C.
WASHINGTON, DC
COL John W. Booher, USAF
Mr. Espey T. Browning, Jr.
Mr. R. William Douglas
MAJ Arthur F. Huber, II
CSM R. A. Oram
LTC Donald L. Wellen, Ret.

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CHAPTER AFFILIATION
CPT Stewart M. Ebaugh
COL Sten G. Edholm
MAJ Bart H. Holtink
Ms. Betsy K. Johnson
CPL Leo M. Noyes
LTC Bruce D. Silvey, Ret.
MAJ Henry Toussaint

AAAA President's Message

(Fourth in a Continuing Series)

MG Richard E. Stephenson, Ret.

The AAAA National Executive Board (NEB) meeting of 16 October 1995 was my first as your president and the last one that will exceed the allotted time. The largest single message from the meeting was that although our membership remains high and vital, our convention revenues and our expenses for 1995 Atlanta Annual Convention were both moving in the wrong direction. This is a 411 information call, not a 911 emergency.

Joe Cribbins briefed the NEB on behalf of the Contract Review Committee (CRC) when Chairman Dave Robinson's day job required his presence at a location other than Washington, D.C. The Contract Review Committee's (CRC) mission is to oversee and review the performance of the contractor, Army Aviation Publications, Inc. (AAPI), month-to-month and year-to year, and monitor strategic health indicators, in concert with the Strategic Planning Committee, including tracking of Membership Trends, Convention Trends, Trends in Other Sources of Revenue; work with the contractor to develop mutually agreeable solutions to issues raised; and to annually recommend to the NEB that the contract be renewed based on the performance of AAPI performance during the previous contractual year. The CRC has a very full plate of action to accomplish prior to contract renewal in 1996.

An Ernst and Young partner named Ted Browning (a WO aviator who served in RVN and GI-billed his way to accounting fame) agreed to give us an outside look at how we do things and also became a renewed member of AAAA at the same time. He promises to be a substantive contributor to AAAA at LOW-TO-NO fees (a miracle in the '90s). He will serve on Carl McNair's fiscal committee and renew handshakes, etc., in time.

As most of AAAA knows, our Acting Executive Director is now Mr. Bill Harris. On behalf of our membership, I offer our thanks to Mr. Terry Coakley for his over-a-decade contributions to AAAA, and we collectively wish him well in his new life.

The Longbow Apache IOT&E is unchallengeable proof of the most significant technological gain in Army Aviation since the advent of the turbine engine, as well as perhaps being the most significant tactical warfighting gain since the helicopter itself. Furthermore, and perhaps most importantly, the IOT&E data provides a battlefield accountability index beyond one's imagination just months ago. It will take our Army a good ten years to fully exploit all the implications involved, by which time, Comanche will be the next quantum leap for the combined arms team. What a time to be an Army Aviator!

AUSA is sponsoring an Aviation Modernization symposium, 24 January in Washington, D.C. This will follow the Aviation Brigade Commanders conference and our next NEB meeting at Ft. Rucker. Army Aviation is battlefield visualization and battlefield accountability. Strap on your piece of all of this and hang on — it'll be a heck of a ride!

New AAAA Chapter Officers

Air Assault:
MAJ William S. Larese (Secretary).

Colonial Virginia
CPT(P) Duane E. Brucker (VP, Publicity).

High Desert:
CW4 James D. McCarty (VP, Programs).

Leavenworth:
MAJ Mark D. Larson (VP, Membership).

Mid-America:
MAJ Timothy J. Moore (Pres); CPT Michael A. Pound (SrVP); WO1 James E.G. Burke (Secy); WO1 Jeffrey D. Flanagan (Treas); CW4 Kirk A. Waymire (VP, Memb).

Morning Calm:
CPT L. Scott Fellows (Secretary).

Narragansett Bay:
CPT Gene K. Lambrecht (Senior Vice President).

Savannah:
CPT Norman M. Wade (Secy); CW2 John R. Musser III (VP, Memb).

Talon:
MAJ Robert L. Johnson, Jr. (Treasurer).

AAAA Aviation Soldier of the Month

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

SPC Michael B. Hoffman
July 1995
(Talon Chapter)

Above: Three Army War College students received Order of St. Michael Bronze Awards by COL Lawrence E. Casper (second from left), Commander, 10th Aviation Brigade, Ft. Drum, NY. The awardees are: LTC Lee Gore, Commander, TF 2-25; LTC Eric Smith, Commander, 2-22 Infantry; and LTC Robert Clark, Commander, TF 1-62 Armor. All were part of the Quick Reaction Force in Somalia under COL Casper's command. The ceremony was held 17 May 1995 in Carlisle, PA.

AAAA LOCATOR • 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.

Ms. Layna Ann McConkey, daughter of CPT Wayne Allen McConkey, deceased, seeks anyone who knew her father. CPT McConkey was an L-19 Bird-dog pilot in Vietnam. Born on 8 June 1943, CPT McConkey was killed when he was shot down on 15 September 1970.

Contact Ms. McConkey through:
Sons and Daughters In Touch, 2030 Clarendon Blvd., Suite 412, Arlington, VA 22201, Tel (703) 525-1107; E-Mail: corky6@ix.netcom.com

Briefings

The **Fort Rucker Officers' Wives Club (OWC)** is having a professionally designed, custom afghan produced that will depict the important aspects of Ft. Rucker. This 50"x65" afghan is made from 100% cotton and is machine washable. The cost is only $40.00 (plus S/H where applicable) and all proceeds will be used for OWC Welfare projects. For more information, call Debbie MacAleese at (334) 347-2705.

The **U.S. Army Research Laboratory** has developed a process that could substantially reduce the cost of composite structures in weapon systems like the RAH-66 Comanche. Two separate systems were developed, one in the process control arena and one in processing itself. In the manufacturing phase, computer applications were designed to model the process and then to design the composite mold. The main area being cultivated is where injection points and vents are placed. The second development, dubbed the "smart weave" concept, uses sensors to detect whether or not the injected composite fills all the voids in the composite mold. Like the first process, the smart weave concept seeks to ensure integrity of the entire composite structure. As of press time, actual savings hadn't been identified.

Boeing Defense and Space Group's Helicopters Division has completed negotiations with the U.K. Ministry of Defence for 14 HC Mk. II Chinook helicopters for the Royal Air Force. The contract, valued at roughly $365M, calls for deliveries to begin in 1997 and continue through early 1999. Boeing said the new procurement and current RAF business will mean the RAF will operate a fleet of nearly 50 Chinooks.

AAAA GOES ON-LINE!

The AAAA National Office now has E-Mail capability via CompuServe. Our address is:

74023.3400@compuserve.com

AAAA CALENDAR

A list of upcoming AAAA Chapter and National events.

AAAA NEWS

November 1995

✔ **Nov. 3.** Phantom Corps Chapter 8th Annual Chili Cook-off and Pegasus Run, Ft. Hood, TX.

December 1995

✔ **Dec. 9.** AAAA Morning Calm Chapter Christmas Ball, Seoul, Korea. Guest Speaker: LTG Richard F. Timmons, Commanding General, Eighth U.S. Army.

January 1996

✔ **Jan. 9.** AAAA National Executive Board Meeting, O-Club, Fort Rucker, AL.

✔ **Jan. 10.** AAAA Aviation Trainer of the Year Award Presentation, AAAA Air/Sea Rescue Award Presentation, AAAA Aviation Fixed Wing Unit Award Presentation, AAAA Aviation Medicine Award Presentation and AAAA ROTC Award Presentation, Fort Rucker, AL.

✔ **Jan. 26.** AAAA Scholarship Board of Governors Executive Committee Meeting, National Guard Readiness Center, Arlington, VA.

✔ **Jan. 27.** AAAA National Awards Selection Committee Meeting to select 1995 National Award recipients, National Guard Readiness Center, Arlington, VA.

✔ **Jan 31-Feb. 2.** Joseph P. Cribbins Product Support Symposium sponsored by AAAA Lindbergh Chapter & AAAA Logistics Support Unit Awards & AAAA Industry Award Presentations, Stouffer Concourse Hotel, St. Louis, MO.

March 1996

✔ **Mar. 27 - 30.** AAAA Annual Convention, Tarrant County Convention Center, Fort Worth, TX.

April 1996

✔ **Apr. 25 - 27.** AAAA USAREUR Convention, Chiemsee, Germany.

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

The 22nd Joseph P. Cribbins Product Support Symposium (PPS) will be held in St. Louis, MO at the Stouffer Concourse Hotel at the airport on 31 January-2 February 1996. The Symposium is also an ATCOM Advance Planning Briefing to Industry (APBI) where business opportunities will be covered in briefings by personnel in ATCOM and the Aviation Program Executive Office (PEO). The symposium is designed to address the issues desired by industry attendees and to allow for government-industry exchange of ideas.

The theme this year is Life Cycle Cost and Support of the Soldier. An outstanding Keynote Speaker will be Mr. Paul G. Kaminski, Under Secretary of Defense for Acquisition and Technology. The Industry Keynote Speaker will be Mr. John P. Capellupo, President of McDonnell Douglas Aerospace. MG John J. Cusick, Commanding General, ATCOM, and MG Ronald E. Adams, Commanding General, USAAVNC and Ft. Rucker, AL, will also be featured speakers.

The Lindbergh Chapter of AAAA, ATCOM, and the Aviation PEO believe that an interesting and informative program has been developed. Your early registration and attendance are encouraged.

The 1996 ATCOM Competition Advocate Shopping List (CASL) Workshop and Spare Parts Symposium will precede the AAAA PSS at the Stouffer Concourse Hotel on 29-31 January 1996. There will be information about the ATCOM CASL Program, Technical Data Packages, Overhaul, Source Approval Requests, and other related subjects.

WEDNESDAY, 31 JANUARY 1996

1500-1900 Registration and Ticket Sales
1700-1900 Early Bird Reception

THURSDAY, 1 FEBRUARY 1996

0700-1600 Registration and Ticket Sales
0700-0800 Continental Breakfast

Morning Session

0800-0815 Opening Remarks
Daniel J. Rubery, President
AAAA Lindbergh Chapter

0815-0900 Government Keynote Speaker
Honorable Paul G. Kaminski
Under Secretary of Defense
for Acquisition and Technology

0900-0945 Industry Keynote Speaker
John P. Capellupo, President,
McDonnell Douglas Aerospace

0945-1015 Break

1015-1115 ATCOM Briefings
Commanding General and
Executive Directors,
Acq. Ctr, IMMC, and AVRDEC.

Lunch

1130-1330 Luncheon with Speaker
MG Ronald E. Adams,
CG, USAAVNC

Afternoon Session

1330-1445 ATCOM Briefings Continued
1445-1515 Break
1600-1630 Q&A Session

Evening Session

1830-1930 Reception
1930-2045 Dinner
2045-2200 Awards Presentation and
Guest Speaker

FRIDAY, 2 FEBRUARY 1996

0700-0800 Continental Breakfast

0800-0915 Aviation PEO Briefings
Program Executive Officer,
Aviation and PMs for Apache
Attack Helicopter, Aviation
Electronic Combat, Aviation
Life Support Equipment, Kiowa
Warrior, PM Utility Helicopters,
Comanche

0915-0945 Break
0945-1130 Aviation PEO Continued
1130-1200 Q & A Sessions
1200-1215 Closing Remarks
Daniel J. Rubery, President
AAAA Lindbergh Chapter

1996 AAAA Joseph P. Cribbins Annual Product Support Symposium/ ATCOM Advance Planning Briefing for Industry Advance Registration Form

STOUFFER CONCOURSE HOTEL ** ST. LOUIS, MO ** 31 JANUARY - 2 FEBRUARY 1996

SPONSORED BY THE LINDBERGH CHAPTER OF THE ARMY AVIATION ASSOCIATION

ADVANCE REGISTRATION DEADLINE: 24 JANUARY 1996

NAME: _____
First MI Last Nickname for ID Badge

RANK/TITLE: _____

UNIT/COMPANY(for Badge): _____

COMPANY ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

OFFICE PHONE: Voice: (___) _____ Fax: (___) _____ Internet E-Mail Address: _____

AAAA Member _____ Yes _____ No Would you like to join AAAA? Please mark membership line below.

If you work for a Defense Contractor on a Full-Time, Part-Time or Consulting basis, you are NOT eligible for Govt/Mil registration fee, even if you are retired military.

	31 Jan - 2 Feb 96 REGISTRATION	1 Feb 96 LUNCHEON	1 Feb 96 BANQUET	PROCEEDINGS MANUAL	1 YEAR MEMBERSHIP	TOTAL PAID
AAAA Member						
INDUSTRY FEES	_____ $195	(Included)	(Included)	(Included)	_____ $21	$ _____
GOVT/MIL FEES	_____ $15	_____ $15	_____ $25	_____ $25	_____ $21	$ _____
Non AAAA Member						
INDUSTRY FEES	_____ $220	(Included)	(Included)	(Included)	_____ $21	$ _____
GOVT/MIL FEES	_____ $20	_____ $20	_____ $30	_____ $25	_____ $21	$ _____
SPOUSE FEES	N/A	_____ $15	_____ $25			$ _____
Late Registration Fee: _____ $25	(Postmarked or faxed after 24 Jan 96)					$ _____
CIRCLE FORM OF PAYMENT:	Cash	Personal Check	Business Check	Grand Total		$ _____

MAKE CHECK PAYABLE TO: AAAA PRODUCT SUPPORT SYMPOSIUM

IF CANCELLATION IS NECESSARY, REFUNDS OF REGISTRATION FEES WILL BE PROVIDED ONLY UPON RECEIPT OF:
WRITTEN NOTICE OF CANCELLATION – POSTMARKED NO LATER THAN 24 JANUARY 1996
ALL PAYMENTS NOT RECEIVED BY CLOSE OF REGISTRATION WILL BE BILLED

MAILING INSTRUCTIONS

PLEASE RETURN COMPLETED REGISTRATION FORM AND FORWARD WITH APPROPRIATE FEES MADE PAYABLE TO:
AAAA PRODUCT SUPPORT SYMPOSIUM, ATTN: Nancy Vermillion AEPCO, Inc. 4433 Woodson Ste 200 St. Louis, MO 63134

INDUSTRY PSS Inquiries should be directed to Nancy Vermillion at (314) 427-6707, FAX (314) 427-2501
GOVERNMENT PSS Inquiries should be directed to Susan Barnes at (314) 263-5311, FAX (314) 263-5315

HOTEL RESERVATIONS

TO MAKE YOUR HOTEL RESERVATION, *CONTACT THE HOTEL DIRECTLY NO LATER THAN 24 JANUARY 1996 AT: (314) 429-1100*

STOUFFER CONCOURSE HOTEL, 9801 NATURAL BRIDGE RD ST. LOUIS, MO 63134. In order to receive reduced rates, please refer to "AAAA Product Support Symposium" when making reservations. Reservations received after 1/24/96 will be on a space available basis only.

The digital battlefield now includes HF Nap-of-the-Earth communication.

The U.S. Army specified the performance levels. Make it eyes-out, easy to learn and simple to use. It had to include high connectivity, with embedded automatic link establishment (ALE), data modem and electronic counter countermeasures (ECCM).

Rockwell's Collins Avionics & Communications Division delivered it all, including full digital signal processing, field programmable ADA software and a spare card slot. The AN/ARC-220 Nap-of-the-Earth (NOE) high frequency communications system is the result of a true partnership with the Army. We're proud to be able to place this technology in our soldier's hands.

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