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Directory

SPECIAL FOCUS:
RAH-66 COMANCHE AND
SIMULATION AND TRAINING

ARMY AVIATION

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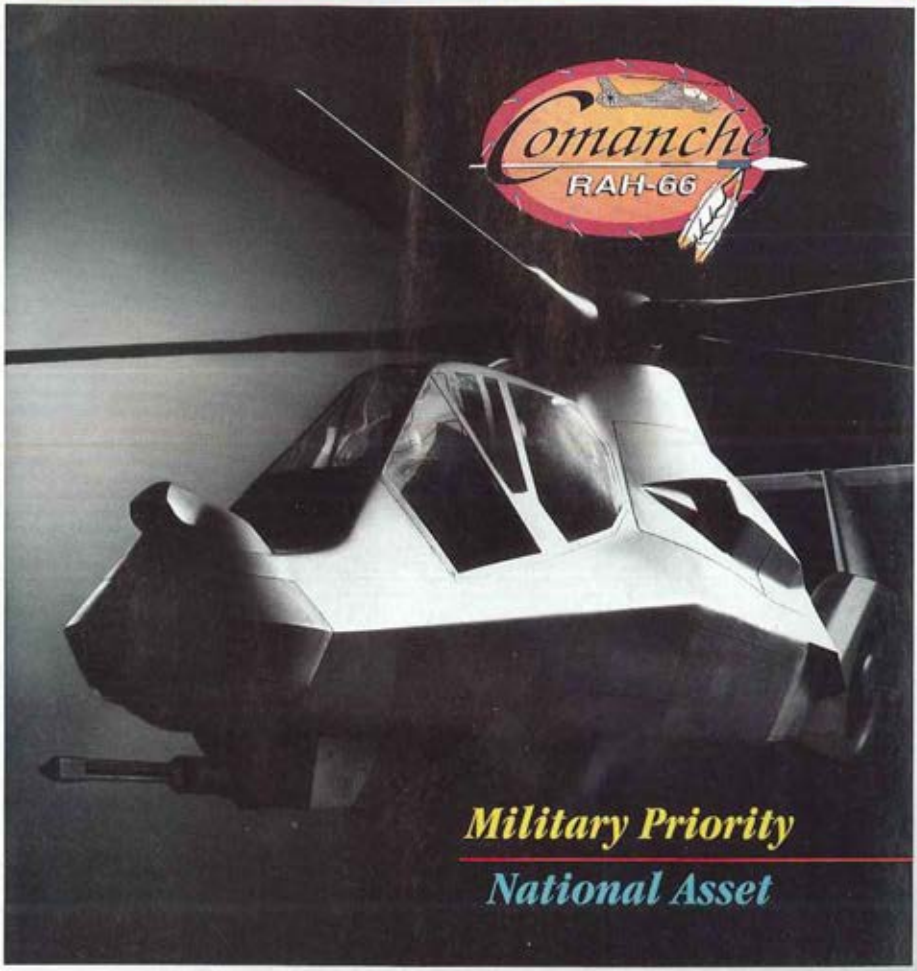

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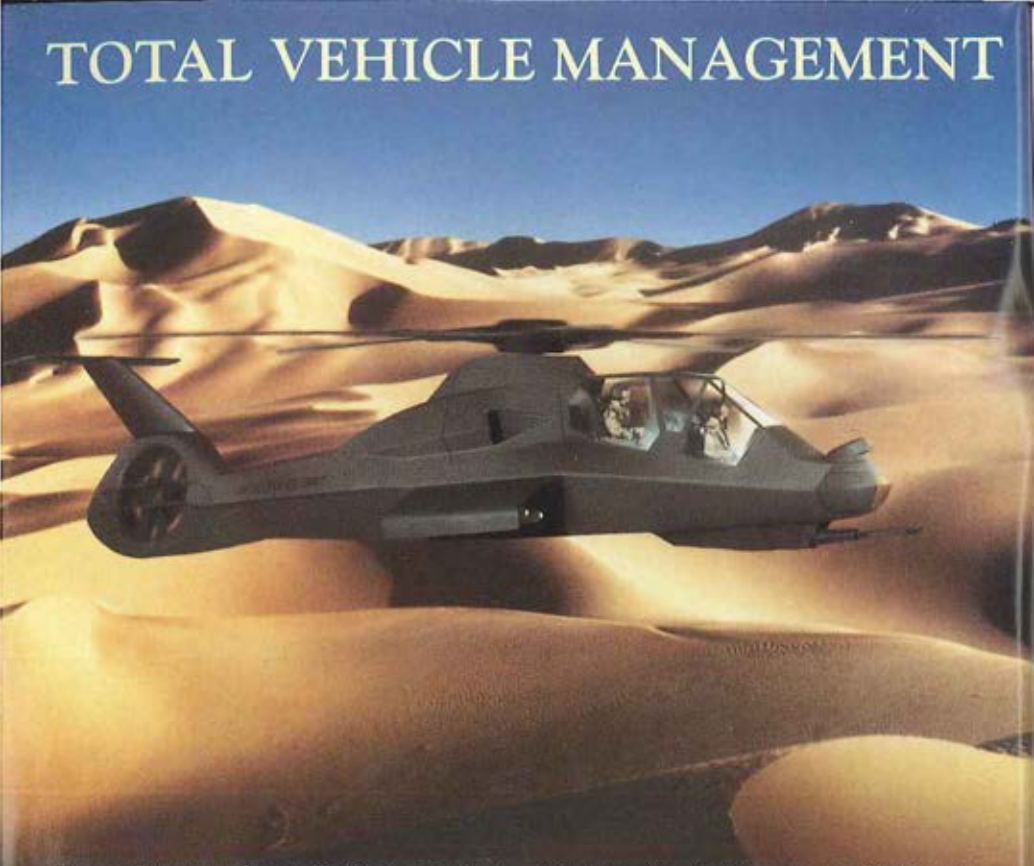

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PUBLISHER
Lynn Coakley

ASSOCIATE PUBLISHER
Terrence M. Coakley

EDITOR
William R. Harris, Jr.

PRODUCTION MANAGER
Barbara Ross

ADVERTISING MANAGER
Deirdre Frost

EDITORIAL/PRODUCTION ASSISTANT
Stephen Moore

CIRCULATION MANAGER
Jill Thomas

CIRCULATION ASSISTANTS
Mary Ann Stirling, Debbie Coley, Deb Simons, Mary Ellen Kother

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FORTHCOMING ISSUES

July 1994 — Special Focus on the 160th Special Operations Aviation Regiment (Airborne) and Night Vision Devices.

August/September 1994 — 1994 Annual "Blue Book" Directory.

Briefings

The Nation's highest military award, the Medal of Honor, was presented posthumously at a White House ceremony on 23 May to two soldiers who were killed in action in Mogadishu, Somalia, on 3 October 1993. **MSG Gary I. Gordon**, 33, and **SFC Randall D. Shughart**, 35, were members of the U.S. Army Special Operations Command (USASOC), Ft. Bragg, NC. The Medal of Honor is awarded for "conspicuous gallantry and intrepidity at the risk of life above and beyond the call of duty in action with the enemy." MSG Gordon's medal was accepted by his widow, Carmen R. Gordon. SFC Shughart's medal was accepted by his widow, Stephanie A. Shughart. They are the first Medals of Honor awarded for valor in any conflict since the Vietnam War.

The **Boeing Sikorsky RAH-66 Comanche** is moving rapidly from design to reality as Comanche Team members progress on assembly of the first prototype air frame and Mission Equipment Package (MEP). At Sikorsky's Stratford, CT plant, the prototype's forward fuselage structure is already half complete, and has been moved to the second assembly fixture. At Boeing, integration of the Comanche's MEP is proceeding apace. The Boeing MEP Systems Integration Laboratory has successfully integrated mission computer cluster racks, power supplies, backplanes, and data processing modules. First flight of the prototype is scheduled for 1995.

The Mohawk Association will hold its annual reunion for 1994 from September 23-25 at the Holiday Inn Oceanside in Stuart, FL. For more information, contact Joel DiMaggio, Grumman Corporation, Mail Stop B33-05, Bethpage, NY 11714, Tel: (516) 575-7238 or the OV-1 Mohawk Association, 11724 67th Place North, Maple Grove, MN 55369, Tel: (612) 493-5522.

The Army Otter-Caribou Association will hold its 9th Annual Reunion 7-11 September 1994 in Orlando, FL. Former Army Otter or Caribou aviation personnel should contact the Association at 1 (800) 626-8194 for membership information.

AlliedSignal Inc. and **Textron Inc.** announced that they signed a memorandum of understanding for Allied Signal to acquire the Lycoming Turbine Engine Division of Textron Inc. for approximately $375 million in cash plus the assumption of certain liabilities. Completion of the transaction is subject to negotiation of a final agreement and regulatory approvals. Lycoming's products are used on a variety of platforms including the British Aerospace BAE 146 and Avro RJ regional airliners, Bell AH-1S Cobra, Boeing CH-47 Chinook, the U.S. Navy's LCAC hovercraft and the Army's M1 series Abrams main battle tank.

VOLUME 42 ARMY AVIATION NUMBER 6

FEATURE ARTICLES

SPECIAL FOCUS: RAH-66 Comanche

SPECIAL FOCUS: Simulation

65 DIRECTORY: AAAA AVIATION SOLDIERS

DEPARTMENTS

FRONT COVER

Paid advertisement: *The RAH-66 Comanche armed reconnaissance helicopter program is the Number One priority in the Army modernization plan. The program will not only enhance America's defense but help preserve the technology and industrial base that keeps America at the forefront in helicopter development. Caption provided by the Boeing Sikorsky Comanche Team.*

Imagine for a moment that each word you see printed on this page weighs five hundred pounds. At high altitude, the Army's current Chinook helicopter can lift about this much. But with our enhanced T55 engines, it could lift about this much. Big deal, you say. A difference of one measly little sentence. Is it worth upgrading the engines on the Chinook for one little sentence? Well, remember, that one sentence means 20 extra soldiers. Or 20% fewer trips back and forth. So yes, one sentence is a big deal. Especially when you have to transport a whole paragraph.

The enhanced T55 series. A whole new level of technology. A whole new level of power.

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COMANCHE — A NEW WEAPON SYSTEM FOR A NEW AGE

Information Age warfare is upon us! Make no mistake about it; the forces of change will have a significant effect upon the role of military forces in future warfare. Classical battle formations with large, massed formations are a vestige of the Agrarian and Industrial Ages. Emerging technologies promise to forever change the face of battle.

Comanche will give commanders the ability to predict the fight.

Revolutionary advancements in harnessing the power of the microchip have made instantaneous, worldwide data transfer nearly commonplace. Vast amounts of digital information are accessible to anyone with a computer and modem; processors can assimilate, sort, and archive vast amounts of data. Events of global significance can be broadcast within minutes of their occurrence throughout the world. Pending conflict and hostile acts in areas of regional instability will not escape the populations of industrialized nations. As demonstrated in recent history, the commitment to military action will be influenced by the way the world is able to see battle events broadcast every 30 minutes on CNN. So then, how will America conduct 21st Century warfare?

Increased situational awareness and the potential to realize near ground truth on future battlefields represent both the challenges and opportunities that lie ahead for America's Army. Lethal, precision strikes with little or no collateral damage are paramount, and a timely end to military intervention is absolutely essential. These tenets form the framework

for the Army's Force XXI initiatives being developed by our senior leadership today.

No-notice deployments supporting a full range of regional contingencies along with operations other than war will be the norm for our 21st Century Army. Smaller forces supported with an array of advanced systems will act as instruments of national power when diplomacy fails. But, high-tech weaponry is not a monopoly of the industrialized nations.

Weapons of mass destruction and theater ballistic missiles are being proliferated throughout the world at bargain-basement prices. Expect them to be present in many future areas of operations. Low signatures and dwell time are characteristic of these systems. To complicate matters, many combat situations may call for tough fighting in built-up areas or in situations where the adversary must be dug out of the ground.

High technology can help in all these circumstances, but it will require new and advanced tactics, techniques, and procedures to get at the problem. Combined and joint capabilities will allow us to detect these early, but the intelligence must be acted upon quickly and accurately. This lends credence to the role of armed reconnaissance — hence, the RAH-66 Comanche.

As a major player in the future force, Army Aviation's trump card lies in our modernization initiatives and technology insertion across our systems. Comanche — the quarterback of the digital battlefield — is central to our efforts. Our focus is to integrate the Comanche into the force as a vital and effective armed reconnaissance platform capable of accelerating lesser and major regional contingency warfare to the graduate level.

Through leap-ahead technologies, the Comanche will provide aviation warriors with the most impressive array of high-tech equipment ever assembled on a combat aircraft. Battlefield commanders will quickly realize the unbalanced advantage gained through the instantaneous transfer of digital reconnaissance data.

Currently, Army Aviation provides ground component commanders a unique capability to fight in four dimensions of the battlespace — length, width, height, and time. But with Comanche, commanders can harness the fifth dimension of maneuver warfare ... the ability to predict the fight!

With such a powerful weapon system, our greatest challenge will be to select and train the right people to maximize its capability. How will we instill agile-mindedness and intellectual flexibility in our young warriors? How can we determine who will perform optimally in the

aircraft? What methods must we use to train logical, yet intuitive, combat decision-making associated with such a powerful system? The answers will come from disciplined thinking with ideas tested and confirmed in simulated environments.

Comanche's developmental concept has been firmly rooted on the cutting edge of high technology. All aspects of the airframe's development support the Manpower Personnel Integration (MANPRINT) requirement. Using CATIA-based, networked computer linkages, the engineering growth of this 21st Century fighting machine comes from innovative and state-of-the-art techniques.

Sophisticated yet straightforward, the CATIA network has allowed designers and engineers to confirm how pieces of the aircraft can be synchronized in the aircraft systems before any part is cast. Intertwined with this concept is the ability to validate much of the Comanche's performance in the virtual simulation environment without ever actually starting an engine or turning a rotor blade. These leap-ahead technologies provide enormous efficiencies and cost savings in development.

"... today's combat mission simulators will give way to networkable, collective trainers like the Aviation Combined Arms Tactical Trainer (AVCATT)."

We are moving boldly to capitalize on the ever-expanding arena of simulation. Training in virtual and constructive simulation environments in stand alone and Distributed Interactive Simulation (DIS) modes will improve training and enhance the warfighting skills of our future force leaders and soldiers.

In the virtual environment, today's combat mission simulators will give way to networkable, collective trainers like the Aviation Combined Arms Tactical Trainer (AVCATT). Constructive wargaming with JANUS allows us to enhance tactical skills in our smaller units, company size and below. Other constructive simulations like Corps Battle Simulation (CBS), for division and higher headquarters, and Brigade and Battalion Simulation (BBS) are already enhancing command and control skills on our battle staffs.

The Battle Command Training Program (BCTP) headquartered at Ft. Leavenworth, KS effectively challenges higher echelon organizations using these simulations; however, truly accurate assessments of the second and third order effects and the value of reconnaissance are difficult to quantify. Prospects

for future technologies that will link virtual and constructive simulations simultaneously with live simulation will allow us to conduct full scale, multi-echelon training and assessment to study these issues. Through DIS architecture and protocols, our simulation strategy promises to validate employment concepts for Comanche.

Live simulation will further validate our tactics, techniques, and procedures. Our Combat Training Centers (CTCs) are already honing tactical skills across our combat, combat support, and combat service support units. Devices such as the Multiple Integrated Laser Engagement System/Air Ground Engagement System II (MILES/AGES II) and the Aircraft Survivability Equipment Trainer IV (ASET IV) are challenging our tactical units with tough, realistic training. With the addition of emulators for all the battlefield operating systems, including the Joint Surveillance Target Attack Radar System (J-STARS), the CTCs are doing a superb job of simulating actual combat environments.

Narrowing the focus to the soldiers who will fight the Comanche begs the question once again of how to train warriors to effectively employ the awesome power of this weapon. Comanche's crew support system enhances training and battlefield capability by including the ability to do flight mission planning, inflight mission preview and rehearsal while

simultaneously facilitating battle command linkages with real-time intelligence and operational data. The battlefield situational awareness factor for the pilots in the Comanche is well beyond what is now available. In fact, it will revolutionize the perspective of the ground commander's goals and objectives. Aviation maneuver in the ground domain will never be more explicitly defined or valued.

Our challenge is to identify and train to standard the tasks that our aviation warfighters must master in order to dominate future battlefields. The sheer quantity of data that potentially will move through the Comanche's Integrated Mission Support System (IMSS) is phenomenal. The Comanche will transfer digitized data on enemy arrays and dispositions, continually amend mission planning based on these data as they relate to friendly courses of action, and instantaneously update intelligence preparation of the battlefield by data burst communications to the command and control elements. All these tasks will be performed while on the move.

Place yourself in the position of making these split-second decisions, prioritizing the relevance of targeted data, assimilating the operational tempo, and assuming the awesome responsibility for mission success on the battlefield. Simulation is our venue to hone the skills of our future battle captains. Comanche provides us with a focal point as a system that spawns from high-tech, simulation-based development. The implications for future warfare are incredible.

Civilization and warfare are changing — neither will remain static. Those without vision for the future will be left behind. The TRADOC Battle Labs and Louisiana Maneuvers will soon showcase Army Aviation leading the way toward the fully digitized battlefield. Creative modeling and aggressive representation of aviation maneuver in the tactical airspace of the ground regime will validate the full capabilities of Army Aviation. Armed reconnaissance is paramount in the 21st Century battle to help commanders see the fight.

Comanche is the Army's flagship for 21st Century warfare. The Information Age is indeed upon us. Comanche will solidify the role of Army Aviation in the operational art, but we must never lose touch with the human element — the warrior spirit. The soul of our warriors make Army Aviation the vital component it is in our nation's armed forces. Soldiers, not their machines, are the key to decisive victory.

★★

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

BY BG ORLIN L. MULLEN

RAH-66 COMANCHE PROGRAM MANAGER'S UPDATE

The Comanche program continues to progress as the Army's number one priority development weapon system. Despite the impacts of a major program restructure during fiscal years 92-93 and the prospect of additional program streamlining revisions in FY 94-95, significant accomplishments have been achieved since my last program update.

First flight for the Army's top priority weapon system is less than 17 months away.

We are moving forward to advance the Army's goal of developing and fielding the next generation of light rotorcraft that will provide critical capabilities lacking in the existing light attack/scout helicopter fleet. Even though economic uncertainties are clouding the future of many defense acquisition programs, Comanche still provides the promise to meet the Army's combat needs not available with existing systems. Following is a brief update on the system's capabilities, program accomplishments and a synopsis of program streamlining efforts.

We have taken steps to incorporate emerging technologies that will provide a leap-ahead weapon system. Our mission is to field a world-wide deployable, air cavalry reconnaissance helicopter that will operate with minimal logistical burden and serve as the command and control node for the commander on the 21st century battlefield to win the information war. This system will provide three dimensional situational awareness with a greater depth and breadth than what is currently possible. The battlefield picture will be overlaid on digital maps that consolidate all real-time data, displaying

friend or foe discrimination. Comanche will avoid detection and increase its survivability through signature reduction, subsystem redundancy, robust design, armor protection and self-healing system architecture. The aircraft design offered by the Boeing Sikorsky team provides the Army with an extremely capable and survivable aircraft system.

The Comanche helicopter is a highly sustainable system, allowing significant reductions in personnel and support equipment while providing a decisive battlefield capability in day, night and adverse weather. It is operationally tailorable to regional conflicts, providing an unprecedented level of lethality and operational flexibility for the battle commander. A large main rotor effective hinge offset and large diameter Fantail will provide excellent maneuverability/agility.

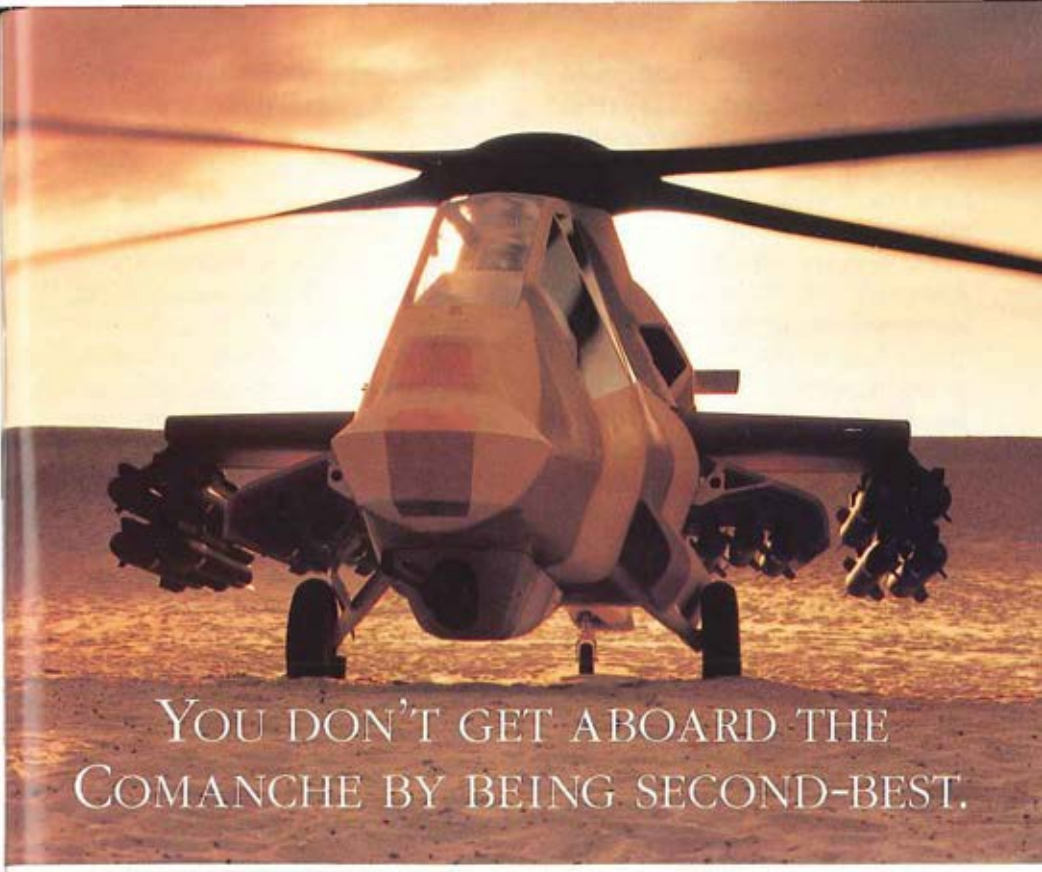
"The Comanche helicopter is a highly sustainable system, allowing significant reductions in personnel and equipment ..."

The Comanche is designed to be exceptionally maintainable and easily transportable. Through the use of keel-beam construction, numerous access panels, easily accessible line-replaceable units/modules and advanced diagnostics, the RAH-66 has designed-in maintainability. The Comanche can be rapidly loaded into or unloaded from any Air Force transport aircraft.

Significant program accomplishments have been achieved and the program remains on schedule and within budget. The Mission Equipment Package (MEP) Critical Design Review (CDR) and the Weapon System CDR were conducted by Boeing Sikorsky in December 1993. More than 3,500 test hours have been conducted on the second generation Forward Looking Infrared (FLIR) system and the Fantail antitorque system has performed well in 100 flight test hours on surrogate aircraft.

Over 9,300 hours of wind tunnel testing, 4,000 hours of piloted mission simulation and 1,400 hours of Radar Cross-Section (RCS) testing have been completed, using both scaled and full-scale RCS models. The major manufacturing jig for prototype aircraft number one has been loaded and assembly is progressing. Recent activities have significantly reduced risk on development of the composite airframe. All long-lead major composite tools have been built and are in place, with some large sample parts having already been fabricated.

The first Comanche airframe is



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The CMA-2012 is the latest development in an evolutionary series of CMC Doppler radar systems installed in thousands of helicopters around the world. At CMC, we design and produce only the best. Our reputation depends on it. At Boeing Sikorsky they insist on it.

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in the early stages of assembly and is now just over one year away from its first flight. Approximately 85% of the airframe system drawings have been released and the dynamic systems and airframe systems CDRs were conducted on schedule. Although the full data set is still being processed, initial results indicate that specification values will be easily met.

Component testing of the mission equipment indicated that the system architecture is proving to be very reliable and no failures were experienced during extensive FLIR bench testing. Seven mission computer modules were tested without failure during 1,000 thermal cycles. The highly integrated MANPRINT/Training program continues to drive the system design in order to optimize man-machine interface and to ensure operator suitability.

A total of ten maintainability assessments have been conducted during the initial design phase. A joint contractor/Army team performed the assessments early in the design process using the Comanche full-scale mock-up and Crew Chief software tools (i.e. electronic mock-ups). Army maintainers performed maintenance tasks to evaluate accessibility, ease of maintenance, MANPRINT criteria and maintenance task procedures. These efforts resulted in several design changes that will enhance system supportability.

A Demonstration/Validation (Dem/Val) Logistics Support Analysis (LSA) Guidance Conference was held in St. Louis during September 1993. The three LSA phases were discussed and agreements were reached on schedules for implementing each phase within the development program. Specific data elements were reviewed and ownership was assigned to applicable Boeing Sikorsky functional elements.

Plans for Government review and approval of submitted data were also discussed. At meeting's end, both Boeing Sikorsky and Government personnel were confident that all Dem/Val LSA and Logistics Support Analysis Records (LSAR) requirements would be executed prior to the start of Low-Rate Initial Production (LRIP).

The T800 engine development program has posted equally impressive accomplishments over the past year after having successfully achieved its qualification milestone. The baseline T800 engine is a 900 kilowatt (1,200 shaft horsepower) class metric turbo-shaft engine designed and built by the Light Helicopter Turbine Engine Company (LHTEC), a partnership between Allison Gas Turbine Engines and the Garrett Turbine Engine Company. It has accumulated over 15,000 engine qualification test hours since the en-

gine source selection was completed in October 1988. To date, the T800 has been installed in several different aircraft including the joint U.S. Coast Guard HH-65A/T800 proof-of-concept program.

Other programs include the Westland Lynx and Augusta A-129, Panther 800, and the UH-1. A major benefit of flight test experience being accumulated now is to reduce risk and assure that the Army will receive a mature engine design for the beginning of the Comanche flight test program.

Component qualification tests and full-up engine testing have demonstrated reliability on a satisfactory growth curve throughout FY 93-94, and maintainability has been demonstrated above specification values. Qualification testing on the baseline engine was completed and initial flight test engines have been readied for shipment to Boeing Sikorsky for use in initial prototype aircraft.

Additionally, the growth engine preliminary design review was completed, and the first engine entered the test cell on 24 March 1994, one month ahead of schedule. Initial flight tests on surrogate aircraft indicated that the T800 is a very versatile engine with the capability of adapting to a wide range of helicopter installations.

All Army Qualification testing and FAA Certification testing have been completed, making the baseline T800 engine production-ready for both military and commercial markets. In April 1993, LHTEC and Global Helicopter Technology flew a Huey 800 (a UH-1H helicopter powered by a T800 engine) 1,975 statute miles non-stop from Oxnard, CA to Dobbins Air Force Base, near Atlanta, GA.

The Huey 800's non-stop flight exceeded by over 600 miles the 28-year old distance record for helicopters weighing between 6,600 and 9,920 pounds. The total enroute flight time of 13 hours and 6 minutes served to demonstrate the T800's low fuel specifics as well as the T800's reliability and dependability.

Since its inception, Comanche has experienced considerable funding fluctuations and numerous program re-directions. Near the end of last year, we experienced budget shortfalls in the program funding stream that could have seriously impacted progress in the out-years. As a result, we were directed to find ways to streamline the program to maximum efficiencies and to eliminate the budget gap.

The current Comanche program consists of a 78-month Dem/Val Prototype phase that began in April 1991, with a follow-on 60-month Engineering and Manufacturing Development (EMD) phase, starting in November 1997. We are now looking at a new streamlined program

consisting of a single development phase that would eliminate costly, redundant activities.

The first flight of a Comanche prototype is still scheduled to occur in November 1995 and the Initial Operational Capability (IOC) date remains intact for 2003. Current plans call for four prototype aircraft to be built and tested during this development phase in addition to a propulsion system test bed.

The program streamlining ground rules are:

- Maintain Comanche's capabilities and performance.
- Create a more efficient development program.
- Eliminate non-value added tasks.
- Apply commercial approaches where possible and simplify contractual approaches.
- Retain MANPRINT, maintainability, reliability and producibility design influence.
- Continue concurrent development of a training system.
- Preserve the combined test team approach.

A combined Government/Industry Process Action Team (PAT) was initiated in November 1993 to explore streamlining ideas. We have focused on applying lessons learned from prior development programs to minimize recurrence of costly problems experienced in the past, as well as investigating a number of modifications designed to reduce total development costs and schedule without adding undue risk.

The most significant aspect is elimination of all Dem/Val-specific tasks or work reports that would have to be re-done during EMD. An In-Process Review (IPR) Briefing, which outlined proposed streamlining ideas, was presented to the Army Staff, Army Vice Chief of Staff and OSD principals at the end of December 1993. In February 1994, the Principal Deputy Under Secretary of Defense for Acquisition authorized the Comanche Program to begin the streamlining process within the following guidelines:

- Consider performance-related cost/benefit trades for user evaluation as part of the streamlined program.
- Plan for a production program based on an affordable rate.
- Document cost savings measures resulting from streamlining that can be shared within DoD.

Accomplishment of the very difficult task of developing a major new weapon system in the most cost-efficient manner requires innovative ideas and concepts. One of these is to eliminate total reliance on military standards and to use commercial practices whenever possible. Likewise, simulation has now developed to the point that it can be utilized to a greater extent, potentially reducing the extensive and more expensive flight test program. Other concepts include reduced

Government oversight, accepting all data submittals in contractor format and allowing contractor-supplied logistics support for the first few years.

Previously, Longbow had been expected to be incorporated in the first production aircraft, however it appears to make more sense to delay incorporation until a later production lot. This would allow for maturation of Longbow hardware on the Apache aircraft, and would provide more time for technology advancement to take advantage of further electronics miniaturization.

The primary focus of the latest streamlining redirection has been planned to ensure that the process is meaningful and assured of achieving its goal of providing a more efficient development program. Current budget constraints are severe, requiring that this new proposal be a logical attempt to deliver the most operationally-effective weapon system, developed in the most efficient, cost-effective manner possible.

The Army and the Department of Defense have combined support to ensure the success of this "melded" development approach. As we go to press, Team Comanche continues to explore further streamlining ideas. Negotiations, preparation of detailed cost estimates and other contractual restructure efforts to incorporate streamling changes will continue throughout FY94.

Comanche will provide commanders a keen situational awareness on the battlefield, maximize deployability and survivability and enable forces to sustain the fight with improved maintainability and survivability features. This system will provide maximum flexibility on a single platform with capability at the battalion/squad level to process the flow of digital battlefield information.

Comanche remains the only logical solution to existing aviation deficiencies and it remains the critical replacement option for the aging light fleet. It is the most viable concept to meet Army Aviation's required capability, modernization and standardization needs, and as such, it is critical that we complete our commitment to providing the troops with the technological edge that is extremely essential with a downsized force structure.

★★

BG Mullen is the Program Manager, Comanche Program Management Office, St. Louis, MO.

1994 Annual Convention Professional Session Presentations now on video cassette!

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BY COL CHARLES L. GANT, JR.

THE VOICE OF THE SOLDIER

The Commander, U.S. Army Training and Doctrine Command (TRADOC) has chartered the TRADOC System Manager (TSM) - Comanche to "perform as the Army's centralized manager for all Combat Development User activities associated with the RAH-66 Comanche." As such, TSM-Comanche is the "Voice of the Soldier" on "Team Comanche."

Comanche user participation during development is key to future fielding success.

This Team consists of the materiel developer, the Program Manager for the RAH-66 Comanche; the prime contractor, Boeing Sikorsky, and its subcontractors; and the combat developer, TSM-Comanche. The TSM mission is to ensure user requirements are identified, appropriately stated, and implemented early and continuously throughout the development, production and fielding of the RAH-66. Our charge is to provide the soldier in the field a fully operational, worldwide deployable, trainable, and maintainable combat system which corrects shortcomings in the current reconnaissance helicopter fleet and is capable of winning the information war in the 21st Century.

The challenge will require the ability to get to the battle, operate and fight 24 hours a day in adverse environments, battlefield obscurants or NBC conditions, in order to provide the commander accurate and real-time information, all while limiting the opposition from acquiring the same information. Accomplishing these critical tasks requires maintaining a dynamic interface with operational units; acquiring, analyzing, and articulating lessons learned; influ-

encing Doctrine, Training, Leader Development, Organization, Materiel, and Soldiers (DTLOMS); interacting with other members of Team Comanche to fully comprehend and understand the most current aircraft configuration; and reflecting operational judgement into the system design and acquisition process.

Our ultimate goal is to ensure Comanche meets the Army's 21st Century objectives and provides a total system that supports the soldiers and enables them to win on the battlefield of the future.

TSM-Comanche incorporates the experience of field soldiers to continue improving each detail of Comanche. Commanders, soldiers and Subject Matter Experts (SMEs), representing all disciplines, are actively involved in the formulation and development of Comanche's operational requirements and design process.

Soldier inputs and participation have been used in major analytical efforts to shape operational requirements such as: Battle Field Development Plans, Army Aviation Mission Area Analysis, Trade-Off Determination, Trade-Off Analysis, Advanced Rotorcraft Technology Integration program, Cost and Operational Effectiveness Analysis, Independent Assessments, Proposal Evaluation Board, Source Selection Evaluation Board, Maintenance Assessments, Major Aircraft Review, and the recent Department of Defense Bottom Up Review.

These major analytical efforts have consistently demonstrated the need for a capable armed reconnaissance helicopter to correct shortcomings in the current reconnaissance helicopter fleet and to ensure the technological edge of the future.

"Our ultimate goal is to ensure Comanche meets the Army's 21st Century objectives and provides a total system that ... enables [the soldiers] to win on the battlefield of the future."

The TSM organization, located at the Army Aviation Warfighting Center, Ft. Rucker, AL, must fully understand the total equation — both operations and acquisition. To accomplish this, the Team is structured (Figure 1) to embody the user's needs, ensuring the "voices" of all disciplines are heard and inserted into an integrated, soldier oriented, combat warfighting system during development.

The TSM includes multifunctional officers, warrant officers, enlisted personnel and civilians. These personnel have vast and varied backgrounds which include

ORGANIZATION

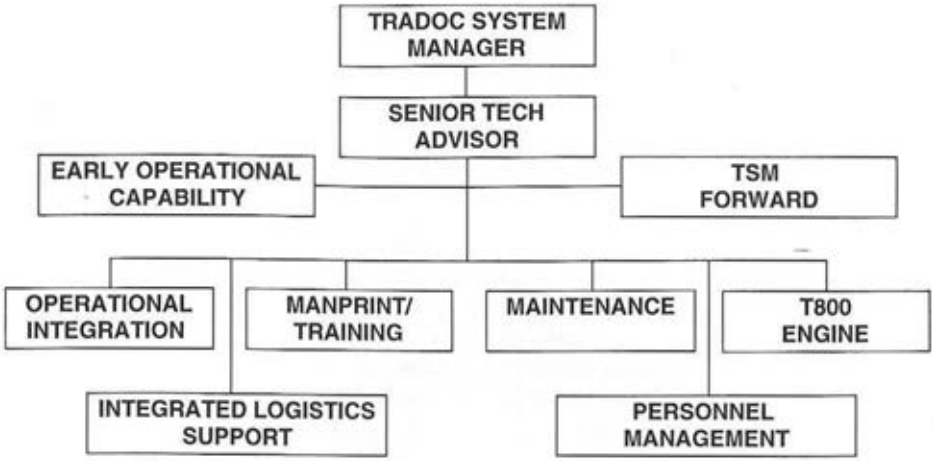


Figure 1

Cavalry, Scout, Attack, Utility, Special Operations, and Maintenance experience. In addition to being operators, they must also be engineers and analysts experienced in design configuration and the acquisition process in order to verify that field recommendations are appropriately reflected in the fielded aircraft. Expertise in operations, simulation, personnel, MANPRINT, electronics, optics, radar, armament, testing, supportability and logistics are all essential in ensuring the fielded system corrects current deficiencies and fits the needs of our future Army Aviation force.

In addition to the Ft. Rucker office, two other critical organizations provide key user input to Team Comanche: TSM-Comanche (Forward), and the Early Operational Capability (EOC) unit.

TSM-Comanche (Forward) is a military contingent of four user representatives (Major, two Master Warrant Officer 4, and a Sergeant First Class) stationed at the Boeing Sikorsky facility in Trumbull, CT. These soldiers are part of a creative developmental design process known as concurrent engineering. This process uses Product Development Teams (PDTs), which consist of designers, human factors engineers (MANPRINTERS), producers, logisticians, trainers, costers, maintainers, and users to effect the complete integrated development of the weapon

system. These user representatives participate in technical interchanges and provide immediate operational inputs and feedback to the PDTs. They continuously monitor the evolving system and subsystem designs and maintain a user data base to document and track user questions.

This data base is reviewed and updated periodically by the user community by reviewing each concern for status, operational impact and determining whether adequate progress has been made in resolution. At the conclusion of this conference the primary operational concerns are shared with the remaining members of Team Comanche. Continuing interface within the Team ensures "Operational Suitability" concerns are known early in the design process to apply corrective actions with the least impact to cost and operations.

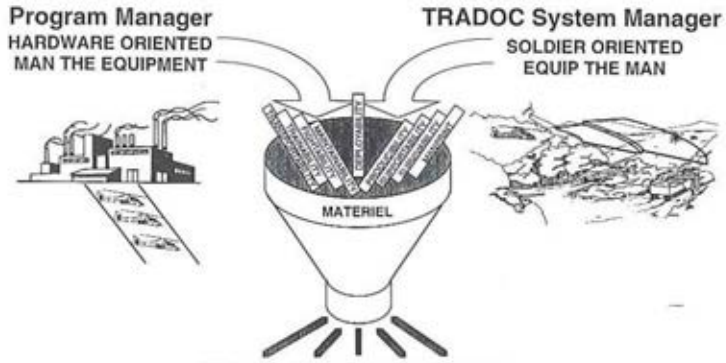
The EOC unit is a provisional Air Cavalry Troop stationed at Fort Rucker. Its primary mission is to develop tactics, techniques and procedures which maximize the leap ahead technologies of Comanche. The EOC is also intimately involved in the preparation and execution of user testing. The unit organizational structure is sufficiently flexible to adapt to programmatic requirements for individual or collective operational inputs.

This unit has been involved in the development and articulation of the Comanche operational requirements as described in the 23 March 1993 Operational Requirements Document (ORD). These specific requirements/expectations have evolved from studies, lessons learned, systems development, full mission crewstation simulation and user participation in crewstation working groups and PDTs. Their technical interpretation is the Pilot Vehicle Interface Mechanization Specification (PVIMS) which is the product of several years of crewstation design, simulation and improvements.

This document, combined with the Weapon System Design Document (WSDD), describes the software and hardware implementations and interfaces the user/operator expectations in the production system. These documents form informal, yet binding, agreements or expectations of the deliverable Comanche. Any changes must be worked through the established forums, working groups or teams described above.

User representatives continuously monitor the design through participation in PDTs, working groups, technical interface meetings, and design reviews. They scrutinize operational suitability by performing full mission simulations and will ultimately fly and maintain pro-

OPERATIONAL PERSPECTIVE



totype aircraft. The materiel developer and contractors receive continual feedback on the user's assessment of the design and recommended alternatives through this active user participation. This process has been designed to be proactive and to ensure the most current information and operational lessons learned have been applied. Continuation of this iterative developmental process should assure user expectations are achieved when the system is fielded.

With the first flight of Comanche approaching within 18 months, our mission continues to provide a realistic perspective to the developmental process, to ensure the Army gets what it needs to execute the National Military Strategy. We must provide America the capability of responding rapidly to contingencies across the operational continuum, in tomorrow's global environment.

Whether this requires forced entry or sustaining land operations with combined, joint, and coalition forces, Comanche will perform the multi-mission roles of cavalry, attack and air combat operations while offering field commanders a first-hand, realtime look at the battlefield. By continuing aggressive voice of user participation through the remainder of the developmental phase, the Army can be confident that when the first unit receives its RAH-66 Comanches, they will be ready to fight and the unit will be ready to win!

★★

COL Gant is the TRADOC System Manager for RAH-66 Comanche, Ft. Rucker, AL.

THE COMANCHE CREW SUPPORT SYSTEM

"Who's going to fly this (Comanche) helicopter, the commander or the S3...?"
Gordon R. Sullivan
General, USA

The integration of mission planning, rehearsal, and execution.

Our Chief of Staff's comments reflect the enormous capabilities and potential of the Comanche helicopter. To harness the unique combat power of the Comanche, the air crew must manage a level of battlefield information and intelligence never before available to an aviation platform.

Successful information management begins with a rigorous manpower personnel integration (MANPRINT) program. Consequently, crew station design has been a priority of the Comanche Program. Other ARMY AVIATION articles in this issue detail extensive MANPRINT demonstrations and crew station design efforts, encompassing over 4,000 hours of piloted simulations, that led to the most advanced crew station development in Aviation today.

This article, however, will look at the broader focus: how the Comanche Crew Support System integrates all aspects of Comanche mission planning, mission rehearsal, and mission execution in real time to provide the air crew and commander an increased Battlefield Situational Awareness.

The Comanche Crew Support System integrates the processes required to best employ Comanche's leap-ahead technology and capabilities by putting a man-in-the-loop equipped with current situational awareness information and precise intelligence and targeting data. The

BATTLEFIELD SITUATIONAL AWARENESS

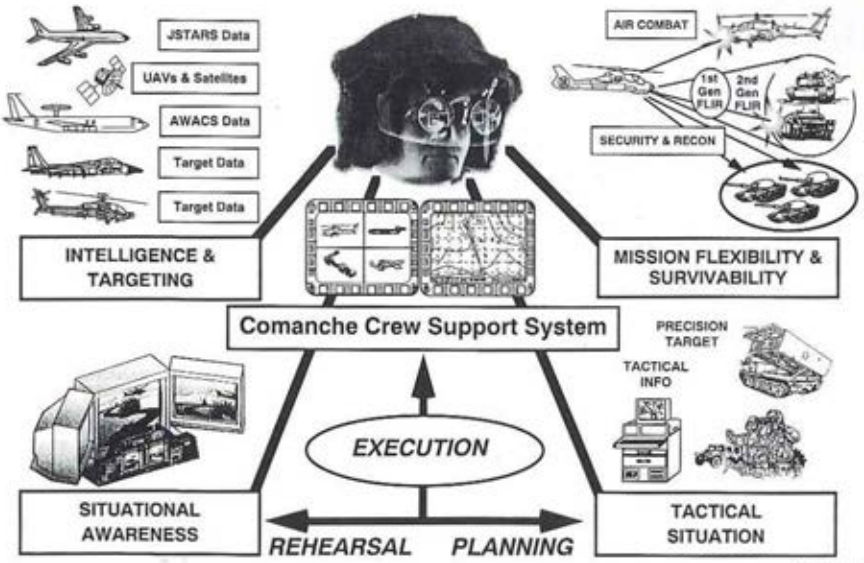


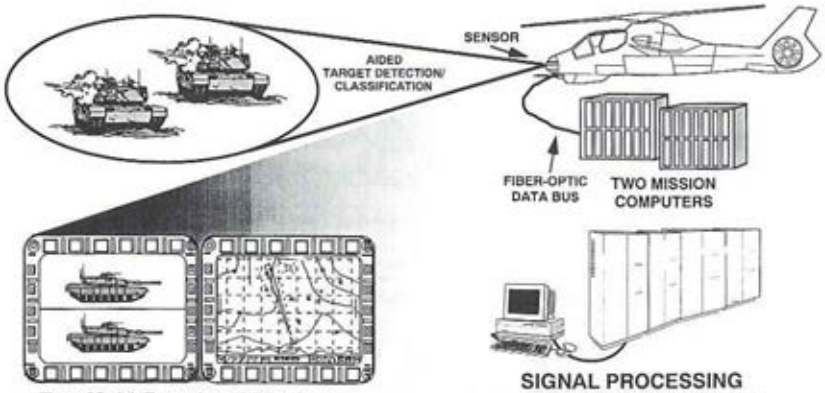
Figure 1

Comanche air crew member is utterly at the focal point of battlefield situational awareness, providing Brigade and Battalion Commanders battlefield information required to quarterback the digital battlefield. As we learned in Operation Desert Storm, Army Aviation is not only the eyes and ears of the Commander, but a decisive combat multiplier.

Tomorrow's Comanche pilot and copilot/gunner will have a power of execution and mission flexibility not found in any current or proposed weapon system. It will be capable of performing armed reconnaissance, attack, or air combat missions in day or night and adverse weather conditions. Additionally, Comanche's low observable technology, increased targeting range, and aided target detection and classification system will enable precise target identification and precision strike capability, while reducing the risk of fratricide.

The Comanche Crew Support System harnesses this combat power, and provides the air crew and tactical Commander the tools and data integration necessary to fight and win with Comanche at the right place and time. While current battlefield information and updated intelligence data will revolutionize mission execution, any commander or leader clearly understands that successful mission execution begins with thorough planning, verified by mission rehearsal.

COMANCHE PROCESSING POWER



- Two Multi-Functional Displays
- Sensor Data Overlayed on Digital Map
- Brings Artificial Intelligence to the Battlefield

DATA PROCESSING	144 Million Instructions/Second (MIPS)
SIGNAL PROCESSING	3.8 Billion Operations/Second (BOPS)

Figure 2

With the enormous processing power of the Comanche, the mission planning/rehearsal/execution loop does not end when the aircraft is launched. This unique processing power provides a resident data base, target detection and classification algorithms, and a digitized terrain map that can be continuously updated with real-time digital battlefield information and intelligence. The traditional aviation premission planning-rehearsal-execution cycle now includes in-flight mission planning and in-flight mission preview/rehearsal.

The Comanche Integrated Mission Support System (IMSS) is the key to continuous mission planning and rehearsal. The IMSS is the interface between the battle command tactical operations center, the Comanche aircraft processing power, and mission planning and rehearsal capabilities.

The IMSS also provides a post-mission video review, allowing for mission critique and situation data base updates critical for the next day's mission planning.

The IMSS provides a data transfer capability between shared data bases and digitized maps common to the combined arms force. Digital information exchange, including threat force locations and dispositions, will be done whenever possible. However, data transfer can also be accomplished through a data disk or HF and UHF/VHF secure

COMANCHE
INTEGRATED MISSION SUPPORT SYSTEM

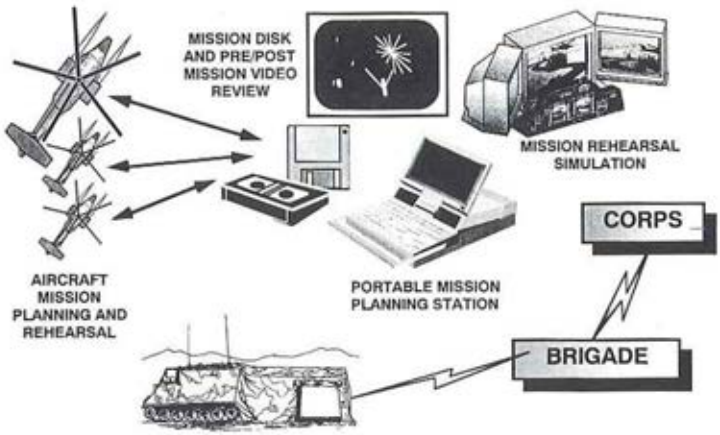


Figure 3

communication radios. Once this information is available at the unit level, terrain analysis, route selection, and battle position criteria, for example, can be developed on the portable mission planning station or through the embedded aircraft mission planning system while on the ground or in the air.

After a macro view mission plan is developed, a three-dimensional perspective view of the proposed flight route will allow the Comanche air crew member to fly and fight the mission before take-off or preview the mission enroute to the target area. Mission rehearsal can be done in the aircraft or with a unit-based simulation device. Recent Louisiana Maneuvers and Training and Doctrine Command Battle Laboratories experiments demonstrated the value of distributed interactive simulation, while rapidly improving virtual reality simulation tools point to the possibility of a virtual-reality helmet training/rehearsal device down to unit level.

Regardless, simulation devices outside the aircraft will be easily transportable and provide the level of fidelity and functionality necessary for individual, crew, collective, or combined arms mission training and rehearsal.

The confidence and tactical edge provided by detailed mission planning and rehearsal give the Comanche air crew a mission execution **(Support — continued on p. 64)**

BY LTC TERRENCE REININGER
and JEFFREY OLSON

T800 ENGINE: A WORLD CLASS PERFORMER

The T800 development program has resulted in the world's most modern and technologically advanced turboshaft engine in its horsepower class. The T800-LHT-800, with its twin centrifugal compressor and two-stage gas generator and two stage power turbines, has achieved a 4.3 to 1 power-to-weight ratio and demonstrated the lowest fuel consumption of any turbine in its class.

The Comanche engine is fully tested and ready for production.

It is designed with self-contained fuel, lubrication, and electrical systems and its advanced integral inlet particle separator has demonstrated sand separation efficiencies as high as 97.5%. The dual-redundant Full Authority Digital Fuel Control (FADEC) significantly reduces pilot workload through automatic starting, control of all engine functions and limits, and anticipatory functions to reduce rotor droop and fluctuations during hard aircraft maneuvering.

The T800-LHT-800 achieved a major milestone in August of 1993 when it became the first turbine engine to simultaneously receive both a military qualification and Federal Aviation Administration (FAA) certification. The engine is tri-service qualified and has undergone the most stringent test program of any Army engine to date. It is designed for a 6,000-hour life and on-condition maintenance.

During qualification, the engine underwent sand, ice, water and bird ingestion tests; was operated at 105° nose-up and 45° nose-down attitudes;

operated under gyroscopic loads of up to 2 Gs (an Army first); ran for six minutes without oil (another Army first); and completed 300 hours of accelerated endurance testing while retaining more than 60% of its power margin (another Army first). More than 15,000 hours of engine testing and over 75,000 hours of component testing were accumulated during the development of the engine. The FAA certification allows the engine to be run for 1,500 hours before a required inspection. This inspection interval is expected to grow once more operational experience is available.

"The T800 engine is the first engine designed for two levels of maintenance. Only maintenance at the user level and ... repairs at the depot level will be required..."

The T800 is the first engine designed for two levels of maintenance. Only maintenance at the user level and engine/component repairs at the depot level will be required, thus eliminating a major Army investment in manpower and materials previously needed to provide an intermediate maintenance capability. Maintenance man hours have also been reduced significantly. Demonstrated maximum removal and replacement times are 34 minutes for modules and 13 minutes for all line replaceable units, using six common tools.

Incorporation of the Army's MANPRINT initiatives in the design process also resulted in several improvements over other engines that the T800 can replace. Examples include:

- Elimination of calibrations or adjustments.
- Single electrical harness with "Murphy-proof" connections.
- Elimination of safety wire.
- Use of captive fasteners.
- Elimination of torque wrenches at user level.
- Only six common hand tools for all user tasks.
- Ease of accessibility for all maintenance tasks.

The T800 has been successfully installed in five different aircraft, including the Agusta A-109A attack helicopter, LTV Panther 800, Westland Lynx, U.S. Coast Guard HH-65, and the Huey. In 1,100+ hours of flight operations, only one engine-related malfunction has occurred. That yields a reliability rate of twice the design goal. The time between removal from the airframe for maintenance is projected to be 3,800 hours, 1,600 hours more than the design goal.

The T800 recently demonstrated its reliability and versatility when it was installed in a UH-1 aircraft and established a world distance

GROWTH ENGINE CHANGES

SAME OUTSIDE ENVELOPE

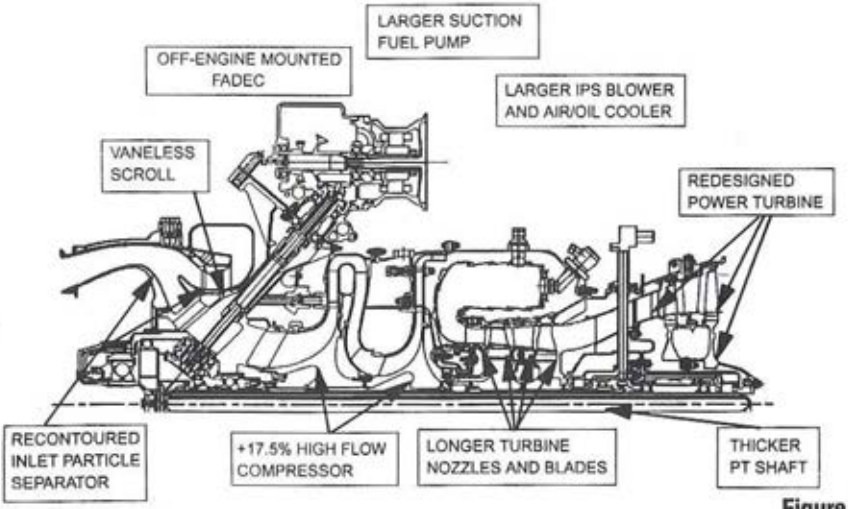


Figure 1

record of 1,975 statute miles. The thirteen hour non-stop, non-refueled flight took the aircraft from Oxnard, CA to Atlanta, GA. Fuel consumption averaged 311 pounds per hour.

In January 1993, the process began to grow the engine to produce a 12% increase in Comanche-installed horsepower. This increase in power (17% uninstalled) is achieved by increasing airflow and turbine inlet temperature while maintaining the same external dimensions, features and capabilities of the baseline engine. Figure 1 shows the changes required to the engine for the power increase. The first growth T800 engine ran at the LHTEC's Allied-Signal Engine facility in Phoenix, AZ in March 1994. Qualification of the growth T800 engine is scheduled for 1999.

The T800 is the most technologically advanced engine on the market today. It has been thoroughly tested and is ready for production. The user-friendly design will result in a maintenance man hour per flight hour ratio of .0059. Its diagnostics and prognostic capability will identify 97% of all failures down to the line replaceable unit, thereby saving countless maintenance man hours. The T800 is a winner.

★★

LTC Reininger is Product Manager, T-800 Engine Program, Comanche PMO, St. Louis, MO.

Mr. Olson is Chief, Power and Propulsion Branch, Comanche PMO, St. Louis, MO.

BY MAJ BRIAN CRADDOCK

RAH-66 COMANCHE TEST PROGRAM

In November of 1995, the first RAH -66 Comanche prototype will make its debut in the skies over the Florida Everglades. That first flight will occur at the Sikorsky Flight Test Facility in West Palm Beach, FL. It will mark the beginning of an extensive flight test program and the culmination of a rigorous ground test effort.

A substantial amount of ground testing is scheduled before next year's first flight.

The prototype design that lifts off next year will be the product of the detailed testing program that preceded it. At the time of this publication, the program will have already conducted 3,500 bench test hours of a second-generation forward looking infrared system. We have flown 100 flight hours of full-scale Fantail testing on a surrogate aircraft. We have performed 9,300 hours of wind tunnel testing supplemented by 4,000 hours of piloted mission simulation. We have already accomplished nearly 4,500 hours of full-scale radar cross section testing.

Despite the significant accomplishments that have already been made, there is still a substantial amount of ground testing to be accomplished prior to the first flight next year. Three of the test activities that are particularly noteworthy are the system integration laboratories, the static test article and the propulsion system test bed.

The system integration labs replicate the operation of the most critical aircraft systems, the mission equipment package and the fly-by-wire flight controls. Before these

essential systems are installed in the prototype they will be fully developed and tested in the contractor's system integration labs.

The laboratories will employ actual aircraft components and software which will duplicate the system's functions in a laboratory environment. This method of developing and testing the software for the mission equipment package and the flight controls will ensure that the bugs have been worked out before the software is migrated into the aircraft. The system integration labs are currently in place at Boeing Helicopters and testing is underway.

The static test article will be a full scale aircraft minus the mission equipment package and primary subsystems. The test article will be used to ensure the integrity of the airframe structural design. The airframe will be stressed to duplicate static design loads expected in the flight environment. Ultimately, parts of the test article will be stressed to the point of failure to confirm the actual load limits of the aircraft. The static test article will be subjected to nearly 11 months of testing prior to the first flight of the prototype aircraft.

The propulsion system test bed will be a full scale operating model of the aircraft propulsion and power-train subsystem for Comanche. The test bed will exercise the actual aircraft propulsion system and drive-train as a total system prior to the first flight of the aircraft. Our intent is to develop operating experience on the test bed prior to first flight and to stay a step ahead of the flight test aircraft to enhance our ability to make some predictions about the operation, reliability and safety of the prototype aircraft. In total, we plan to conduct approximately 1,100 hours of testing on the propulsion system test bed.

The flight test program will consist of over 2,500 flight hours on four or five test aircraft and is being established to exercise every capability inherent in the Comanche aircraft. The first prototype will be used primarily as a structural test aircraft to determine aircraft flight handling characteristics to establish flight envelope limitations. The second prototype aircraft, expected to be available in 1997, will be used to develop and test the mission equipment package. The remaining test aircraft, as they become available, will be used to test the armament system, the electrical system and the aircraft's low observable characteristics.

The test effort will employ the same total quality management and concurrent engineering practices that have marked the entire **(TEST — continued on page 48)**

BY MAJ WILLIAM R. JOHNSON

THE AVIATION COMBINED ARMS TACTICAL TRAINER (AVCATT)

Army Aviation's priority training system for the Information Age.

As the Army develops the capability to fight "information age" warfare, the Aviation Community is developing the capability to conduct "information age" training. Before the end of the decade, Aviation leaders and their units will have the most sophisticated and versatile training system in the world: the Aviation Combined Arms Tactical Trainer (AVCATT).

AVCATT is a networked simulation system which trains and sustains individual, crew, leader, and combined arms training tasks. It is a major component of the Army's Combined Arms Training Strategy (CATS) and is the Aviation Center's priority training system.

Through its realistic high intensity, task-loaded combat environment, AVCATT provides a wide range of training capabilities. Its mix of high fidelity cockpit trainers and lower fidelity combined arms simulators enables commanders to train a wide range of tasks. From training crew level emergency procedures to the rehearsal of unit contingency missions, AVCATT puts Army Aviation squarely into the crucible of battle.

At the Aviation School, students will be introduced to the dynamics of the combined arms battlefield early in their training. Aviation officers will begin their training to become Masters in the Arts and Sciences of Combined Arms Warfare. This training combines the art of reading the battlefield and knowing when to "call the audible" with the science

of employing resources, building up combat power, and coordinating operations. In field units AVCATT provides the most dynamic and flexible training capability to date. Units will have the ability to conduct the following types of training:

- Sustain individual and crew level proficiency.
- Train tasks from their Mission Essential Task List (METL).
- Conduct command post exercises.
- Rehearse missions.
- Prepare for Combined Arms Training Center (CATC) rotations.
- Conduct gunnery training.
- Increase the experience base of leaders.

When deployed on extended peacekeeping missions, units can take components of AVCATT with them to sustain proficiency. When deploying for large scale, high-intensity operations, the entire AVCATT site can be transported with the unit to allow missions to be rehearsed up to the eve of battle. Aviation units in the Reserve Component will be able to achieve readiness levels faster than ever before and provide additional battle ready resources more quickly.

AVCATT provides a revolutionary training for Army Aviation, but in this era of lean budgets, it must be developed in an evolutionary way. AVCATT uses lessons learned and technologies from the Close Combat Tactical Trainer (CCTT) program as well as training system programs under development by the Program Executive Officer (PEO) Aviation. The emphasis on reuse, interoperability, rigorous front end analysis, and streamlined post fielding sustainment minimizes cost, reduces the number of unique training systems, and makes the Army's Aviation Maneuver Force a full participant on the Distributed Interactive Simulation (DIS) synthetic battlefield.

AVCATT is planned for 14 sites which include a site in Korea, one in Germany and two for the reserve components. National Guard and Army Reserve Aviation units will also have the opportunity to train at neighboring active duty AVCATT sites.

Given the requirements stated in the ORD, a typical AVCATT site may consist of the following major components (Figure 1):

- High Fidelity Visual Systems
- High Fidelity Cockpit trainers and Instructor/Operator (I/O) workstations
- Lower Fidelity Combined Arms Crew Simulators
- Semi-Automated Forces (SAF)
- Tactical Operations Center (TOC) Mock-Ups
- Administrative/Logistics Operations Center (ALOC) Mock-Ups
- Mission Planning and Debriefing Center
- Performance Data Bases
- Terrain Data Bases

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CSRDF -- Crew Station Research Development Facility

SPIRIT -- Simulation Program for Improved Rotorcraft Integration Technologies

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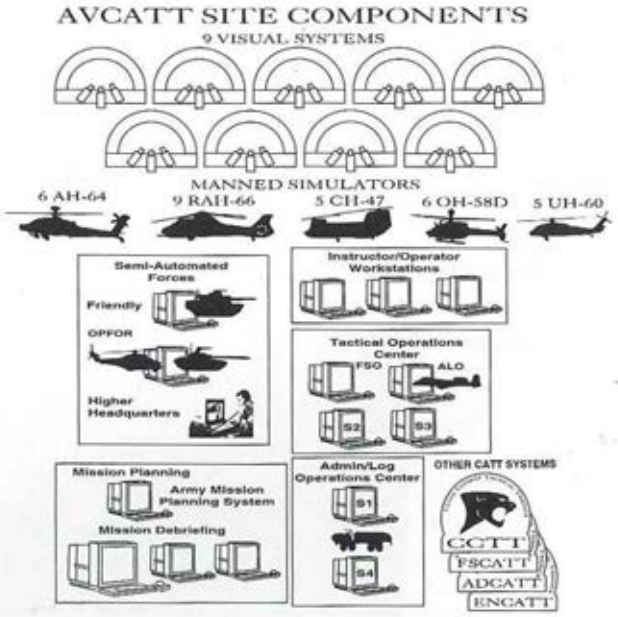


Figure 1

- DIS Network and Protocols

In order to get AVCATT into the units as quickly and efficiently as possible, a cooperative funding and program management strategy has been proposed by PEO Aviation, STRICOM, and TRADOC. By utilizing the unique talents and resources of this triumvirate, AVCATT ushers in a new era of information-age systems acquisition.

The following short descriptions highlight each of the AVCATT components and identifies the Army agency with the lead for development and life support:

High Fidelity Visual System (STRICOM): AVCATT requires a common, transportable, visual system that allows commanders to reconfigure training exercises with various mixes of airframes. The visual system will provide for fields of view of 180° horizontal and 60° vertical as well as support viewing ranges equal to the capabilities of the aircraft's sensors. Graphical update rates will be sufficient to provide a realistic combined arms environment without inducing simulator sickness and producing distracting anomalies.

High Fidelity Cockpit Trainers and I/O Workstations (PEO Aviation): A small number of DIS compatible high fidelity cockpit trainers will be developed to support individual and crew proficiency training. Trainers for Apache A and D models, Comanche, Kiowa War-

rior, Black Hawk and Chinook helicopters are now included in the AVCATT requirements document. Approximately one high fidelity trainer is required at each AVCATT site. These simulators are fully deployable to support training at remote locations as are their I/O workstations. Their modular software architecture facilitates aviation system upgrades ensuring that the simulator is comparable to the unit's current fleet of aircraft. Use of the DIS architecture enables them to take advantage of the AVCATT local area network and take part in combined arms operations.

Lower Fidelity Combined Arms Simulators (PEO Aviation): A larger number of Combined Arms Simulators will be developed to support unit level training. These simulators are of sufficient physical fidelity to allow the realistic conduct of simulated combined arms operations. A reconfigurable cockpit to support training for the Kiowa Warrior, Black Hawk, and Chinook is desired.

Semi-Automated Forces (STRICOM): SAF replicates the weapons systems, tactics, and behaviors of enemy, friendly and para-military forces, as well as civilian noncombatants. The behaviors in SAF are adjustable to allow a wide range of training capabilities. Commanders can set a standard level of behavior to conduct unit ARTEPs in simulation, create specific behaviors to meet real world contingencies, or vary the behaviors over time to push young leaders to their full potential.

The SAF suite provides a "Higher Headquarters" Workstation that allows a unit commander to "fly" around the battlefield and observe the exercise from all aspects. Additionally, this workstation allows the commander to communicate with subordinate leaders and direct the SAF to meet his training objectives.

AVCATT SAF development takes advantage of lessons learned from existing SAF programs. These include CCTT, Modular Semi-Automated Forces (MODSAF), and the Interactive Tactical Environmental Management System (ITEMS). Government owned data and behaviors from these programs is evaluated for reuse and possible reengineering in AVCATT.

Tactical Operations Center (TOC) Mock-Ups (STRICOM): Workstations allowing Battalion and Squadron Staff Officers to interact with the combined arms battle are a key component of AVCATT. These workstations allow the S-3 (Operations Officer), S-2 (Intelligence Officer), Air Liaison Officer (ALO) and Fire Support Officer (FSO) to receive training in performing their tasks as well as influence the outcome of the battle. The ALO workstation allows an Air Force Officer to coordinate and conduct Close Air Support operations as well as other operations requiring joint Ar-

my and Air Force coordination. The FSO workstation allows crews in the manned simulators to call for fire and adjust various types of munitions. The requirement for a liaison officer workstation to support coordination not only with adjacent U.S. Forces but also with multi-National forces is under consideration.

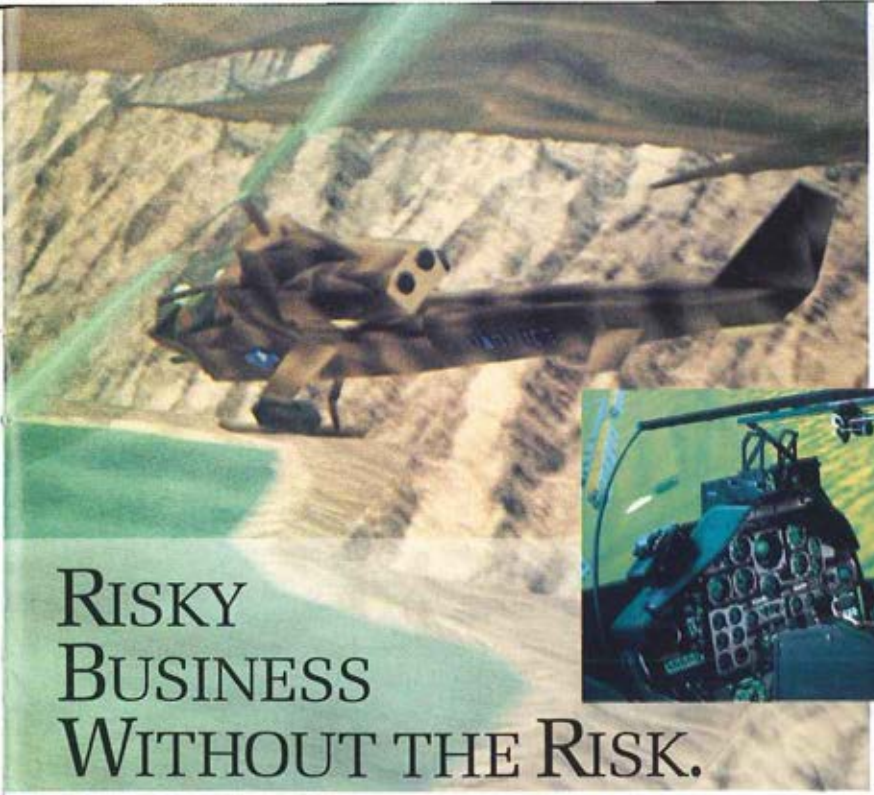
Administrative/Logistics Operations Center (ALOC) Mock-Ups (STRICOM): The dynamics of logistics and sustainment are introduced through the ALOC workstations. Similar to the TOC Mock-Up, the ALOC enables the Battalion/Squadron Personnel (S1) and Logistics (S4) Officers to receive training and influence the battle. Refuel, rearm, maintenance, and most sustainment functions are controlled through the ALOC workstations.

Mission Planning and Debriefing Center (STRICOM/PEO Aviation): Prior to the execution of an exercise, units use the Mission Planning Center to plan and brief the mission. An Aviation Mission Planning System (AMPS) is provided in each site. After the exercise, an After Action Review (AAR) is conducted in the Mission Debriefing Center. Every phase of the battle is captured and played back to address deficiencies as well as identify events that went well.

Performance Data Bases (PEO Aviation/STRICOM): The extensive use of engineering simulations to develop the Apache and Comanche helicopters have a tremendous potential for reuse in AVCATT. Only performance data verified and validated by an official DOD agency and owned by the Government will be used in the AVCATT program. This avoids the pitfalls of buying data over and over again, establishes the data's credibility and facilitates its reuse on future programs.

Terrain Data Bases (STRICOM): Four geo-typical data bases measuring 100 x 300 kilometers each are required. European and desert data bases developed for the CCTT program will be modified for use in AVCATT. A typical/littoral and Northeast Asia data base are also specified in the AVCATT requirements. To ensure realism, these robust data bases must be capable of supporting the wide array of sensors and night vision devices used by Army Aviation units. A wide variety of battlefield effects and weather conditions are also required. AVCATT, additionally, must be capable of using rapidly configured data bases to support real world mission planning and rehearsal.

DIS Network and Protocols (STRICOM): Each component of the AVCATT site is connected to a DIS local area network and is also capable of long haul networking with other sites. This open architecture facilitates interoperability with dissimilar simulators as well as



RISKY BUSINESS WITHOUT THE RISK.

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Photos of Evans & Sutherland-supplied AH1-W Simulators courtesy of the U.S. Department of the Navy.

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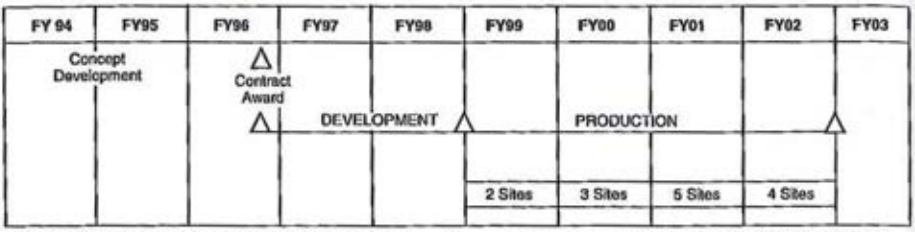
THE POWER BEHIND THE SCENES

AVCATT SCHEDULE

Figure 2



other CATT, such as CTT, the Fire Support Combined Arms Tactical Trainer (FSCATT), Air Defense Combined Arms Tactical Trainer (ADCATT), and Engineer Combined Arms Tactical Trainer (ENCATT).

Although the requirement for an Aviation Combined Arms Trainer dates back to 1984, recent developments are promising. A new Operational Requirements Document (ORD), that encompasses the Army's new roles and missions, is being finalized at the Aviation School and should be available for industry comment later in the spring. Task and fidelity analyses as well as training strategy studies have already begun. Agencies supporting this front end analysis include the following:

- Simulator Training Research Advanced Test Bed for Aviation (STRATA). A facility operated by the Ft. Rucker field office of the Army Research Institute.
- Crew Station Research and Development Facility (CSRDF). An advanced R&D program maintained by PEO Aviation.
- Advanced Distributed Simulation Test Bed (ADST). An advanced R&D program managed by STRICOM.
- Aviation Test Bed (AVTB). The Aviation Center's current combined arms test bed facility.
- The University of Central Florida Center for Applied Human Factors in Aviation (CAHFA) and Institute for Simulation and Training (IST). Support from these agencies and programs helps to refine requirements, reduce overall technical risk and uncertainty and pave the way for the development of an RFP.

The proposed Acquisition Schedule for AVCATT is provided at Figure 2. This schedule, which requires resourcing in the FY 96 Program Objective Memorandum (POM), is under review.

Interoperable, transportable, and capable, AVCATT is likely to rewrite the book on simulation development. The cooperative joint development by PEO Aviation, STRICOM and TRADOC combined with the reuse of existing capabilities and technologies is an example of the way things will be done in the information age.

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MAJ Johnson is the Assistant Project Manager for Combined Arms Tactical Trainers, STRICOM, Orlando, FL.

BY MAJ CLEMENT E. GREEK

ARMY AVIATION ON THE SYNTHETIC BATTLEFIELD

How Army Aviation gains efficiency through Distributed Interactive Simulation.

As the Chief of Staff of the Army, General Gordon R. Sullivan stated, "The challenge is ... can we change, maintain our effectiveness, and grow into the 21st century?" The answer is yes, the solution is to grow through new technologies in simulation.

The Army Science Board in 1991 stated that "The electronic battlefield embodied in Distributed Interactive Simulation (DIS) offers potential across the board and can revolutionize our way of doing business in combat developments, system acquisition, test and evaluation, and training. High resolution mock-ups, or perhaps even actual hardware in-the-loop, can be evaluated under realistic battlefield conditions with the synthetic battlefield. The results of such evaluations should be substantial cost savings in concept development, system development, and test and evaluation.

The DIS initiative focuses on a standards-based environment for interactive simulation. When fully implemented, DIS compatible simulation assets will be utilized in small to large simulation sessions involving geographically dispersed and dissimilar simulators capable of interoperating on a "level playing field".

Multiple sessions, involving players in diverse locations may be in progress simultaneously. DIS protocols and standards open up extensive possibilities for interoperability, allowing simulators to participate in

increasingly complex combined arms simulation exercises and experiments.

Managing the DIS environment means a new way of doing business in simulation. In July 1993, the Secretary of the Army granted approval to the Simulation, Training, and Instrumentation Command (STRICOM) to establish a position for Project Manager, Distributed Interactive Simulation (PM DIS). PM DIS missions are to serve as the Army's Technical Manager for DIS, integrate the DIS synthetic environment in support of the Louisiana Maneuvers (LAM) and Battle Labs, and manage the combined arms network.

Other missions include developing and maintaining the Army's DIS modernization plan and DIS standards and architecture. PM DIS will also coordinate the exploration of emerging technologies from industry, academia, and other research activities.

Additionally, the Product Manager for Combined Arms Assessment Network (PM CAAN) and office was established as the management focus to pull these emerging technologies together. PM CAAN's mission is to manage the Combined Arms Assessment Network facilities in support of experiments, studies, research, and analysis. PM CAAN performs the coordination and integration of DIS activities and the synthetic environment in support of TRADOC Battle Labs, and Louisiana Maneuvers, and the RDECs.

The BDS-D Advanced Technology Demonstration (ATD) Technology Development Plan was approved on 2 June 1992. This plan requires simulators and simulations to be computationally autonomous, provides the flexibility to add, delete, or modify them as required. Models must be designed with the same flexibility.

Some of the key technologies associated with BDS-D ATD are:

- Computer networking protocols and standards to link dissimilar simulations and simulators.
- Low Cost reconfigurable simulators.
- Object oriented simulation architectures and standards.
- Local, wide area, and long haul networking technologies.

The Aviation Test Bed (AVTB) is a test facility used to meet Army Aviation's requirements to conduct research and development in concept evaluations, develop tactics and doctrine, develop new materials, and test new material designs, all in a DIS environment.

The AVTB is a government-owned, contractor-operated test facility located at Fort Rucker, AL. The AVTB is the aviation component of the Battlefield Distributed Simulation-Developmental tech-

nology and provides the Army with an aviation oriented research development, test and evaluation facility which can simulate aviation, armor, infantry, air defense and artillery devices.

In a training development role, the AVTB serves as a joint and combined arms collective task trainer and provides real-time simulations which replicate battle at each tactical echelon, team through brigade, to include combat, combat support, and combat service support functions. The AVTB gives the user a vehicle to experiment with training concepts and collective task accomplishment in a cost effective and safe environment.

In a RDT&E role, the AVTB gives the users and testers a capability to conduct pre-prototype development tests and systems modeling in a facility where tests can be recorded and duplicated time after time. This allows developers the opportunity to *simulate before you buy, build, or fight a weapon system.*

The test bed provides an environment that allows the user to explore the capabilities that should be incorporated into a new system, investigate the numbers and the allocation of the system that achieves optimum performance on the battlefield, and determine the best means to employ the system once it is built. The AVTB is a research laboratory for doctrine, force structure, training, and leader development.

STRICOM, the Aviation Center and PEO Aviation are developing a master plan to upgrade the AVTB to satisfy developmental and testing requirements for the modern aircraft weapon systems. The goal is simulation of aircraft mission equipment packages to include weapons, sensors, navigational equipment, ASE, and communication systems, operating at night as well as during the day, to include adverse weather and obscurants.

Warfighting is the central theme driving the strategy to take Army Aviation into the 21st century. STRICOM, PEO Aviation, and the Aviation Center have developed a team to develop a strategy to ensure Training Aids, Devices, Simulations, and Simulators (TADSS) are available to provide research, development, individual, crew, and collective training on a synthetic combined arms battlefield.

To use the AVTB and simulation in the further development of the Comanche and Longbow weapon systems, PEO Aviation, STRICOM, and the user community have developed what is called the Aviation Warfighting Cell (AWC).

The AWC will be placed in the AVTB. The AWC will simulate ac-

curately the capabilities of these two weapon systems on the synthetic battlefield to provide essential data for crew station design, development, and updates, as well as providing an expandable capability for training system development. When in place, the AWC will also provide an opportunity for increased participation in Advanced Technology Demonstrations, Battle Labs, and Louisiana Maneuvers experiments.

The AWC consists of a Longbow Player Station and a Comanche Player Station, and a session manager. The AWC will be integrated with Computer Generated Forces to add additional aircraft and threat interaction. Both player stations will have out-the-window visuals systems and full mission equipment packages. Delivery of the AWC into the AVTB will be in the spring of 1995.

STRICOM, PEO Aviation, and the Aviation Warfighting Center are dedicated to leading the aviation community into the 21st century as a key participant in Louisiana Maneuvers, Battle Lab Integration, ATDS and development of future technological systems. As budgets are shrinking, it is crucial to ensure the Army has the simulation capability to reuse existing technology, hardware, and software.

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MAJ Greek is the Project Director, PM CAAN, U.S. Army STRICOM, Orlando, FL.

BY H. MICHAEL HARTIN

NEW AND IMPROVED UH-60 MAINTENANCE TRAINERS

Historically, maintenance trainers have been in the background and have not gotten a lot of attention when dollars were available for the development or upgrade of training devices.

Only those who use these devices and learn through their application in the TRADOC schools are painfully aware of this lack of attention. You could say that maintenance trainers are not pretty and are certainly not as glamorous as the flight simulators, but they are just as important to the overall mission of training Army Aviation. Things are looking up for both the maintainer and the instructors who use these devices to train our young soldiers. The extensive use of simulation and state-of-the-art computer technology will significantly enhance maintenance training effectiveness.

New Maintenance Trainers will result in the return of almost a battalion of aircraft to the fleet.

Tomorrow's UH-60 maintenance trainers will employ the latest and best technology available in the marketplace. They will be low cost and will provide the look, feel, and operational characteristics of the UH-60 without requiring the use of actual UH-60 hardware. Precious aircraft parts and airframes can be returned to effective service due to these advanced simulations.

The initial advances were made in 1987 with the fielding of the first trainers utilizing the Ada program language, the UH-60 Cockpit Emergency Procedures Trainer (CEPT). These devices were originally maintenance devices converted to procedure trainers. Now, these devices

are employed at Ft. Rucker and used in the pilot transition course. Efforts continue to move in this direction with the reuse of developed software whenever possible and the application of new ideas and technology as they become available.

The latest ongoing maintenance trainer project is the design and fabrication of the UH-60 Black Hawk Maintenance Trainer (BHMT), formerly known as the Composite Maintenance Trainer. When delivered, these trainers will replace the need for twelve UH-60 CAT "B" aircraft in the Aviation Logistics school at Ft. Eustis, VA. That is practically one full battalion of aircraft that can be returned to service!

The BHMT will virtually duplicate the many systems of the UH-60 aircraft, from engines and drive train to landing gear and brakes. Trainer control will be maintained by the instructor through the Instructor/Operator Station (IOS). This device will make available to the instructor over one hundred faults, which can be implemented by a simple menu selection.

The construction of the BHMT will be a combination of UH-60 airframe components and tubular and sheet metal fabrications with a fiberglass outer covering which will look exactly like the aircraft. The design is such that the students will probably never know they are not working on an actual aircraft.

Another aspect in the individual training of our maintainers is the use of Computer Aided Instruction (CAI). All too often, students find it difficult to grasp the complexities of the hardware systems that make up the modern helicopter. This can be described as "how do I make this device do what it's supposed to do if I don't know what the system does?"

Good news for the instructors! The newest devices will tell the student what he is going to learn, what he needs to know about the operation of the specific hardware system he is being trained on, and a step by step procedure to accomplish his goals. How? The new "Individual Panel" trainers will take maximum advantage of CAI, have touch screen control, be menu driven, and provide more training depth than is obtainable from previous Panel maintenance trainers.

The first of this series of devices for the UH-60 will be new trainers for the electrical systems, the Black Hawk Electrical and Avionics Trainer (BEAT). They will encompass both AC and DC systems, and are "built" to the specifications of the present technical manuals (TMs) for the Black Hawk. These devices will be capable of being upgraded easily. Any changes to the installed program of instruction to reflect changes to the aircraft or technical manuals will be implemented by the worldwide software support facility

at Ft. Rucker, AL.

Further on into the future, maintenance training personnel will receive another trainer that will help them to better understand the systems of the UH-60; the Automatic Flight Control Systems (AFCS) trainer. This device will provide the capability to train the troubleshooting, repair, and adjustment of the automatic flight control system. Again, the emphasis will be on maximizing the use of state-of-the-art simulation technology to enhance training effectiveness.

Army Aviation depends heavily on the efforts of its maintainers to keep the aviation fleet operational. To quote MG Robinson, "As we move from the era of the Huey and Cobra, significant investment must be made in the training base now to transition aviator and maintenance personnel from these mature systems to modern equipment." The capability to make such a transition will stem largely from the extensive use of simulation throughout maintenance training.

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Mr. Hartin is the Project Director for UH-60 Maintenance Trainers, ACTS PMO, PM TRADE, STRICOM, Orlando, FL.

TEST
(continued from page 32)

Comanche program. In order to accomplish that, we will employ a combined test team to manage and guide our testing effort. The combined test team is made of all the organizations within the Army test community, the PMO and the contractors.

All test planning and execution is conducted jointly by the team. Government testers will help the contractor write and execute test plans and will share test results.

This joint team approach is a marked departure from the way of doing business in the past. It will allow us to minimize redundant testing, eliminate dedicated Government testing, minimize the need for dedicated operational testing and make the most efficient use of diminishing funds and test personnel.

The Comanche test program will culminate with the conduct of an Initial Operational Test phase. This test, preceded by training a representative Cavalry Troop, will evaluate the aircraft while it is being employed by an actual unit in an operational environment. The unit's soldiers will be trained using the same integrated training system that will be employed at the TRADOC school, thus serving to validate the training system. Finally, the unit will conduct collective training and a unit evaluation prior to going to test that will confirm that the RAH-66 Comanche meets the Army's requirements and provides the soldier with the needed capabilities for the battlefield of the future.

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MAJ Craddock is APM for Test and Evaluation, Comanche PMO, St. Louis, MO.

BY JOSEPH T. LABALBO

THE DATA AUTOMATED TOWER SIMULATOR

Air Traffic Control's move into state-of-the-art simulation.

The first Data Automated Tower Simulator (DATS) will soon be operational at Fort Rucker, AL. The simulator represents a huge jump in capability for the U.S. Army Aviation Center's Air Traffic Control training program.

The current training labs consist of a dead mockup of a typical three position Air Traffic Control tower, a magnetic board providing an aerial view of the airfield, and tape recorded scenarios. When I say the mockup is dead, I mean like a doornail. The wind indicators are fixed, the telephones and radios aren't wired up, there is no radar, no field lighting. Changes in weather conditions cannot be visually simulated. Since the radio calls are taped, the instructors ability to improvise is limited. The students and the role playing instructors are shoulder to shoulder. Most importantly, the aircraft and vehicles do not move in time with the exercise. Targets that would be converging in real life are stuck to the board until the instructor moves them.

Although DATS is fairly complicated, the program was not intended to break new ground technologically. To get to this point, DATS has done what many DOD programs are going to have to do in the lean years to come. DATS has lived off the land.

The USAF, Navy, the FAA, and several foreign governments have procured tower trainers of varying complexity over the last several years. We did not spend scarce R&D funds to reinvent the wheel. We also

listened to industry. Hundreds of comments and questions were received during the review of the draft requirements and these comments resulted in significant changes to the government specifications.

DATS simulates a typical Army ATC tower, using Cairns Army Airfield as a model. Each simulator will have three student positions and three instructor positions. The out-the-window view from Cairns Tower is simulated on a large screen using commercial projectors. The screens are fourteen feet tall and occupy two-thirds of a circle with a diameter of 24 feet. The image covers a 240-degree horizontal by 40-degree vertical field-of-view. Photographs of Cairns were digitized for the background, and the computer-generated aircraft are inserted in the scene by off-the-shelf image generators.

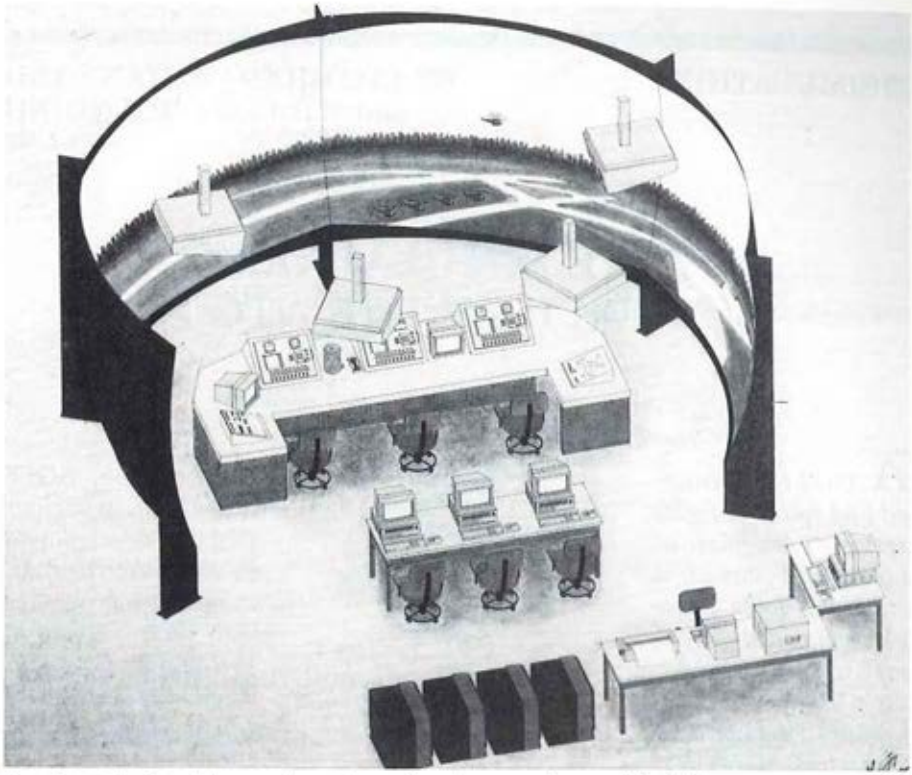
The simulator will allow up to 15 moving objects at a time. A object may be either an aircraft or a vehicle. Day, night, dawn and dusk operations may all be simulated. A variety of weather conditions from severe-clear to complete obscuration are available. DATS simulates the radios, landlines, weather display, Digital-BRITE Radar, binoculars, light guns, and field lighting controls found in a typical fixed-base Army tower.

DATS can simulate 13 different aircraft models including cargo aircraft (C-130, C-9) light fixed-wings (Cessna 172, U-21), high performance jet aircraft (A-10), and several types of rotary-wing aircraft. Instructors may also select from a variety of ground vehicles.

"Situations develop over time on DATS, and if the students aren't alert, they will be bad situations!"

The most important difference between the current magnetic board and DATS is that the aircraft and vehicles move continuously at the right speeds just like live traffic. Situations develop over time on DATS, and if the students aren't alert, they will be bad situations!

About the time the student gets comfortable and is focused on the traffic, the wind will start swirling or the altimeter will drop to remind him to check his indicators. Anyone can work in ideal conditions — but how about in the rain? At night? On a rainy night? Just to keep it interesting on the ground, conflicts can be planned



for the student to sort out, and there will be trucks and mowers moving around the airfield.

There's more to a program like this than designing and building the trainers. DPTSC and DEH did a great job modifying the facility. We could not have built a better facility from scratch, and the government saved over four million dollars from the original plan. All of the spare parts and test equipment are in place, and the first groups of instructors and maintainers have been trained. Instructors from the 1-13th Aviation Regiment provided the necessary ATC expertise for the program, participated from the very beginning, and are now preparing the computer "scenarios" that will drive the training sessions.

The first unit will be completely installed and tested in April 1994 and ready for training in May. It will be an important first step in upgrading the Army's ATC training capability.

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Mr. Labalbo is the Project Director for DATS, ACTS PMO, PM TRADE, STRICOM, Orlando, FL.

BY LTC CRAIG B. HANFORD
and WILLIAM BLANDING

LIVE SIMULATION: AGES II AT THE NTC

"A Total Force trained and ready to fight; serving America at home and abroad; a strategic force capable of decisive victory." That is the Army's Vision. The Air-Ground Engagement System II (AGES II) is one of the tools Army Aviation will use to achieve that vision.

Full production of this readiness tool begins in FY95.

AGES II provides the commander of an aviation unit the capability to culminate his warfighting training cycle with realistic training in a live synthetic environment at the National Training Center (NTC) against an Opposing Force (OPFOR). Thus, Army Aviation can be an integral member of the combined arms team during live Force-On-Force (FOF) training, and better contribute to the outcome of the maneuver battle in real combat.

Since 1985, AGES II has been in various stages of development as a research and development project in the Air Combat Training Systems Product Management Office (ACTS PMO), Office of the Project Manager Training Devices (PM TRADE), Simulation, Training, and Instrumentation Command (STRICOM), Orlando, FL.

The AGES II concept is to provide a capability to Army Aviation similar to the ground versions of the Multiple Integrated Engagement Laser System (MILES) so that the various aircraft models could operate tactically at the NTC while simulating live combat. As with MILES, aircraft can be killed by OPFOR weapons systems or can kill OPFOR elements with simulated

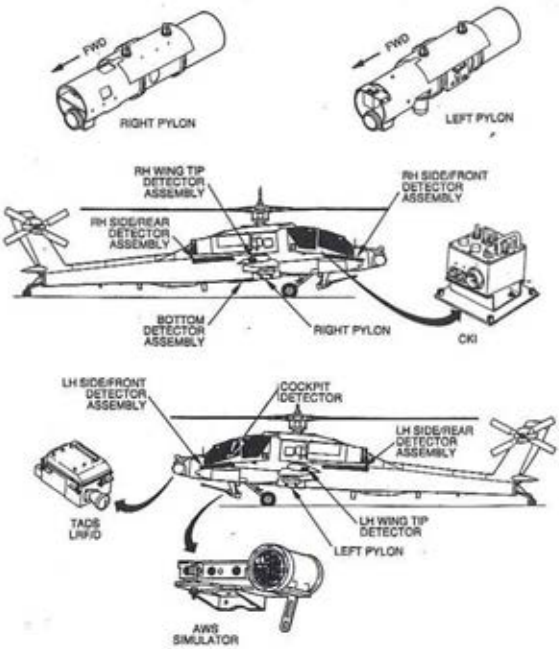

Figure 1

on-board weapons, i.e. Hellfire and 30mm. When full production begins in FY95, this capability will become available for the AH-64A, unarmed OH-58D (AHIP), and various UH-60 and CH-47 models. AGES II for the AH-64A+ and the OH-58D Kiowa Warrior will be made available at a later date.

The development of AGES II leveraged heavily off of the results of the earlier MILES development by using the same sensor belt technology. This technology was modified to conform to the different aircraft models without adversely effecting airworthiness. Weapon systems simulation was the most difficult and had to plow new ground. An Eye-Safe Laser Range Finder/Designator (ESLRF/D) was developed to replace the current LRF/D in the AH-64 in order to simulate the employment of the Hellfire. A new type of gun emitter was designed for the 30mm (Figure 1). Thus, the point and area weapons effects for those weapons systems are accurately simulated. Modifications of these designs are used for the AHIP and Kiowa Warrior.

When production of all of the kits is completed, the three Combat Training Centers (CTCs) will have sufficient AGES II kits to outfit the majority of the aircraft used for training by the rotating aviation unit. Also, the CTCs will have additional kits for spares, as well as enough to send to the next sche-

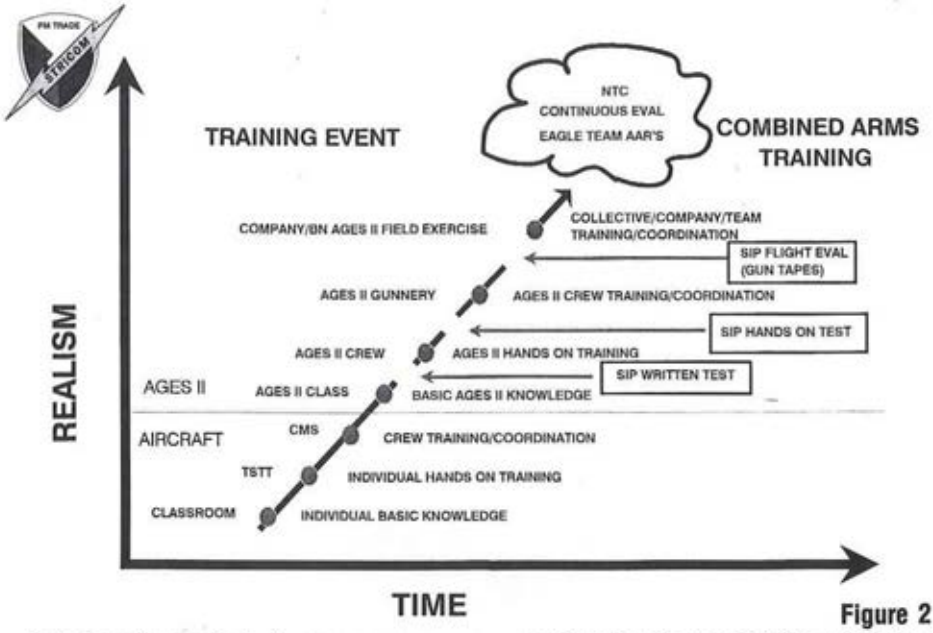

Figure 2

duled unit so that it can accomplish preparatory training at its home station. This type of fielding strategy facilitates the successful accomplishment of an enhanced combat training strategy for the aviator, the crew, and the unit.

The development of an aviation unit's warfighting skills so that it can effectively contribute to the domination of the land battle depends on a training program that spans the full training spectrum. For example, an aviator develops individual and crew skills for the AH-64 in the classroom, using simulation devices, e.g. the TADS Selected Task Trainer (TSTT) and the Combat Mission Simulator (CMS), and in the aircraft. These tools provide a sufficient level of realism for that end of the training spectrum. As you traverse the spectrum towards collective and combined arms training, AGES II provides an increased level of realism in the training event simulation.

A set of AGES II kits is placed in the unit's hands before it rotates to the NTC so it can train on AGES II operation and perfect crew coordination. Then the unit can conduct live training on the collective tasks prior to live combined arms training in the synthetic environment of the NTC. The completion of this AGES II-based combat training strategy cycle provides increased simulated training realism across the training spectrum in successively enhanced training events (Figure 2).

Currently, there have been several prototype AGES II kits for the AH-64 and OH-58D in use at the NTC. These prototypes have been used by rotating units for the last three years to further refine the developmental design and the training employment. Earlier in the project's development, there were many "bugs" that had to be worked out of the system. One of the most notable was the inconsistent eye safe range finding operations on the AH-64. That "bug" has been corrected.

The most visible test of AGES II's training value has occurred with its use in the recent Digitization of the Battlefield Advanced Technology Demonstration (ATD) at the NTC. AGES II kits were installed on nine AH-64A, three AH-64A+, and three Kiowa Warriors.

Due to improvements in the technical performance of the prototypes, the impact of the system in FOF training was significant. The statistics show that the aviation units using AGES II were able to achieve a shot-to-kill ratio with simulated Hellfire shots comparable with the real system. The effectiveness of Army Aviation to the maneuver battle was surely validated in the live synthetic environment of the NTC.

"The effectiveness of Army Aviation to the maneuver battle was surely validated in the live synthetic environment of the NTC."

Combined arms warfare depends on the combined effectiveness of the individual parts; as does combined arms training. GEN Gordon R. Sullivan, Chief of Staff, stated in his address to the Interservice/Industry Training System and Education Conference (I/ITSEC) on 30 November 1993:

"Simulation technology has the potential to truly revolutionize the way we train, the way we fight, and the way we develop weapons ... simulations should replicate combat — they must place the same physical and mental demands on soldiers that we send them to face on the real battlefield."

With AGES II, Army Aviation participates as a full member of the combined arms team during Force On Force training at the NTC.

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LTC Hanford is Product Manager, ACTS PMO, Office of the Project Manager Training Devices (PM TRADE), STRICOM, Orlando, FL.

Mr. Blanding is the Project Director for AGES II, ACTS PMO, PM TRADE, STRICOM, Orlando, FL.

A SALUTE TO AN OLD WAR HORSE AND THE AVIATORS WHO FLY HER

"Like so many of my generation ... I had the good fortune of doing a sizable part of my growing up in the Bell Huey. It saw me through the turbulent period between my teenage years and the time I could honestly call myself a man. It lifted me from a childhood where nothing notable occurred, and set me off with thousands of other unconscious souls on a tragic adventure filled with all the excitement and sad catastrophe of the age.

"What made it all worthwhile, what made it worth risking the ultimate consequence, was the mode of travel... that screaming, most marvelous machine which charted the paddies and jungle of Vietnam: the incredibly tough, incredibly graceful creature that everyone called the Huey.

The UH-1 Huey's past, present, and future.

"Once in a great while it happens that a time and need, a circumstance and class of men, a level of technology and the precisely correct application converge to produce a great aircraft. Despite arguments of engineers and project managers, the essential element of luck in bringing these things together can leave the impression that part of it happened by accident. Nothing, of course, could be further from the truth; the fact remains that it takes a special set of conditions for a really good aircraft to become great."

These words by Vietnam helicopter pilot and author Layne Heath, appearing in the May 1991 issue of *Rotor & Wing* Magazine, are perhaps nostalgic, but they accurately reflect the feelings many of us have towards

the UH-1 Huey. The UH-1 Huey was the mainstay of Army Aviation during Vietnam and served in the full spectrum of missions of air mobility: as a gunship; command and control platform; observation scout, and performed reconnaissance; logistics support; and medical evacuation. Indeed, as Mr. Joseph P. Cribbins, the former Chief of Army Aviation Logistics remarked not long ago, "The Huey is now viewed with the same affection, respect, and regard as the C-47 Gooney Bird was during and after World War II."

The UH-1 series of aircraft have been made in greater quantity than any other single type of post World War II aircraft except for the Soviet Union's Antonov An-2 biplane transport. Since June of 1955, when Bell won a U.S. Army competition for a new utility, casualty evacuation, and training helicopter, the Huey evolved into the work horse of Army Aviation. Thirty-seven years after the competition, while Army Aviation was celebrating its 50th birthday in June of 1992, UH-1 SN 62-2109 celebrated its 30th birthday and its 20,000th flight hour as a primary trainer at Fort Rucker, AL.

When the XH-40, SN 55-4459, was first flown on 22 October 1956 it was powered by a 700 shaft horse power XT-53-L-1 Lycoming engine. The basic Required Operational Capability (ROC) was for a utility helicopter capable of carrying 800 pounds at speeds up to 100 knots with a mission radius of 100 nautical miles. Bell emerged the winner of the design competition after each proposal had been submitted to a complete medical evacuation mission suitability evaluation before being considered in its other capacities as a general purpose helicopter.

Such emphasis was placed on the aeromedical evacuation function that the winning proposal was initially referred to as a "helicopter ambulance". This emphasis carried forward and the first UH-1 Huey unit in Vietnam was the 57th Medical Detachment, a MEDEVAC unit which arrived in early 1962. They brought with them five UH-1A helicopters.

The Huey represented a quantum leap in technology over previous aircraft. The author of *Chickenhawk*, Robert Mason's first impressions of the UH-1 in flight school, after flying the piston powered H-19, is familiar to a lot of Army Aviators of the era: "My first impression of the machine was that it was pure silk. When the IP squeezed the starter trigger on the collective, the response was a shrill whine as the high speed starter motor began slowly to move the blades, not the clacking cough and roar I was used to. At operating speed there was no roaring, vibrating, or shaking, just a smooth whine from the turbine. The IP signaled me to pull up the collective.

The big rotors thudded a little as they increased their pitch, and the machine left the ground like it was falling up."

Without question, the most significant event to occur in solidifying the long term marriage of the UH-1 and Army Aviation was the Vietnam War. In 1951 the U.S. Army inventory listed about 1,500 aircraft, less than 80 of which were helicopters. By 1967, Army Aviation had more than 8,500 aircraft, of which 85% were helicopters! During the period from 1959 to 1976 almost 7,000 UH-1A/B/C/D/H/M were delivered, a procurement of rotary wing aircraft that has never been matched. Exact figures are:

- UH-1A (1959-1961): 173
- UH-1B (1961-1965): 1,027
- UH-1C/M (1965-1967): 749
- UH-1D/H (1963-1976): 5,098.

During the height of the Vietnam conflict, Bell was producing over 100 Hueys per month.

Army Aviators flying the Huey in Vietnam did it all. They were Cav pilots, they were gunship pilots, they were lift pilots, they were medevac pilots and they flew every sort of mission that the Army could dream up for this true utility aircraft.

Perhaps lift pilot, Jim Pressman said it best in *Headhunter Stories from the 1st Squadron, 9th Cavalry in Vietnam*, by Matthew Brennan, "I was a lift pilot. We were different from lift pilots in the assault helicopter battalions because we did almost exclusively single-ship landings in small LZs, rappelling, McGuire rigging, sniffer missions, a lot of dangerous things with little backup. Everything we did was specialized and different from the multiship landings of the assault helicopter battalions. Every day was air combat, and after a time, it made us different from other pilots in Vietnam. I take great exception to the idea that all the 'right stuff' lies with Air Force and Navy pilots. If you're looking for the right stuff as far as pilots are concerned, you don't have to look farther than Army chopper pilots."

Yes, those who flew the Huey in Vietnam had the "right stuff"; some were perhaps incredibly lucky, but the following bears witness to the valor of the U.S. Army UH-1 crewmen recipients of the Congressional Medal of Honor:

- MAJ Patrick H. Brady, a MEDEVAC pilot with the 54th Medical Detachment, was awarded the CMH for operations conducted in Chu Lai on 5 January 1968;
- PFC Gary G. Wetzel, a door gunner with the 173d Assault Helicopter Battalion, was awarded the CMH for actions on 8 January 1968 at Ap Dong An;
- CWO Frederick Ferguson, a lift pilot with C Company, 227th Aviation Regiment, was awarded the CMH for operations in Hue on 31

January 1968; and

- CWO Michael J. Novosel, a MEDEVAC pilot with the 82d Medical Detachment, for actions at Kien Tuong, on 2 October 1969.

It is also interesting to note that both the Air Force and Marines had Medal of Honor Recipients as pilots of various versions of the Huey.

My personal hero was CWO Richard Torres. He was fearless, brilliant, and modest — an unsung hero deserving the most valiant medal not because he took so many lives, but because he saved so many. I will never forget March 20, 1976, when in the sparse, rugged terrain of the Mountain Ranger Camp in Dahlonega, GA, CW2 Torres was forced to carve his own landing zone into the National Forest at a crash site in order to rescue the survivor of an aircraft accident.

Doctors later stated that the survivor was close to death at the time of the evacuation and would have surely died had it not been for the quick decision and selfless bravery of CW2 Torres. His unit recommended him for the award of the Soldier's Medal, which was later downgraded to a threatened letter of reprimand for destruction of the Huey's blades! But this didn't faze Torres; he has the biggest heart and smallest ego I have ever found combined in one human being.

After Vietnam, the Huey continued to earn her combat stripes in Grenada, Panama, and Operations DESERT SHIELD and STORM. During DESERT STORM, over 350 UH-1H/V aircraft flew over 31,000 hours while maintaining a fully mission capable rate of 70%. Hueys constituted over 20% of the helicopters in the theater and amassed 21% of the flying hours.

The current inventory of UH-1s exceeds 2,300 assigned to over 200 Reserve Component and the Active Army units throughout CONUS and overseas. 385 UH-1V Hueys still represent 76% of the Army's MEDEVAC aircraft. The Huey flying hour program today exceeds 30% of the Army's total program.

Over the past 33 years, the UH-1 has flown 25 million hours in support of military and humanitarian operations. It is simple to maintain, inexpensive to operate, and dependable. This is a combination that is tough to beat. The UH-1 Iroquois is indeed the "heartbeat" of the Army helicopter fleet.

But now, the question must be asked: "Is the Huey approaching retirement?" or "Is it past retirement?" or "Can the Army afford to retire it?" The Huey today finds itself involved in perhaps one final controversy in its long career. It is obvious that in these times of reduced force structure and reduced budgets, tough questions will not get easy answers.

U.S. Army Aviation Branch Chief,

MG John D. Robinson told the AAAA Avionics Symposium at Fort Monmouth in October 1992 of plans to trim the active Army inventory from 8,900 aircraft to less than 5,000, and concentrate on the Kiowa Warrior, Apache, Black Hawk, remodernized CH-47, and Comanche. As reported in the December 1992/January 1993 issue of *Defence Helicopter*, MG Robinson went on to say, "Notice I didn't say Huey. Huey may be okay for some other folks, but ... if we go into a big modernization program for the Huey and keep it with U.S. ARMY on the tailboom, we'll take the last Black Hawk to the boneyard and come home in a Huey ... There's all kinds of people in the Army today who just love the Huey. I love the Huey. I've got lots of hours in it... fun aircraft to fly. But you can't fight it."

But industry isn't listening or perhaps they just don't believe that the Army has no current intentions of initiating large scale UH-1 modernization programs. Currently, three teams are developing and marketing various upgrades of the UH-1. The Light Helicopter Turbine Engine Company (LHTEC) and Global Helicopters has put the T88-LHT-800 engine into the UH-1H and calls it the Huey 800. Bell Helicopter, Textron Lycoming, and Bogan Aerotech are developing the Huey II or UH-1HP powered by a T53-L-703. And, UNC Helicopter with General Electric is offering the T700-701C engined Ultra Huey. All upgrades are emphasizing the need to reduce maintenance man hours per flight hour, and improve reliability, avionics, and performance at high temperatures and high altitudes.

Any military system, whether it be an aircraft or land vehicle, is measured in terms of its mission effectiveness which in a general sense is a function of both survivability and lethality.

Without doing a Cost and Operational Effectiveness Analysis (COEA) it is still quite safe to suggest that any significant survivability enhancements will call for major modification of the UH-1 airframe, dynamic components, and mission equipment package if heroic levels of survivability are to be achieved. These will all add weight to the aircraft and both the range and payload will suffer. A major component of the payload is lethality; the number of combat equipped soldiers carried is reduced and/or the on board armament itself. As the helicopter grows in size and cost, one might begin to wonder, "Why not just buy more Black Hawks?"

This is a question that would have been a moot point if the Army had been successful at the start of the LHX (Comanche) Program in the early 80s with its initial plans to replace all UH-1s with the LHX utility version. But the purchase of additional Black Hawks will not occur

in sufficient numbers as the 21st Century dawns. Current Army plans call for retiring several hundred UH-1s each year, leaving 1,000 in the fleet in the year 2001.

Now, in 1994 with Defense budget cuts, base closings, and personnel reductions all moving at a fevered pitch, the situation as always boils down to available funding and trying to get the most "bang-for-the-buck". The Army's Aviation Modernization Strategy is well conceived, but is undercut in several areas by a severe lack of funding. The most pressing aviation funding dilemma remains in the area of utility helicopters.

Yes, after a long and glorious career filled with contributions to Army Aviation, it is time for this work horse to retire, but the circumstances just won't let it. As the sun rises on the first day of the 21st Century, somewhere in the world a Huey will take flight, and the words of Layne Heath will be on many of our minds: "The beat of Huey blades still brings the hair up on my arms and along my neck, and my eyes turn skyward and watch until nothing is left to see. When the craft is gone, the image remains, trailing all the endless images that will forever be the Huey."

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LTC Fardink graduated from the USMA at West Point in 1970. He served in the 1st Infantry, 2nd Infantry, and 101st Airborne Division, as well as in several R&D positions before retiring in 1990.

[Editor's Note: An extensive bibliography is available from the AAAA National Office.]

BY CSM FREDY FINCH, JR.

ENLISTED INITIATIVES: AVIATION BRANCH

The Aviation Branch is in the midst of change! Initiatives are currently being worked that will affect virtually every Aviation enlisted soldier.

The impact of ARI and Stripes on the Flight Line.

The most far-reaching of these is the Aviation Restructure Initiative (ARI). This bold and innovative action shifts the Aviation organizational structure toward homogenous units with modernized aircraft systems as we phase out the older systems. While there are great opportunities, implementation of this action presents significant challenges which will affect the entire branch.

A second initiative that will have a significant impact on Aviation enlisted soldiers is Stripes on the Flight Line. This program consists of several actions. First, we will upgrade crewchief positions. Highly technical and sophisticated aircraft systems demand experienced technicians to keep them flying. To make this a reality, our proposal is being staffed at the DA and MACOM levels. The second piece is in the final development stage, and this realigns the senior grades in Aviation maintenance. It puts some of our most experienced soldiers back in the TOE units working in Aviation maintenance.

At present, the majority of our Master Sergeants (67Z) are in leadership positions, not maintenance, and most all of our Sergeants Major (67Z) are in TDA positions. This proposal, and the leadership/technical tracking of our soldiers, will capitalize on the wealth of knowledge and experience our senior NCOs possess. This action re-

quires development of another CMF, CMF 15, to form a career pattern for those selected to the leadership track.

Under this concept, a soldier at the SFC level would be tracked into either leadership (CMF 15) or technical (CMF 67) positions. Those selected for the traditional leadership track would become platoon sergeants, first sergeants, and sergeants major. Soldiers selected for the technical track would perform or supervise maintenance, and could progress to the higher enlisted level.

Currently, about 80% of our most experienced soldiers are taken out of the technical side at the SFC/MSG level and put into leadership positions. Soldiers will be tracked, initially by the SFC centralized promotion board. To support this, we will be asking DA for "stand alone" Aviation panels on future promotion boards. Once tracked, these soldiers will remain in and compete for promotions within their track. The Stripes on the Flight Line package will improve Aviation maintenance capabilities, increase the experience level of soldiers performing maintenance, allow for progression of the technical track soldiers, and provide competent NCO leaders at all levels.

Another project being worked in the maintenance arena is the transfer of proponency for MOSs 68L (Avionics Communications Equipment Repairer), 68Q (Avionic Flight Systems Repairer), 68R (Avionics Radar Repairer), and 93D (Air Traffic Control Equipment Repairer) to the Ordnance Branch. This move will result in these low density MOSs being managed with other bench repairers and enhance the career opportunities for these soldiers.

Consolidations of some MOSs are also being developed. For example, consolidating MOS 68J (Aircraft Armament/Missile Systems Repairer), 68F (Aircraft Electrician), and 68N (Avionic Mechanic) with ASIs W5 (OH-58D Qualification) and W6 (Aircraft Survivability Equipment) will result in an Armament and Electronics Avionic Mechanic for the Kiowa Warrior. In a similar vein, consolidating MOSs 68F and 68N with ASI W6 will result in an Avionic Electronic Mechanic for non-attack aircraft.

Work is in progress on revising MOS 67S (OH-58D Helicopter Repairer) to cap at the sergeant first class level. This will provide a more logical career pattern for these soldiers.

On the Aviation Operations side of the branch, work in continuing on the merger of MOSs 93C (Air Traffic Control Operator) and 93P (Aviation Operations Specialist) at the MSG level. This will benefit the 93C by increasing their potential for promotion and the 93P by

infusing some top quality soldiers into Aviation Operations.

Currently, a significant percentage of 93P MSG/SGM positions are filled by soldiers who have held MOS 93C at some point in their career.

A proposal to merge Aviation Life Support Equipment (ALSE) tasks into MOS 93P is also being developed. This action will eliminate an ASI and give commanders more flexibility in choosing their ALSE technician.

As you can see, a lot of changes are in the process. However, change is necessary as we focus on the future of Army Aviation and move into the next century.

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CSM Finch is the Command Sergeant Major, USAAVNC, Ft. Rucker, AL.

SUPPORT
(continued from page 27)

advantage and unequaled means for increased Battlefield Situational Awareness. Digital links to and from targeting and intelligence sources, a mission flexibility that allows for reconnaissance, attack, or air combat missions, and digital links to the tactical commander make the Comanche the focal point of battlefield situational awareness.

Improved situational awareness, combined with a lethal, precision strike weapon system and digital target handover capability, provide the recipe for successful mission execution. Advanced helmet mounted displays, improved pilotage FLIR and image intensification, and precision navigation equipment are also key elements of the Comanche Crew Support System.

These enhancements, coupled with multifunctional and multipurpose displays, aided target detection and classification (record/prioritize/review capability), integrated weapons systems, and a digitized terrain map make the pencil and knee board obsolete.

The Comanche Crew Support System harnesses the power of the Comanche helicopter through a closed-loop process beginning with mission planning and continuing until post mission review and/or the next mission to be planned. Due to the Comanche Crew Support System integration of design, processing power, and advanced technology systems, tomorrow's Comanche air crew and battle commander will enjoy a battlefield situational awareness never before seen on the combined arms battlefield.

This continuous mission planning-rehearsal-execution cycle before and after aircraft launch will maximize the combat power and capability of the Comanche helicopter, making it a key member of the 21st century maneuver and peacekeeping force.

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LTC Langhorst is Product Manager, Comanche Crew Support System, Comanche PMO, St. Louis, MO.

AVIATION SOLDIERS

The Backbone of Army Aviation

Directory Sample

LAST NAME, First Name, M.I., (Rank) (Initial Membership Year) (Nickname) Mailing Address. Dy: Duty Phone. Res: Residence Phone. S: Spouse's Name. Dy: Duty Assignment. MOS. AAAA Offices Held.

* A professional-personal roster of Enlisted AAAA members. Data sheets were sent to all AAAA enlisted members, requesting information for the following directory. Only those members who responded by 15 May are listed.

A The 1994 Aviation Soldier

Alfred, Anthony L., (MSG) (M93) 14 Valrey Drive, Hampton, VA 23669. Dy: (804) 878-5551. S: Karen. MOS: 67Z5M.

Allen, Michael D., (1SG) (M88) (Mike) 4324 Lake Road, Woodlawn, TN 37191-9294. Dy: (502) 798-1793. Res: (615) 551-8459. S: Rhoda. Dy: B Co, 2/160th SOAR (A). MOS: 67Z5P.

Allyn, Stephen R., (SGT) (M94) 730 Tamarack Drive, No. 4305, Fayetteville, NC 28311. Dy: (919) 396-5217. Res: (919) 822-3202. S: Tracey. Dy: Air Traffic Controller, B Co, 1/58th Avn Regt. MOS: 93C2V.

Anger, W. Kent, (SSG) (M93) (Kent) 10317 Ocean Drive, Corpus Christi, TX 78418. Dy: (512) 939-3166. Res: (512) 937-7327. S: Jodi. Dy: Flight Operations Sergeant. MOS: 93P3P.

Badgley, Ky D., (PFC) (M93) (Jelly) PSC 2, Box 117, APO AP 96264-0117. Dy: Air Traffic Controller, USAF.

Baker, William J., (SFC) (M94) (Bill) HHC, 3-58 Avn. (ATS), CMR 430, Box 1929, APO AE 09096. S: Lori. Dy: Air Traffic Controller. MOS: 93C4P.

Barker, Bobby G., (MSG) (M93) (Bob) 100 Dixie Drive, Forest Park, No. 54, Enterprise, AL 36330. Dy: (205) 255-9592. Res: (205) 393-6162. S: Barbara. Dy: AFRP, NCOIC, HHC, 1-13th Avn, Fort Rucker, AL. MOS: 67Z5M.

Battle, James G., (SFC) (M94) (Bat) 104 Adele Court, Yorktown, VA 23693-4327. Dy: (804) 878-4791. Res: (804) 867-9227. S: Myong. Dy: Instructor, 1st Staff & Faculty.

Bausman, Thomas, (1SG) (M91) (Boz) 4218 C Moyer Street, Schofield Barracks, HI 96857. Dy: (808) 656-2550. S: Yon Suk. Dy: First Sergeant, D Co, 4-25th Avn Regt. MOS: 67Z.

Beckman, Edwin J., (1SG) (M93) 3936 Old Petersburg Road, Martinez, GA 30907. Dy: (910) 396-2645. Res: (910) 865-5471. S: Janice. Dy: D Co, 1/229th Avn Regt. MOS: 67Z5M.

Berndt, Daniel P., (SGT) (M92) (Dan) 1951A McNair Road, Fort Bliss, TX 79906. Dy: (915) 568-9135. Res: (915) 564-5884. S: Marion. Dy: 67420 Attack Helicopter Repair, N Trp, 4/3 ACR.

Bernier, R. Craig, (CSM) (M93) (Craig) Lindbergh Chap VP Enl Afr, 701 Hinkle Court, Granite City, IL 62040. Dy: (314) 263-1018. Res: (618) 451-7432. S: Christine. Dy: USA Aviation & Troop Command, St. Louis, MO. MOS: 00Z. Vp, Enlisted Affairs, Lindbergh Chapter.

Bethea, Dwayne, (SFC) (M82) (B) 178 Old Bridge Road, Newport News, VA 23602. Dy: (804) 878-2605. Res: (804) 888-6516. S: Marisa. Dy: MMD/MTFB/Maint Test Flt Instructor, Ft Eustis. MOS: 67T.

Bezore, Jeffrey, (SFC) (M86) (Bezz) 101 St. George Boulevard, No. 6-K, Savannah, GA 31419. Dy: (912) 352-5218. Res: (912) 927-9347. Dy: Det. 1SG, 70th Avn Det. MOS: 67H4M.

Blair, Michael G., (SSG) (M93) (Spanky) 163 Bordeaux Lane, Savannah, GA 31419. Dy: (912) 352-5311. Res: (912) 927-0527. S: SuAnne. Dy: Senior Technical Inspector, F Co, 924 SB (A), HAAF, GA. MOS: 68X3H.

Blum, Michael D., (SSG) (M93) F Co, 4th Avn Regt, Box 95, Fort Carson, CO 80913. Dy: (719) 579-4581. Res: (719) 540-9302. Dy: Aircraft Armament. MOS: 68J3W.

Bowling, Arthur A., (SFC) (M89) (Art) 1504 Miriam Avenue, Garner, NC 27529. Dy: (919) 396-8922. Res: (919) 662-4878. S: Pamela. Dy: Production Control NCOIC, E Co, 1/158th Avn Regt, Ft. Bragg, NC. MOS: 67Y4P.

Boyce, Steven D., (SFC) (M94) 5401 York Road, Fort Belvoir, VA 22060-2431. Dy: (301) 981-7885. Res: (703) 780-6547. S: Susan. Dy: USAPAT C-20 Detachment, Operational Support Airlift Command.

Brand, Richard L.M., (SSG) (M92) (Rick) E Troop, 3/4 Cav, CMR 464, Box 84, APO AE 09226. S: Allison. Dy: OH-58D Aeroscout Obs. Sec Sgt., E Troop, 3/4 Cavalry. MOS: 93BW5.

Brasley, Ronald R., (SFC) (M93) (Ron) B Co, 2/501st Avn Bn, Unit 15212, APO AP 96271-0148. S: Carrie. MOS: 93P40.

Britt, David R., (SGM) (M94) 500 Janice Lane, Leesville, LA 71446. Dy: (318) 531-0204. Res: (318) 238-0598. Dy: Avn O/C Div SGM, JATC, Ops Grp. MOS: 67Z50.

Bruck, Edward W., (MSG) (M94) (Patches) 966 Cheekwood Trail, Clarksville, TN 37042. Dy: (502) 798-5531. Res: (615) 572-9023. S: Deana. Dy: Div Avn Life Supt Equip. MOS: 67Z5F.

Burbank, Devin C., (MSG) (M89) (Finbo) 949 Creek Side Run, Fayetteville, NC 28303-4372. Dy: (910) 396-2570. Dy: HHC, 1-159th Aviation Regiment, Fort Bragg, NC. MOS: 93C5P.

Caffey, Roy O., III, (SGT(P)) (M90) (Roy-O) 413 10th Street, Edwards AFB, CA 93523. Dy: (805) 277-4885. Res: (805) 258-7053. S: In Suk. Dy: CH-47D Rt Engr, Airworthiness Qualification Testing Directorate. MOS: 67U.

Cahill, Todd W., (PV2) (M93) D Troop, 2/6 Cav, CMR 416, Box 291, APO AE 09140. S: Melissa.

Calhoun, John C., (SGT) (M91) 3101 S. Fort Hood Street, Lot 43, Killeen, TX 76542. Dy: (817) 287-5905. Res: (817) 628-1917. S: Janice. Dy: HHC, 2/7 Cav, 1CD, Fort Hood, TX. MOS: 11C24.

Calvery, Donnie D., (1SG(P)) (M90) (Don) 4015 Sawmill Drive, Woodlawn, TN 37191. Dy: (502) 798-4842. Res: (615) 326-5567. S: Barbara. Dy: CSM HQ's, 2/160th SOAR (A). MOS: 67Z.

Campbell, Charles L., (SPC) (M93) C Troop 3/6 Cav. Bde., Fort Hood, TX 76544-0485. Dy: (817) 287-9950. Dy: C Troop, 3/6 Cav Bde, Fort Hood, TX. MOS: 93B.

Campbell, Susan P., (MSG) (M92) 10876-A Baldwin Circle, Fort Drum, NY 13603. Dy: (315) 772-3805. S: Roger. Dy: Bn Rt Ops NCOIC, HHC, 2/25 ATK HB. MOS: 93P50.

Campbell, William K., (1SG) (M89) (Ken) 6713-B Mills Road, Columbia, SC 29206. Dy: (803) 751-7585. Res: (803) 782-3440. S: Judy. Dy: A-TCC DPTM, Fort Jackson, SC. MOS: 11H.

Carbone, Steven V., (SFC) (M93) (Bones) 208 Egret Circle, Richmond Hill, GA 31324. Dy: (912)

C The 1994 Aviation Soldier

353-2382. Res: (912) 756-4130. S: Sharlene. Dy: B Co, 3/160th SOAR (Abn), HAAF, GA. MOS: 67URH.

Carew, John F., (MSG) (M93) 3211 Honeysuckle Drive, Killeen, TX 76542. Dy: (817) 288-9830. S: Mary. Dy: NCOIC Avn Test Directorate, TEXCOM, Fort Hood, TX. MOS: 67Z.

Carrasco, Hilser, (PVT) (M93) (Polo) A Co. 1-222 Avn. Regt., Fort Eustis, VA 23604-5000. Res: (804) 878-2424. Dy: 68F Aircraft Electrician.

Castro, Jose T. Jr., (CPL) (M93) (Stro) 6915 14th Avenue NE, Olympia, WA 98506. Dy: (206) 967-3319. Res: (206) 459-3173. S: Shannon. Dy: HHC, USAG, GAAF, Fort Lewis ATC. MOS: 93C.

Chester, James D., (SFC) (M93) (JD) 351 Susan Constant Drive, Newport News, VA 23604. Dy: (804) 878-1605. Res: (804) 872-8233. Dy: Maint Supervisor, 3rd Staff & Faculty.

Christopher, Dean, (SSG) (M91) 4230 599th Street, No. 6, Fort Wainwright, AK 99703-1023. Dy: (907) 353-6198. Res: (907) 356-8973. S: Anna. Dy: Stds Flt Engineer Instructor, C/228th Avn Regt. MOS: 67U30.

Ciboth, Johann, (CSM) (M87) (John) Aloha Chapter VP Enl Aff., 111 Charleston Street, Wahiawa, HI 96786. Dy: (808) 656-2742. Res: (808) 624-1741. S: Linda. Dy: Avn Bde, 25th ID (L). MOS: 00Z. VP, Enlisted Affairs, Aloha Chapter. Past Chapter Officer.

Class, Rafael D., (PFC) (M93) P.O. Box 792, Morovis, PR 00687. S: Marisela. Dy: C Co, 7/227th Avn Regt, Box 2, Unit 20197, APO AE, 09165. MOS: 67S.

Claunch, Daniel R., (SPC) (M93) (Sandman) I Co, 158th Avn Regt, Fort Hood, TX 76544-5070. Dy: (817) 288-3668. Res: (817) 532-1572. MOS: 68DX.

Coake, Michael S., (SSG) (M94) (Mike) 8547-1 Carroll Drive, Fort Hood, TX 76544. Dy: (817) 287-8552. Res: (817) 634-5501. S: Theresa. Dy: AH64 TI, E Troop, 4-6 Cav.

Coburn, Don, (1SG) (M90) (Rooster) 1207 Westway Circle, Killeen, TX 76542. Dy: (817) 288-1274. Res: (817) 634-0757. Dy: B Co, 4-227th Avn Regt, 1st Cav Div, Fort Hood, TX. MOS: 67Z5M.

Cole, William H., (SFC) (M93) 6496 Pittsfield Drive, Fayetteville, NC 28303. Dy: (910) 432-0665. Res: (910) 864-3733. S: Diana.

Coleman, Karen R., (PFC) (M92) (Odie) B Co, 7/159th Avn Regt, Unit 25405, Box 106, APO AE 09182. S: Troy. Dy: 67-U Medium Helicopter Repairer, Gieblestadt Army Airfield, Germany. MOS: 67U10.

Cook, Frank, (SGT) (M93) (Cookste) 527 Bruce Jenner Drive, Clarksville, TN 37042. Dy: (502) 798-1813. Res: (615) 572-9062. S: Belinda. Dy: F Co, 1/160th SOAR (A), Fort Campbell, KY. MOS: 67T20.

Cooper, Rickey L., (SFC) (M89) C Co, 1-501st Avn, Box 157, APO AP 96208-0575. Res: (402) 291-9010. S: Mary. Dy: Platoon Sergeant, Camp Page, Korea. MOS: 67T.

Creed, Daniel F., (1SG) (M81) (Danny) A Co, 603rd ASB, CMR 454, Box 3403, APO AE 09250. S: Margaret. MOS: 67Z5X.

Crosby, Ricky L., (SFC) (M94) (Rick) 14867 Swallow Court, Dale City, VA 22193. Dy: (703) 806-7149. Res: (703) 730-2030. Dy: HHC OSAC, Fort Belvoir, Trg & Analysis NCOIC.

Crouch, Terry L., (MSG) (M85) 124 Raymond Drive, Hampton, VA 23666. Dy: (804) 728-5128. S: Chong Ae. Dy: HQ, TRADOC, Log Maint, ATC Maintenance Staff NCO. MOS: 93D.

Dartez, Raywood P., (CSM) (M92) (Ray) 9746 Harrington Drive, Fort Belvoir, VA 22060-1932. Dy: (703) 806-7114. Res: (703) 799-8238. S: Ruth. Dy: HQ, Operational Support Airlift Command, Fort Belvoir, VA. MOS: 00Z50. Scholarship Board. VP, Enlisted Affairs, Washington DC Chapter. Past Chapter Officer.

Davis, Sok C., (CSM) (M91) (Chong) 4 Malibou Circle, Savannah, GA 31406. Dy: (912) 971-6088. Res: (912) 355-9235. S: Kwang Cha. Dy: 3rd Bn, 160th SOAR (A), HAAF, GA. MOS: 00Z5P.

Davison, Lloyd H., (1SG) (M80) (Hal) RR 4, Box 736D-7, Spring Lake, NC 28390-9204. Dy: (919) 396-3109. Res: (919) 497-8265. S: Vicki. Dy: E Co. 1-159th Avn Regt. MOS: 67Z5M. Past Chapter Officer.

Dennis, Anthony O., (SFC) (M94) USA CATB, 3005 Westrim Drive, Killeen, TX 76542. Dy: (817) 288-0393.

Diamond, Robert J., (SPC) (M93) (Rob) 109 Lake Road, Tavernier, FL 33070. Res: (305) 852-2054. MOS: 67N.

Diaz, Luis E., (SFC) (M94) (Louis) 3rd Staff Faculty Co, Fort Eustis, VA 23604. Dy: (804) 887-0904. Dy: Instructor/Writer.

Dickens, Deana, (SPC) (M93) Electronics Test Co, Fort Huachuca, AZ 85613. Dy: (602) 538-6213. Res: (602) 452-1141. MOS: 68R10.

Don, Jack P., (SFC) (M93) 3337 Redfox Drive, Spring Lake, NC 28390-1538. Dy: (910) 396-9297. Res: (910) 960-9985. Dy: D Co, 1/159th Avn Regt. MOS: 67Y40.

DuBuque, Mark, (SFC) (M92) ASE Course, P.O. Box 7753, Fort Gordon, GA 30905. Dy: (706) 791-3035. Dy: HQ & A Co, 366th Sig Bn, Fort Gordon, GA. MOS: 68P4H.

Duncan, Todd E., (MSG) (M90) P.O. Box 222, Owasso, OK 74055. Dy: (918) 835-1302. Res: (918) 272-3739. S: Regina. Dy: Army Advisor, 1/245th Avn (Sp Opns)(Abn). MOS: 67Z.

Dunn, Lawrence F., (1SG) (M86) (Hawkeye) D Co, 2/1st Avn Bn, CMR 454, Box 2350, APO AE 09250. S: Carmen. MOS: 67Z. Life Member.

Eckrich, Robert F., (CSM) (M94) (Bob) 725 Frutchey Road, Wahiawa, HI 96786-4105. Dy: (808) 656-0330. Res: (808) 624-9200. S: Ann. Dy: 4-25th Avn Regt, WAAF, Hawaii. MOS: 00Z50.

Eggleston, Bethanie K., (SPC) (M93) (Beth) 9340 Oakdale Drive, Laingsburg, MI 48848. Dy: (913) 239-6852. S: Andrew.

Elliott, Cynthia L., (SFC) (M92) (Cynde) 9257 Potomac Loop, Fort Belvoir, VA 22060-2404. Dy: (703) 806-7069. Res: (703) 781-0420. Dy: HHC, OSAC, Ft. Belvoir, VA. MOS: 93P40.

Ellsworth, David C., (SFC) (M94) (Dave) HQ CO, CMPSC, ATTN: SATAS-ZR, Granite City, IL 62040-1801. Dy: (618) 452-4397. Res: (314) 838-1950. S: Maryann. Dy: Retention NCO, AT-COM. MOS: 00R40.

Emery, Debra L., (SFC) (M94) (Debbie) 103 Karen Drive, Ozark, AL 36360. Dy: (205) 255-1354. Res: (205) 774-9898. Dy: C Co, 1/13th Avn. MOS: 71L40.

Engleman, Devon A., (SSG) (M93) 118 John Street, Fayetteville, NC 28305. Dy: (910) 396-9070. Res: (910) 485-3197. S: Krista. Dy: UH-60 CE, A Co, 2/82nd Avn. MOS: 67T3P.

Everett, Ralph A., (1SG) (M93) (Tony) 801 S. Liberty Church Rd., Clarksville, TN 37042. S: Maria. Dy: 1SG, A Co, 5/101st Avn Regt, Fort Campbell, KY. MOS: 67Z5P.

Fabianek, Jason L., (SPC) (M93) 3717 Neely Road, No. 309, Fort Wainwright, AK 99703. Dy: (907) 353-9645. Res: (907) 356-1441. Dy: C Co. 228, 4/123rd Avn Regt.

Feagin, George F., (SFC) (M92) (Fudge) 932 Jouett Drive, Newport News, VA 23602. Dy: (804) 878-3338. Res: (804) 877-3352. S: Sharon. Dy: AH-1 Instructor/Writer, Atk Hel Div, 3rd Staff & Faculty Company. MOS: 67Y4H.

Fies, Eric, (CPL) (M93) HHC, 17th Avn Bde (PFDR), APO AP 96205-0043. S: Lynn. Dy: HHC, 17th Avn Bde, Pathfinder Platoon. MOS: 11B1P.

Figueroa, Manuel, (MSG) (M90) (Manny) PSC 4, Box 1317, APO AA 34004. S: Carmen. Dy: Acft Maintenance Sgt, ODCSLOG, USARSO. MOS: 67Z.

Filgueira, Emilio, (SFC) (M93) (Fig) D Co, 4/228th Avn Regt, Unit 5704, APO AA 34042-5000. S: Dina. Dy: UH-60 Maint Plt Sgt, 4-228th Avn Regt, Honduras.

Finch, Fredy, Jr., (CSM) (M89) (Fred) AAAA Natl Member-at-large, P.O. Box 620492, Fort Rucker, AL 36362. Dy: (205) 255-3549. Res: (205) 598-1968. S: Sukyong. Dy: Avn Ctr/Avn Branch CSM. MOS: 00Z50. NEB. Past Chapter Officer.

Finney, Harry J., (MSG) (M94) 2259 Ainsworth Drive, St. Louis, MO 63136. Dy: (314) 263-5033. Res: (314) 868-9670. S: Margaret. Dy: ATCOM Opns, HHC, CMPSC.

Fleischmann, Tricia K., (SGT) (M94) (Trish) B Co, 2/158th Avn, Fort Hood, TX 76544. Dy: (817) 287-8157. Dy: CH47D Crew Chief.

Folger, Scott D., (SGT) (M93) A Co, 2/501st Avn Bn, Unit 15210, APO AP 96271-0146. Res: (806) 637-2155. S: Kendra. Dy: A Co, 2/501st Avn Bn. MOS: 67U20.

Fosque, Timothy L., (CSM) (M93) (Tim) HHC, 12th Avn. Bde., Unit 29632 CMR 467 BxS001, APO AE 09096-5000. S: Regina. Dy: CSM.

Foster, Diane M., (SFC) (M93) 1929 A Williford, Fort Eustis, VA 23604. Dy: (804) 878-0304. Res: (804) 888-6895. Dy: Attack Helicopter Supervisor. MOS: 67Y4H.

Foster, Robert S., (SPC) (M93) (Gator) 5183 Bradshaw Road, Hopkinsville, KY 42240. Dy: (615) 798-9353. Res: (502) 885-1910. S: Robin. Dy: Aircraft Armament Repairman, 3/101st Airborne.

Fox, Adam N., (SGT) (M93) (ToxicFo) D Co. 4-229 AAHR, CMR 416, Box 762, APO AE 09140. Dy: P.C. NCO, D Co, 4-229th AAHR. MOS: 68F20.

Furrey, Dana T., (SFC) (M93) 19th Svc. Co. (AED), CMR 467, Box 3052, APO AE 09096.

Dy: Chief, Avn. Maint. Branch, 19th CMMC. MOS: 67T4F.

Gallant, Michael Z., (CPL) (M94) B Co, 2/158th Avn Regt, Fort Hood, TX 76544. Dy: (817) 287-8157. Res: (817) 532-4200. Dy: CH47D Crewchief.

Gartner, Justin S., (SPC) (M93) HQ CO HQ CMD, Hunter Army Airfield, Savannah, GA 31409. Dy: (912) 352-5110. Res: (912) 352-9496. Dy: HQ Co, HQ Cmd/Hunter Army Airfield. MOS: 93P.

Gates, Randy W., (SGT) (M93) 4418 Blanton Road, Apt. H, Fayetteville, NC 28303. Dy: (910) 396-2806. Res: (910) 630-5189. S: Linda.

Geddes, Patrick L., (SSG) (M94) (Pat) 335 Lee's Mill Drive, Newport News, VA 23602. Dy: (804) 878-1616. Res: (804) 887-8968. S: Mary. Dy: Instructor/Writer, 3rd S & F, USAALS, Fort Eustis, VA. MOS: 67R3H.

Gillyard, James C., (SGT) (M94) B Co, 2/158th Avn Regt, Fort Hood, TX 76544. Dy: (817) 287-8157. Res: (817) 532-4656. MOS: 67U20.

Gosz, William J., (SFC) (M94) (Bill) 530 Wood Thrush, Apt. A, Troy, IL 62294. Dy: (314) 263-2081. Res: (618) 667-7832. S: Kim. Dy: ATCOM, Cobra PM Office. MOS: 67Y4X.

Graham, Carl A., (SSG) (M92) (G-Man) 377th Med. Company (AA), Unit 15248, Box 414, APO AP 96205. Dy: Flight Medic.

Gribble, Tony D., (SPC) (M93) (G Man) HHT, 2/3rd Arm Cav, Box 280, Fort Bliss, TX 79916. Dy: 2/3rd ACR HHT, Fort Bliss, TX. MOS: 63S10.

Grisham, David E., (SSG) (M93) 114 Brandi Lane, Daleville, AL 36322. Dy: (205) 255-5404. Res: (205) 393-3271. S: Kelly. Dy: Helicopter Tech Inspector.

Guide, Glenfield L, (SPC) (M93) 25 Buchanan Drive, Newport News, VA 23602. Dy: (804) 878-3489. Res: (804) 875-5357. S: Patricia. Dy: Snr Instructor/Writer, 3rd S & F Co., Fort Eustis, VA. MOS: 68K40.

Gulserian, John H., (SFC) (M91) 604 W. Mary Jane Street, Killeen, TX 76541. Dy: (817) 554-3209. Res: (817) 288-5539. S: Lynne. Dy: A Co, 4/501st Avn, Fort Hood, TX. MOS: 67R.

Gustafson, Gary G., (MSG) (M90) (Gus) 317 Barnett Drive, Edwardsville, IL 62025. Dy: (314) 263-5554. Res: (618) 692-6499. S: Doreen. Dy: Avionics Equip. Maint. Technician, PM-AEC, PEO Avn. MOS: 67Z5H.

Guzman, Francis J., (1SG) (M85) (Frank) A Co, 2/501st Avn Bn, Unit 15210, APO AP 96271-0146. S: Katherine. MOS: 67Z5M.

Haase, Steven A., (SPC) (M89) A Co, 2/227th Avn Regt, Unit 20195, Box 1702, APO AE 09165. S: Susanne. Dy: Aeroscout Observer, US Army, A Co, 2-227th Avn Regt, Hanau, Germany.

Hall, Kerry D., (1SG) (M74) (Barn Barn) 365 Offing, Fayetteville, NC 28314. Dy: (919) 396-2925. Res: (919) 867-0691. S: Lori. Dy: 1st Sgt, F Trp, 1/17 Cav, Fort Bragg. MOS: 67Z.

Hall, Richard C., (1SG) (M91) 308 Hudson Circle, Ozark, AL 36360. Dy: (817) 288-5146. Res: (205) 774-5538. S: Lydia. Dy: HHC, 4-501st Avn Regt, Fort Hood, TX 76544. MOS: 67Z.

Harford, Gregory E., (1SG(P)) (M88) (Greg) 707 Inver Lane, Clarksville, TN 37042. Dy: (502) 798-4698. Res: (615) 647-9400. S: Penny. Dy: 101st Aviation Regiment, D Co, 6th Battalion. MOS: 67Z.

G The 1994 Aviation Soldier

Harris, Eric J., (SFC) (M87) (Big 6) 940 Layette Court, Fort Wainwright, AK 99703. Dy: (907) 455-6702. Res: (907) 356-2774. S: Cammy. Dy: U.S. Army Recruiter, Seattle, Washington. MOS: 67Y. 89 Soldier Of Year.

Hartless, James, (SFC) (M94) 9232 Soldier Road, Fort Belvoir, VA 22060. Dy: (301) 981-7885. Res: (703) 781-3638. Dy: USAPAT C-20 Detachment, Andrews AFB, MD.

Hawkins, Herman L., (SGM) (M92) (Hawk) Route 1, Box 348-AA, Tyner, NC 27980. Dy: (804) 878-6221. S: Joyce. Dy: SGM, Enlisted Training Branch, DOTD, USAALS, Fort Eustis, VA. MOS: 67Z.

Hayes, James F.F., (SFC) (M93) (Jim) D Co, 2-2 Avn Regt, Unit 15431, Box 905, APO AP 96257-0464. Res: (206) 481-1077. S: Dawn. Dy: Production Control NCOIC. MOS: 67T4H.

Hayes, John F., (SGT) (M91) 5018B Hammond Heights, Fort Campbell, KY 42223-5000. Dy: (502) 798-1993. Res: (502) 439-3918. S: Crystal. Dy: Aviator Operations Sergeant, B Co, 1/160th SOAR (A). MOS: 93P3P.

Hernandez, Daniel, (SFC) (M93) (Dan) 1974 B Patton Avenue, Fort Eustis, VA 23604. Dy: (804) 878-1608. Res: (804) 887-2778. S: Rachel. Dy: Senior Writer Developer, Advanced Attack Helicopter Division. MOS: 68K40.

Herring, Franklin W., (SPC) (M93) A Co, 5/159th Avn Regt, Box 2, APO AE 09182. S: Stacey. Dy: A Co, 5/159th Avn Regt, Giebelstadt, Germany. MOS: 67410.

Hicks, Jim A., (PV2) (M92) B Co., 7/159th Avn Regt, Unit 26405, APO AE 09182-5000. S: Brenda. MOS: 68B10.

Hildebran, Jr., Earl, (SGM) (M93) 13 Creekpoint Cove, Newport News, VA 23603. Dy: (804) 878-4404. Res: (804) 887-3830. S: Doris. Dy: Aircraft Armament, USAALS. MOS: 67Z50.

Hilderbrand, Scott R., (SSG) (M92) 554 Jacquie Drive, Clarksville, TN 37042. Dy: (502) 798-1813. S: Babette. Dy: F Co, 1/160th SOAR, Fort Campbell, KY. MOS: 67V.

Hillburn, Chade T., (PFC) (M93) (Burns) B Co, 7/159th Avn Regt, Unit 26405, Box 232, APO AE 09182. Dy: Giebelstadt, Germany. MOS: 67S10.

Hite, Leon, (CSM) (M94) (Boogie) 6426 Anderson Street, Fort Hood, TX 76544. Dy: (817) 287-2000. S: Bobrie.

Hoffmann, Dennis P., (SFC) (M93) 335 Windy Ridge Lane, Newport News, VA 23602. Dy: (804) 878-6572. Res: (804) 887-5022. S: Carole. Dy: DOTD, Fort Eustis, VA, 1st S & F. MOS: 67R40.

Howdeshell, Mark A., (SSG) (M86) 121 W. Silver Oak Drive, Enterprise, AL 36330-1598. Dy: (205) 255-3866. Res: (205) 347-3788. S: Jo. Dy: UH-1 H Instructor/Writer, Maint. Trng. Comm., HHC, 1-13th Avn Regt. MOS: 67N.

Ingraham, George E., (1SG) (M88) PSC 2, Box 2545, APO AA 34002. S: Vicky. Dy: C Co, 1/228th Avn Regt. MOS: 6725M.

Jenkins, John R., (MSG) (M93) (J.R.) 135 Colony Road, Newport News, VA 23602-6647. Dy: (804) 878-4481. Res: (804) 874-0395. S: Christine. Dy: Project NCO, DOTD, USAALS. MOS: 67Z5M.

Johnson, Frank W., (SPC) (M93) 6213 Toble Court, No. 4, Fort Riley, KS 66442-1313. Dy: (913) 239-3353. Res: (913) 784-7196. S: Glenna. Dy: OH-58 Crewchief, C Co, 1/1 Avn (Atk). MOS: 67V10.

Johnson, Kevin, (SFC) (M93) 48 Stanley Drive, Newport News, VA 23602. Dy: (804) 878-5414. Res: (804) 986-1611. S: Rosa. Dy: Plt Sgt, 1st Staff & Faculty. MOS: 67U40.

Jones, Gregory J., (SFC) (M92) CMR 416, Box 764, D Co., 4/229th AAHR, APO AE 09140. S: Denise. Dy: Armament Plt Sgt./NCOLP.

Kennedy, Homer, (SFC) (M93) 209 Auburn Drive, Enterprise, AL 36330. Dy: (205) 255-2111. Res: (205) 393-9138. S: Deborah. Dy: TDD, NSTB, DOTDS, B Co, 1-10th Avn Regt, Fort Rucker, AL. MOS: 67T4H.

Keyes, Rodney S., (SSG) (M93) (K-Eyes) 3345 Maple Street, Hayes, VA 23072. Dy: (804) 876-2397. Res: (804) 642-5902. S: Theresa. Dy: Instructor, USAALS, 1st S & F, UHD. MOS: 67T3H.

Kibler, Luther D., (1SG) (M92) 469 Ashton Green Blvd., Newport News, VA 23602. Dy: (804) 878-3462. Res: (804) 887-8140. S: Teresa S.. Dy: C Co. 1/222nd Avn. Regt..

Kidd, Almandl J., (SSG) (M93) (Jene) Unit 1322, Box 5315, APO AA 34004. Dy: F/W Ops NCO, HHC, 128th Avn. MOS: 93P30.

Kierstead, John M., (SFC) (M93) 5806 Plaster Lane, Quinton, VA 23141-2415. Dy: (804) 878-5513. Res: (804) 932-8180. S: Barbara.

Kiggen, Gerd A.P., (1SG) (M90) (Jerry) 538-B Stryker Village, Fort Campbell, KY 42223. Dy: (502) 798-2349. Res: (615) 431-6703. S: Shirlene. Dy: D Co, 1st Bn, 160th SOAR. MOS: 67Z5P.

Kinder, David E., (SPC) (M94) (Bullman) 9003 Gunston Road, Box 3, Fort Belvoir, VA 22060. Dy: (703) 806-7110. Res: (703) 781-6529. Dy: Aircraft Refueler/OSAC, Fort Belvoir, VA. MOS: 77FH7.

Kinney, Bond, (SSG) (M93) (Ian) Quarters 5915 B Quincy, Fort Lewis, WA 98433. S: Anna. Dy: Huey Aircraft Inspector. MOS: 67N.

Kliebert, Remie J., (SSG) (M92) 78th Avn Bn, Unit 45007, Box 47, APO AP 96343. S: Patricia. Dy: Japan, Camp Zama. MOS: 93P30.

Knight, Robin B., (SPC) (M93) 3535 Rebecca, No. D, Colorado Springs, CO 80917. Dy: (719) 526-0303. Res: (719) 574-7339. S: William. Dy: C Co, 4-4 Avn Bn, Fort Carson, CO. MOS: 68D10.

Krebs, Allie F., (SFC) (M87) 2703 Copperhead Drive, Killeen, TX 76542-1374. Res: (817) 628-1391. S: Dale. Dy: HHC, 13th COSCOM, Fort Hood, TX. MOS: 968.

Kroner, Mario A., (SFC) (M91) 837 Setter Lane, Hopkins, SC 29061. Dy: (803) 695-0137. Res: (803) 783-8271. S: Sandra. Dy: RTD 1/151st Avn (AAH). MOS: 67R.

LaGrander, John N., (1SG) (M93) 3062B Hammond Heights, Fort Campbell, KY 42223-1309. Dy: (502) 798-7042. Res: (502) 439-4739. S: Deborah. Dy: HHC, 3-101st Avn. Regt. MOS: 6725P.

Lai, Aaron K., (SGT) (M93) 1010 Gardenway, Apt. C, Manhattan, KS 66502. Dy: (913) 239-2710. Res: (913) 537-8794. Dy: Blackhawk Crewchief, HHC, 1-1 Avn Regt, Fort Riley, KS. MOS: 67T.

The 1994 Aviation Soldier

Laidlaw, Patrick J., (1SG) (M93) 10839 B Utah Street, Fort Drum, NY 13603. Dy: (315) 772-3363. Res: (315) 773-1875. S: Alex. Dy: D Trp, 3rd Sqdn, 17th Cav. MOS: 67Z5M.

Lamury, Donald G., (SSG) (M93) (Leprech) 232 Gena Court, Newport News, VA 23602. Dy: (804) 878-1605. Res: (804) 872-8950. S: Linda. Dy: 3rd S & F, Fort Eustis, VA. MOS: 67R3H.

Lancia, Christopher, (PFC) (M93) (Lance) E Co, 25th Avn Regt, Box 112, Fort Drum, NY 13602. Dy: (315) 772-4531. Dy: UH-60 Tactical Transport Helicopter Repairer, E Co, 25th Avn Regt.

Langford, Chad F., (SPC) (M93) (Chadwic) B Co, 2/501st Avn Bn, Unit 15212, APO AP 96271-0148. Dy: (910) 960-1735. Res: (509) 582-8753. Dy: Aviation Operations Specialist, B Co, 2/501st Avn Regiment. MOS: 93P1P.

Laranang, Garibaldi, (SGT) (M94) (Gari) 553 Danielle Drive, Clarksville, TN 37042. Dy: (502) 798-2772. Res: (615) 552-7925. S: Gabriele. Dy: Air Traffic Control, A Co. 1/58th Avn.. MOS: 93C.

Lawrence, John E., (CSM) (M93) HHC, 2/227th Avn Regt, Unit 20195, Box 1357, APO AE 09165. S: Dorothea. Dy: HHC, 2/227th Avn Regt.. MOS: 00Z50.

Lebron, Juan C., (SGT) (M93) 1936 Austin Road, No. B, Fort Bliss, TX 79906-3624. S: Bianca. Dy: Aircraft Armt Repair System. MOS: 68J20.

Lee, William G., (SFC) (M91) (Bill) C Co, 7-158th Avn. Regt., Unit 26404, Box 72, APO AE 09182. S: Colleen. Dy: C Co, 7-158th Avn Regt.

Leija, Sergio G., (SGT) (M93) CMR 6, Box 4033, Fort Rucker, AL 36362. Dy: (205) 255-3402. Res: (205) 598-9434. Dy: Aircraft Structural Repairer, D Co, 2/229th Atk Helicopter Regt. MOS: 68G.

Li, Hans E., (CSM) (M90) Phantom Corps VP Enl. Afrs, 4303 Vicky, Killeen, TX 76542. Dy: (817) 287-9633. S: Jinnie. Dy: HHT, Aviation Brigade, 1st Cav Div, Fort Hood, TX. MOS: 00Z. VP, Enlisted Affairs, Phantom Corps Chapter. Past Chapter Officer.

Little, Dennis E., (PV2) (M93) (Skittle) D Co, 4/501st Avn, Unit 15010, APO AP 96208-0503. Dy: Camp Page, Korea, D Co, 4/501st Avn.

Littlejohn, William H., (CSM) (M93) (Bill) Route 1, Box 500A, Copperas Cove, TX 76522. Dy: (907) 353-1177. Res: (817) 542-5838. S: Brenda. Dy: 4/123rd Avn Regt, Fort Wainwright, AK.

Lockhart, Rose L., (SFC) (M92) 130 Lehardy Drive, Savannah, GA 31405. Dy: (912) 352-6763. Res: (912) 354-5860. S: Carl. Dy: Personnel Actions Center Supervisor, HHC, 1-24th Avn. Regt. MOS: 75Z40.

Loflin, Michael L., (CSM) (M93) 4973A Hammond Heights, Fort Campbell, KY 42223. Dy: (502) 798-3960. Res: (502) 439-1973. S: Margie. Dy: 6/101st Avn. MOS: 00Z.

Lowell, Bruce T., (SFC) (M93) A Co, 4-229th Avn, CMR 416, Box 777, APO AE 09140. Dy: Platoon Sergeant, A Co, 4-229th AAHR, Illesheim, Germany. MOS: 67R.

Lozier, Garrett J., (1SG) (M83) 643 Ululani Street, Kailua, HI 96734. Dy: (808) 655-0847. Res: (808) 262-9042. Dy: Ass't IG Inspector General's Office, 25th Inf Div (L). MOS: 67Z.

Lunsford, Erik D., (PFC) (M93) (CamelJo) B Co, 2/501st Avn Bn, Unit 15212, APO AP 96271-0148. MOS: 67U10.

Mabrey, Robert O Jr, (SSG) (M92) ("Mabes") 2560 B Cole Street, Fort Eustis, VA 23604-5000. Dy: (804) 878-2727. Res: (804) 887-0542. S: Janene. Dy: Instructor, USAALS, 1st Staff & Faculty. MOS: 68B30.

Mahone, Charlie L., (MSG) (M91) (SirChas) 4739 Loma Del Rey, El Paso, TX 79934. Dy: (205) 255-3005. S: Paula. Dy: U.S. Army Safety Center, Fort Rucker, AL. MOS: 93P50.

Manson, Nicole M., (PV2) (M93) (Nikqui) B Co, 2/501st Avn, APO AP 96271-0148. Dy: Aircraft Structural Repairer. MOS: 68G10.

Marvin, Robert A., (SGT) (M93) (SkyKing) P.O. Box 834, B Co, 4-229th Avn, APO AE 09140. S: Jennifer. Dy: Aerial Observer. MOS: 93B20.

McCann, Gregory L., (MSG) (M81) (Greg) 32 Booker Street, Fort Rucker, AL 36362. Dy: (205) 255-3568. Res: (215) 269-6293. S: Tae Cha. Dy: Assistant Commandant, USAAVNC NCO Academy. MOS: 93P5M.

McCloud, Carl W., (CSM) (M94) (Mac) 421st Med. Evacuation Bn., CMR 467, Box 6742, APO AE 09096. S: Alice. Dy: 421st Medical Evacuation Bn. MOS: 00Z.

McCoy, Herbert W., (1SG) (M92) (Mac) PSC 1, Box 174, APO AA 34001-5000. S: Tangerine. Dy: 1SG, 617th SOAD(A). MOS: 67Z5P.

McGlocklin, James A., (1SG) (M93) (Andy) D Troop, 6/6 Cav, CMR 416, Box 554, APO AE 09140. S: Gerda. MOS: 67Z5M. Bronze St. Michael.

McKinney, William D., (SFC) (M87) (Dave) P.O. Box 366, Rindge, NH 03461. Dy: (508) 796-3816. Res: (603) 899-3044. S: Kathy. Dy: Trng Dev NCO For Avn Sys Intel School. MOS: 98J.

Meadows, Glenn R., (SFC) (M94) 2201 Manhattan Blvd., No. H-158, Harvey, LA 70058-3469. Dy: (504) 245-9828. Res: (504) 361-5989. S: Myong. MOS: 67T40.

Meints, Alvin H., (SFC) (M93) P.O. Box 4514, Fort Eustis, VA 23604. Dy: (804) 878-5334. Res: (804) 887-1009. S: Charlotte. Dy: R.A. UH-60 Instructor, 1st S & F. MOS: 67N.

Mello, Carl, (MSG) (M93) (Charlie) HQ, First U.S. Army, ATTN: AFKA-TR-A, Fort Meade, MD 20755. Dy: (301) 677-3454. Dy: Headquarter First US Army, Aviation Division Arms Team. MOS: 67Z50.

Melton, Daniel, (SPC) (M93) (Dano) B Co. 501st Avn. Bn., Unit 15211, APO AP 96271-0142. S: Jenny. Dy: B Co, 501st Avn Regt, Red Barons. MOS: 67T10.

Mercer, John J., (CSM) (M88) (John) Iron Mike Chap VP Enlist., 232 Livermore Drive, Fayetteville, NC 28304. Dy: (919) 396-9769. Res: (919) 487-0733. S: Linda. Dy: 18th Aviation Bde, Fort Bragg, NC. MOS: 007. VP, Enlisted Affairs, Iron Mike Chapter. Past Chapter Officer.

Merkle, George A., (SGT) (M94) D Co, 2/227th AHB, Unit 20195, Box 1577, APO AE 09165. S: Vicki. Dy: Armament Tech. MOS: 68X30.

Michels, Eric H. Jr., (SPC) (M93) D Co, 4/501st Avn, Unit 15010, APO AP 96208-0503. S: Misty. MOS: 68H.

Migliozzi, Tom M., (SFC) (M87) (Mig) Colonial VA Chap..VP Sch., 103 Pheasant Watch, Yorktown, VA 23692. Dy: (804) 878-6971. Res: (804) 898-9481. Dy: DCD-MRD, USAALS. MOS: 67T. VP, Scholarship, Colonial Virginia Chapter.

Mines, Dexter L., (SGT) (M94) 9172 Miller Road, Fort Belvoir, VA 22060-1613. Dy: (703) 806-6122. Res: (703) 781-7499. S: Connie. Dy: Personnel Admin. NCO, HHC, OSAC, Fort Belvoir, VA.

Mitchell, Michael W., (SFC) (M93) (Mitch) D Co, 2/2 Avn Regt, Unit 15431, APO AP 96257-0464. S: Sun'I. MOS: 68K4M.

Moditz, Alan J., (SGT) (M93) (Moe) 17th Signal Bn, Unit 25731, APO AE 09225. S: Christina. Dy: Air Traffic Control Equipt Repairman.

Mong, Jacob A., (SPC) (M93) (Jake) Army Avn. Det., Unit 26777, APO AE 09235-5000. Dy: UH-1H Crew Chief, Avn. Det. USMCA. MOS: 67N1F.

Morgan, Carl L., (SSG) (M94) (Scooby) 2354 G 11th Street, Fort Eustis, VA 23604. Dy: (804) 878-3983. Res: (804) 888-0167. S: Valerie. Dy: 3rd S & F.

Morgan, Stephen A., (SSG) (M94) (Steve) 2561-D Cole Street, Fort Eustis, VA 23604-1350. Dy: (804) 878-2114. Res: (804) 887-2378. S: Linda. Dy: Instructor/Writer, Aircraft Tech. MOS: 68F.

Morrison, Bert A., (SSG) (M94) 8215 Waskow Avenue, Fort Hood, TX 76544. Dy: (817) 288-1867. Res: (817) 554-8366. S: Loretta. Dy: OPTEC, TEXCOM. MOS: 67Y30.

Mosley, Fred L., (SFC) (M92) 210 Inca Road, Savannah, GA 31406. S: Osun. Dy: C Co, 2-2 Avn Regt, APO AP, 96257-0463.

Moyer, Sean M., (SPC) (M93) A Co, 4/24th Avn, Box 7287, Hunter Army Airfield, GA 31409. Dy: (912) 352-6592. Res: (912) 354-0569. Dy: A Co., 4/24th Avn, HAAF, GA. MOS: 93B10.

Mueller, David J., (SFC) (M91) OMC/AV Apache TAFT, Unit 64901, Box 18, APO AE 09839-4901. S: Gloria. Dy: AH-64 Technical Advisor, OMC/AV Apache TAFT, US Embassy, Cairo. MOS: 67R.

Mundell, Zachary J., (PV1) (M93) 9910 Manila Road, Bennett, CO 80102-9910. Res: (303) 644-3522. Dy: B Co., 1/501st Avn., Unit 15211, Box 61, APO AP 96271-0142. MOS: 67T.

Murry, Donald, (SFC) (M93) 945 Chartwell Drive, Newport News, VA 23602. Dy: (804) 878-4791. Res: (804) 874-8987. S: Elaine.

Myers, Darrin, (SGT) (M93) 420 Lakebridge Plaza, No. 1216, Ormond Beach, FL 32174. Dy: (904) 673-3900. Res: (904) 252-1051. Dy: Aircraft Armament, AH-64 HSC, 1/111th Avn Regt (Atk Hel).

Newcomer, Kristopher, (PFC) (M93) (Newk) B Co, 2/501st Avn Bn, Unit 15212, APO AP 96271-0148. S: Dana. Dy: 7th Battalion, 101st Avn Regt, Fort Campbell, KY. MOS: 67Z11.

Newell, Craig W., (SGT) (M93) 5140 C. Afton Canyon Way, Fort Irwin, CA 92310. Dy: (619) 386-5472. Res: (619) 386-9796. S: Pamela. Dy: AD, 247th Med Det.

Newman, Michael J., (SFC) (M93) (Mike) A Co, 2/501st Avn, Unit 15210, APO AP 96271-0146. S: Ragna. Dy: Component Repair Supervisor. MOS: 68K40.

Neysmith, Errington L, (SFC) (M93) 4309 Cambridge Court, Newport News, VA 23602. Dy: 1st Staff and Faculty, USAALS.

Obermier, Charles T., (SSG) (M94) 4402 Colby Drive, Box 4, Killeen, TX 76542. Dy: (817) 287-9101. Res: (817) 690-3629. S: Mary. Dy: E Troop, 4/6 Cav, Fort Hood, TX. MOS: 67R30.

O'Brien II, Clifton P., (CSM) (M92) (Clif) 2040C Pualika Place, Honolulu, HI 96818. Dy: (808) 656-5550. Res: (808) 833-7898. S: Carol. Dy: HHT, 5/9 Cav, 25th ID. MOS: 00Z5P.

Oglesdy, Donald R., (SFC) (M93) (Don) P.O. Box 656, Fort Monmouth, NJ 07703-0656. Dy: (908) 544-2735. Res: (908) 389-5319. S: Patricia. Dy: Avionics Maintenance Supervisor.

O'Keefe, Rhonda S., (PV2) (M93) 305 Judy Lane, No. 283, Copperas Cove, TX 76522. Dy: (804) 878-5083. Res: (817) 542-4997. S: Glenn.

Olsen, Ronald, (SPC) (M93) P.O. Box 42, Jarales, NM 87023-0042. S: Maria.

Oltmanns, Virgil T., (CSM) (M92) (Terry) PSC 1, Box 724, APO AA 34001. S: Ann. Dy: HHC, 1-228th Avn Bn, Fort Kobbe, Panama. MOS: 00Z50.

Owen, Raymond E., (SFC) (M93) (Ray) 160th SOAR (A), 309 Ridgeland Drive, Clarksville, TN 37043. Dy: (502) 798-4384. S: Kathy. MOS: 67T47.

Owens, Kevin A., (SSG) (M94) 7631 Marin Woods Court, Lorton, VA 22079. Dy: (703) 806-7601. Res: (703) 339-8410. S: Lareshiia. Dy: Avn. Ops.. MOS: 93P30.

Owens, William S., (SGT) (M93) (Bill) HHC 4th Brigade, Unit 20194, APO AE 09165. S: Lisa. Dy: Aviation Operations Specialist.

Parker, Sarah J., (SGT) (M93) 173584 Knight Street, Fort Belvoir, VA 22060. Dy: (703) 806-7110. Res: (703) 360-4712. Dy: HHC, Operational Support Airlift Command, Fort Belvoir, VA. MOS: 77F2P.

Parnell, Cornelius, (1SG) (M91) 207 Coral Way, Enterprise, AL 36330. Dy: (205) 255-4030. Res: (205) 393-1538. Dy: HHD 1-212th Avn.

Parton, Thomas B., (SFC) (M93) Ragin Cajun VP Enl Afrs., P.O. Box 751, Rosepine, LA 70659. Dy: (318) 531-0210. Res: (318) 462-3775. Dy: Avn O/C JRTC, Fort Polk. VP, Enlisted Affairs, Ragin' Cajun Chapter.

Patton, Sonia R., (SFC) (M93) 332 Meriweather Road, Route 3, Enterprise, AL 36330. Dy: (205) 255-1310. Res: (205) 347-7691. S: Kenneth. Dy: BNCOC Instructor, NCO Academy. MOS: 93P4H.

Paxton, Daniel, (CPL) (M93) (OldCrow) P.O. Box 188, 11176 Sims Street, Fort Bliss, TX 79918-8003. Dy: (915) 568-8489. Dy: O Troop, 4/3 ACR, Fort Bliss, TX. MOS: 67Y10.

Pearson, Dennis R., (SSG) (M94) (DOC) PSC 2, Box 180, APO AA 34002. Dy: (507) 286-4517. S: Gladysin. Dy: Flight Medical NCO/214th Medical Detachment. MOS: 91B3P.

Petch, Douglas M., (SSG) (M87) (Doug) 131 Saratoga, Clarksville, TN 37042. Dy: (502) 798-1783. Res: (615) 552-2354. S: Mary Beth. Dy: 2/160th SOAR(A), Bn Standardization Flt Engr Instructor. MOS: 67U.

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Peterson, Steven L., (SFC) (M94) (Pete) TEXCOM-AVTD, Fort Hood, TX 76544. Dy: (817) 288-1878. Res: (817) 634-4309. S: Ursula. Dy: Test NCO, Test and Experimentation Command. MOS: 68J4W.

Pittman, Audrey M., (PFC) (M93) HHC, 4th Brigade, Fort Riley, KS 66442. Dy: (913) 239-6900. Res: (913) 239-8343. Dy: Intelligence Analyst.

Porter, Randy D., (MSG) (M93) (Port) High Desert Chap VP Enlis, P.O. Box 893, Helendale, CA 92342-0893. Dy: (619) 386-3504. Res: (619) 245-1017. S: Susan. Dy: Senior NCO Trainer, Avn Training Div, Opns Grp, NTC, Fort Irwin, CA. MOS: 67Z5M. VP, Enlisted Affairs, High Desert Chapter.

Quenga, William L., (CPL) (M92) (Bill) P.O. Box 620722, Fort Ruckar, AL 36362-0722. Dy: (205) 255-2029. Res: (205) 598-6039. Dy: Driver/Ofc. Asst., US Army Safety Center. MOS: 93P20.

Quinn, Thomas W., (CSM) (M93) (Tom) HHC Avn. Bde, 2nd AD, 4208 Frog Drive, Killeen, TX 76542. Dy: (817) 287-4774. Res: (817) 699-2377. S: Linda. Dy: Aviation Brigade, 2nd Armored Division. MOS: 00Z50.

Raley, Lora J., (MSG) (M88) Route 1, Box 197B, Daleville, AL 36322. S: Jerry. MOS: 93P.

Ramirez, Gilbert G., (CSM) (M92) 304 Buckingham Place, Clarksville, TN 37042. Dy: (502) 798-9675. Res: (615) 552-2708. Dy: 2nd Bn, 160th SOAR.

Ray, Robert R., (SSG) (M92) (Read) P.O. Box 4259, Fort Eustis, VA 23604. Dy: (804) 878-2110. Res: (804) 865-6058. Dy: Medium Helicopter Repairer.

Rela, Dominick J., (SFC) (M93) 200 South Hunt Club Run, Newport News, VA 23602. Dy: (804) 878-5497. Res: (804) 887-0153. S: LaNell. Dy: Instructor, UH-60, 1st S & F Co., Fort Eustis, VA. MOS: 67T4H.

Richards, Jason, (PFC) (M93) 24th AG Repl Det, Fort Stewart, GA 31314. Dy: (912) 352-6284. Res: (912) 922-8993. S: Melody. Dy: A Co, 4/24th Avn, HAAF, GA. MOS: 67T.

Ridlehoover, William E., (SSG) (M93) (Bill) 2138 Atlanta Circle, No. B, Andrews AFB, DC 20335-5796. Dy: (301) 981-7885. Res: (301) 599-9152. S: Pam. Dy: Army Jet Flight Engineer, USAPAT, C-20 Det, Andrews AFB, MD. MOS: 67N30.

Rivenburg, Gordon, (SFC) (M93) 6788-5 Burnside Loop, Fort Riley, KS 66442. Res: (913) 784-3174. Dy: AH-1 Attack Helicopter Repairer, C Co, 2nd Avn Regt (AHC).

Roberts, Godfrey D., (CSM) (M86) (Jeff) HHD, 7-159th Avn. Regt., CMR 416, Box 1553, APO AE 09140. S: Barbara. Dy: HHD, 7-159th Avn Regt. MOS: 00Z.

Robinson, John A., (SSG) (M94) (Rob) A Co, 1-2 Avn Regt, Unit 15432, Box 1078, APO AP 96257-0478. S: Lisa. Dy: Aeroscout Observer Section Chief. MOS: 13F3P.

Robinson, Matthew W., (PFC) (M93) (Matt) C Co, 7/158th Avn Regt, Unit 26404, Box 122, APO AE 09182. Dy: (804) 878-5334. S: Annette. Dy: Tactical Transport Helicopter Repair. MOS: 67T.

Robinson, Michael J., (SGM) (M92) (Mike) 704 Blenheim Court, Newport News, VA 23602. Dy: (804) 878-1111. Res: (804) 877-8313. S: Yong. Dy: Electrical and Electronic Div Chief, 3rd S & F, USAALS, Fort Belvoir. MOS: 67Z5.

Robinson, Richard A., (SFC) (M93) (Robbie) 2214-15 Knight Place, Spring Lake, NC 28390. Dy: (910) 396-8703. Res: (910) 497-3642. S: Beulah. Dy: 57th Medical Company, Fort Bragg, NC. MOS: 68K4H.

Rockwell, Scott F., (SGM) (M84) (Rocky) 402 Thor Street, White Sands, NM 88002-1150. Dy: (505) 678-3808. Res: (505) 678-7902. S: Patsy. Dy: SGM, EW Div, Army Research Laboratory. MOS: 67Z.

Roman, Kenneth E., (MSG) (M87) P.O. Box 1201, Ozark, AL 36361-1201. Dy: (205) 255-1115. Res: (205) 774-7565. S: Helene. Dy: Sr. Flight Inspection Technician, US Army Air Traffic Cntrl Activity. MOS: 93O5H.

Rooks, Joe H., (SGM) (M93) 502 Heacox Lane, USAALS/DAHT, Newport News, VA 23602-2024. Dy: (804) 878-3595. S: Joyce. MOS: 67Z5H.

Rucinski, Julian, (SPC) (M93) A Co. 1-501st Avn. Bn., Unit 15238, APO AP 96205-0011. MOS: 68D.

Ruiz, Mark A., (CSM) (M88) (Tony) 1955 Dotsonville Road, Clarksville, TN 37042. Dy: (502) 798-4338. Res: (615) 552-0302. S: Barbara. Dy: 160th SOAR. Past Chapter Officer.

Russell, Grant W., (SFC) (M93) 526 Maynor Drive, Williamsburg, VA 23185. Dy: (804) 878-4254. Res: (804) 229-3523. S: Norma. Dy: Instructor, Aircraft Armament Div. MOS: 68J4H.

Russell, Steven C., (SGT) (M93) (Steve) 4171 Neely Road, No. 8, Fort Wainwright, AK 99703. Dy: (907) 353-6480. Res: (907) 356-9835. S: Christine. Dy: Airframe Structural Repairer, H Co, 123rd Avn Regt. MOS: 68G20.

Ruwlag, John B., (SGT) (M93) A Co, 2/501st Avn Bn, Unit 15210, APO AP 96271-0146. S: Eugenia. MOS: 67U.

Ryan, Nancy W., (SGT) (M94) 5701 Euclid Street, Cheverly, MD 20785. Dy: (703) 806-7042. Res: (301) 773-6739. Dy: Flight Medic, RW PAT OSAC, Fort Belvoir, VA. MOS: 91B2F.

Sanders, Welthie, (CSM) (M93) HHC, 2nd Bn., 2nd Avn. Regt., APO AP 96257-0460. S: Ok Ye. Dy: HHC, III Corps, Fort Hood, TX 76544-5000.

Scheer, Andrew P., (PV2) (M93) C Co, 2nd AMC, Unit 15426, APO AP 96257-0456. Dy: (804) 887-5564. Res: (419) 394-5324. Dy: C Co, 2nd AMC, Unit 15426. MOS: 67Y.

Scott, Eric T., (1SG) (M86) (Muschi) B Co, 2-2 Avn Regt, Unit 15429, APO AP 96257-0462. Res: (804) 877-8127. S: Claudia. Dy: 2 ID, Camp Stanley, Korea. MOS: 67Z5M.

Seigfried, Joseph A., (SFC) (M93) (Joe) 29 Powell Place Road, Tabernacle, NJ 08088-9221. Dy: (609) 530-4296. Res: (609) 268-7776. S: Louise. Dy: Bn Supply Sgt, HSC, 1/150th Avn. MOS: 92Y40.

Sellars, David, (SGT) (M93) 141 A West Concord Drive, Clarksville, TN 37042. Dy: (502) 798-6385. Res: (615) 572-7908. S: Sherry. Dy: A Co., 7-101st Avn Regt, Fort Campbell, KY. MOS: 67U20.

Semanski, Joseph M., (SSG) (M94) 15 Domino Drive, Williamsburg, VA 23185. Dy: (804) 878-1616. Res: (804) 888-6864.

Singletary, Rodger L., (SFC) (M93) P.O. Box 620304, Fort Rucker, AL 36362. Dy: (205) 255-2248. Res: (205) 774-5467. Dy: B Co, 1/10th Avn Regt (DOTDS), Fort Rucker, AL. MOS: 68P4R.

Skeete, Michael O., (CPL) (M94) P.O. Box 11272, Killeen, TX 76547-1272. Dy: (817) 287-8552. Res: (817) 634-7489. S: Crescenta. Dy: AH64 Repairman, E Trp, 4/6 Cav.

Small, George S., (PSG) (M93) (Bones) 377th Medical Company, APO AP 96205-0021. S: Chae-Un. Dy: 4th Flt Plt (DMZ Dustoff), 377th Med Co (AA), Korea. MOS: 91B4F.

Smith, Craig M., (SGT) (M93) (Matt) 8804 Knight Street, Apt 1, Fort Belvoir, VA 22060. Dy: (703) 806-7553. Res: (703) 799-0353. S: Diane. Dy: Crew Chief R/W PAT OSAC.

Smith, Duane E., (SGT) (M89) 535 Inver Lane, Clarksville, TN 37042. Res: (615) 647-4260. S: Angela. Dy: Observation Helicopter Crewchief, B Trp, 2/17th Cav. MOS: 67V20.

Smith, Everett, (SFC) (M93) (Frank) P.O. Box 4400, Fort Eustis, VA 23604-0400. Dy: (804) 878-6656. Res: (804) 989-0820. Dy: Longbow Apache Project NCO, USAALS 1st Stf DOTD, Fort Eustis. '91 Soldier Of Year.

Smith, Rusty S., (PV2) (M93) E Co, 214th Avn Regt, Schofield Barracks, HI 96857. Dy: (808) 656-2788. Res: (505) 378-8448. S: Angela. Dy: Aircraft Structural Repair, E Co, 214th Avn Regt.

Solomon, Jeffrey B., (SPC) (M94) D Co, 1/222nd Avn Regt, Fort Eustis, VA 23604. Dy: (804) 878-2519. Res: (804) 887-9816. S: Julie. Dy: Helicopter Mech.. MOS: 67U.

Soria, Luis J., (SSG) (M93) (Big Lu) D Troop, 1st Squadron, 6th Cav Bde (Air Cbt), Fort Hood, TX 76544. Dy: (817) 287-3667. Dy: OH-58 Technical Inspector. MOS: 67V3T.

Soriano, Paul Y., (SFC) (M92) P.O. Box 123, Fort Campbell, KY 42223. Dy: (502) 798-2297. Res: (615) 551-4950. S: Ira J.. Dy: Flight Platoon Sergeant, B Co. 5/101 Avn. Regt. MOS: 67T.

Stearnes, Michael G., (SSG) (M87) (Spanky) 1004 E. Barker Street, Apt. 7, Rice Lake, WI 54868. Dy: (715) 234-7837. Res: (715) 234-9436. Dy: US Army Recruiting Station, Rice Lake, WI. MOS: 67Y34.

Stevens, Timothy L., (SFC) (M89) (Tim) 3416 Mallard Drive, Clarksville, TN 37042-5832. Dy: (502) 798-6531. Res: (615) 431-4315. S: Rhonda. Dy: HHC 1-160th SOAR, Ft. Campbell, KY. MOS: 93P.

Stone, David, (SFC) (M93) A Co, 2/501st Avn Bn, Unit 15210, APO AP 96271-0146. S: Yong. MOS: 67U.

Stone-Hampton, Jean A., (SPC) (M94) HHT, 2-17th Cavalry, Box 121, Fort Campbell, KY 42223. Dy: (502) 798-4108. Res: (615) 553-4068. S: Shelly. Dy: Administrative Specialist, 2-17th Cavalry Squadron. MOS: 71L10.

Strahan, Ronald, (CSM) (M94) (Ron) HQ 1-58th Avn. Regt., Fort Bragg, NC 28307-5000. Dy: (910) 396-8577. S: Marcy.

Sutter, Paul K., (SGT) (M94) USAPAT C-20 Det, Andrews AFB, MD 20331. Dy: (301) 981-7885. Res: (301) 568-8148. S: Michele. Dy: USAPAT OSAC.

S The 1994 Aviation Soldier

Swindle, John L., (1SG) (M93) Route 1, Box 15-A, Coffee Springs, AL 36318. Dy: (502) 798-4560. S: Gwen. MOS: 67Z5M.

Tanna, Sanford C., (CSM) (M89) (Stan) HHC, 3-58th Avn. Regt., CMR 430, Box 934, APO AE 09096-5000. S: Song. MOS: 00Z50. VP, Enlisted Affairs, Taunus Chapter.

Tarsia, Michael J., (SSG) (M88) HHS, 501st MIB, CMR 406, Box 1416, APO AE 09110. S: Jane. MOS: 33T.

Thomas, Richard F., (CSM) (M91) (Rich) HHC, 11th Aviation Bde., CMR 416, Box 1199, APO AE 09140. S: Pam. Dy: 11th Aviation Regiment, Regimental Command Sergeant Major. MOS: 00Z. Past Chapter Officer.

Thompson, Crystal A., (PFC) (M94) (Kris) D Co. 1-13th Avn. Regt., CMR #3, Box 7081, Fort Rucker, AL 36362. Dy: (205) 255-9501. Res: (205) 598-8721. Dy: Administrative Assistant. MOS: 71L.

Tronu, James C., (SFC) (M90) (Jim) 3304 Secret Isle Lane, Jacksonville, FL 32225. Dy: (904) 641-8875. Res: (904) 645-0200. S: Carol. Dy: HQ 2nd Army, Fort Gillem, GA; HQ-1/111th Avn, Jacksonville, FL.

Valentino, Christopher, (SPC) (M92) (Chris) HHC, Aviation Brigade, Fort Campbell, KY 42223-5000. Dy: (502) 798-4046. Res: (615) 206-0191. Dy: Bde S3, Opns Clerk. MOS: 93P.

VanDeMark, David J., (PV1) (M93) 2/377th Med Co (AA), Unit 15461, APO AP 96271-0534.

Vang, Sang M., (PVT) (M93) (Meas) A Co. 1-222 Avn. Regt., Fort Eustis, VA 23604. Dy: (804) 878-2523. Res: (715) 842-7810. Dy: 1-147th Avn Battalion, Madison, WI. MOS: 68F10.

Vasquez, Eric N., (PFC) (M93) B Co, 2/501st Avn Regt, Unit 15212, APO AP 96271-0148. Dy: Aircraft Mechanic. MOS: 67U10.

Vincent, Thomas J., (SFC) (M93) (T.J.) 4384-L 9th Street, Fort Wainwright, AK 99703. Dy: (907) 353-7768. S: Linda. Dy: Platoon Sergeant. MOS: 67U.

Violette, Craig L., (SSG) (M92) HHC 4/58 Aviation, APO AP 96205-0049. S: Son. Dy: Retention NCO, HHC 4/58th Aviation. MOS: 00R.

Voechting, Michael T., (PVT) (M93) 2822 Faircourt Street, Hopkinsville, KY 42240. Dy: (502) 798-6738. Res: (502) 885-0832. S: Nancy. Dy: Utility Helicopter Repairer. MOS: 67T10.

Von Gortler, Fred C., (MSG) (M89) (Phred) HHC, 3rd COSCOM, CMR 467, Box 4751, APO AE 09096. S: Renie. Dy: Senior Avn NCO, Spt Ops Maint Mgmt Div. MOS: 67Z5H.

Weaver, Mark C., (PFC) (M93) Box 302, USMAPS, Fort Monmouth, NJ 07703-0302. Dy: (908) 532-1307. Res: (908) 532-1307. Dy: Cadet Candidate, USMA Prep School. MOS: 67T.

Weiss, Raymond A., (SSG) (M86) (Ray) D Co, 4/228th Avn Regt, Unit 5704, APO AA 34042-5000. S: Dee. MOS: 67N.

Wessel, Richard D., (SGM) (M92) (Doug) 105 Pondella Drive, Enterprise, AL 36330. Dy: (205) 255-9333. Res: (205) 347-5140. S: Pok Ye. Dy: USA Air Traffic Control Activity, Tactical Requirements Section. MOS: 93C50.

White, Jimmie D., (SGT) (M94) (Moose) B Co, 2/158th Avn, Fort Hood, TX 76544. Dy: (817) 287-7383. Res: (817) 539-5110. Dy: Floor Supervisor Maint.

Williams, Diane E., (CSM) (M91) (Shy Di) 2/6 Cavalry, CMR 416, Box 271, APO AE 09140. S: Winston. Past Chapter Officer.

Williams, Willie F., (CSM) (M94) 3105-1 Venable Drive, Fort Riley, KS 66442-5000. Dy: (913) 239-3778. Res: (913) 784-3013. S: Anna. Dy: 4th Battalion, 1st Aviation Regiment, Fort Riley, KS. MOS: 00Z50.

Wing, Robert W., (SPC) (M94) (Bobby) D Co, 1/1 Aviation, Fort Riley, KS 66442. Dy: (913) 239-3229. Res: (913) 784-3133. Dy: 68X-Apache Electrical/Armament Specialist, D Co, 1/1 Avn, Fort Riley. MOS: 68X10.

Wingfield, John W. Jr., (SGT) (M94) (Wing) P.O. Box 253, Fort Campbell, KY 42223-0253. Dy: A Co, 8/101st Avn Regt. MOS: 68X.

Wirick, Ernest J., Jr., (SFC) (M87) (Ernie) 422 Middletown Avenue, Wethersfield, CT 06109. Dy: (203) 347-3972. Res: (203) 529-4057. S: Christianne. Dy: US Army Recruiter, Middletown Recruiting Station. MOS: 67Y44.

Wolfe, Sheri M., (SGT) (M94) 203 Glenwood, Apt. 4, Enterprise, AL 36330. Dy: (205) 255-4141. Res: (205) 393-4684. Dy: Air Traffic Control Tower Operator. MOS: 93C20.

Wommack, Rick L., (SFC) (M92) (Rick) A Co, 3/501st Avn Regt, APO AP 96271. Res: (813) 527-0264. S: Tammie. Dy: Avn Plt Sgt, A Co, 3/501st Avn Regt.

Worthen, David B., (SSG) (M89) 1010 Bucknell Road, Fayetteville, NC 28311. Dy: (910) 396-6707. Res: (910) 488-1766. S: Marsha. Dy: Production Control NCO, I Co. 159th Avn. Regt. MOS: 67N. Life Member.

Wright, Steven J., (PFC) (M93) (Steve) B Co, 2/501st Avn Bn, Unit 15212, APO AP 96271-0148. MOS: 67U.

Zornes, Johnny E., (SGM) (M93) ("Z") PSC 4, Box 1496, APO AA 34004. Dy: (507) 287-4067. Res: (507) 287-4067. S: Anamaria. Dy: HHC, 128th Avn Bde, Fort Clayton, Panama. MOS: 93P50.

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Colonels

Blough, John M.
104 W. Silver Oak Drive
Enterprise, AL 36330

Lt. Colonels

Brinson, Wade H.
3221 Mill Springs Road
Belleville, IL 62221

Notarianni, Peter A.
Cdr. 1/222 Avn Bn
Ft.Eustis, VA 23604

Sears, Wayne R.
29 Brian Drive
Carlisle, PA 17013

Steagall, Benny G.
6857 Marshall Street
Fort Hood, TX 76544

Vins, Joseph J.
2949 Fox Tail Court
Woodbridge, VA 22192

Majors

Goggans, Wayne G.
16th Medical Command
Unit 15281, Box 754
APO AP 09205

McKearn, Mark J.
9202 S. Butterfly Lane
Beloit, WI 53511

Pruitt, David N.
253 Grierson Street
Fort Leavenworth, KS 66027

Captains

Brierly, Gregory T.
P.O. Box 620115
Fort Rucker, AL 36362

Carroll, Richard C.
14 Galt Lane
Fort Rucker, AL 36362

Doehl, Robert A.K.
6715 Poplar Avenue
Takoma Park, MD 20912

Drennon, William S.
104 Bel Air Drive
Enterprise, AL 36330

English, William T.
2-6 Cav, CMR 416, Box 281
APO AE 09140

Frenda, Salvatore
619 Citation Loop
Harker Heights, TX 76543

Gilliland, Donald P.
4406 Fawn Drive
Killeen, TX 76542

Holmes, Christopher
1703 Cedar Oaks Lane
Harker Heights, TX 76543

Moore, Bruce
6 Pine Hammock Court
Savannah, GA 31406

Repavi, Michael J.
908 Becontree Place
Lawton, OK 73505

Swicord, Paul
2505 Bacon Ranch Road
Apt. 609
Killeen, TX 76542

White, John C.
104 Oliver Drive
Enterprise, AL 36330

Wolons, David S.
1492 Eastmeadow Drive
Colorado Springs, CO 80906

1st Lieutenants

Fugate, Thomas M.
6 William Jay Court
Savannah, GA 31419

Noles, James L.
2732 Tammerack Lane
Owen's Crossroads, AL 35763

Rideout, Dane D.
914 Princeton Drive
Clarksville, TN 37042

Walters, Christian J
3374 Durrett Drive
Apt. 54
Clarksville, TN 37042

2d Lieutenants

Brannstrom, Kurt R.
207th Avn Co
Unit 29231, Box 142
APO AE 09102

Gignilliat, Andrew D.
100 AM Windham Drive
Apt. 104
Daleville, AL 36322

Granger, Charles B.
1412 Beechwood Terrace
No. 5
Manhattan, KS 66502

Meeks, Lynda C.
207th Avn Co, Unit 29231
Box 102
APO AE 09102

Patterson, Damon A.
B Co, 2/501st Avn
Unit 15188
APO AP 96271

Rose, Richard M.
P.O. Box 28053
Saint Paul, MN 55128

Schmidt, Gordon D.
A Co, 5-158th Avn Regt
CMR 432, Box 79
APO AE 09096

Strub, Matthew J.
739 Belmont Lane E.
Maplewood, MN 55117

MW4s

Barr, Chas. M. II
9110 Hardesty Drive
Clinton, MD 20735

Burnett, Peter R.
2503 Limestone Trail
Harker Heights, TX 76543

CW4s

Bremseth, Joe C.
RR 2, Box 293
Enfield, NH 03748

Clark, Daniel E.
HHC, 5/158th Avn Regt
Unit 26439, Box 281
APO AE 09182

Lee, Robert D.
25503 32nd Place South
Kent, WA 98032

CW3s

Dalzell, Gregory D.
B Co, 3rd MI Bn (AE)
Unit 15219, Box 203
APO AP 96271

CW2s

Brown, Rod A.
A Co, 7-1 Avn Regt
CMR 454, Box 2989
APO AE 09250

Gore, Wayne E.
P.O. Box 620732
Fort Rucker, AL 36362

Hellerman, Brenda M.
377th Medical Co (AA)
Unit 15248, Box 261
APO AP 96205

Rinaldi, Guido S.
P.O. Box 35511
Fort Wainwright, AK 99705

WO1s

Arnold, Richard S.
10 Normandy Drive
Fort Bragg, NC 28307

Berdanier, Robert J.
56 Red Cloud Road
Fort Rucker, AL 36362

Carleton, Larry T.
124 Patricia Lane
Daleville, AL 36322

Graves, Charles G.
6029 Flat Rock Road
No. 235
Columbus, GA 31907

Reopell, John J.
68-179 Au Street
Waialua, HI 96791

Richardson, Bobby L.
4231 Friar Tuck Lane
Buford, GA 30518

Schroeder, Patrick D.
7757 Jacks Run Road
Freeburg, IL 62243

Shirley, Greg D.
6413 Yank Court, No. A
Arvada, CO 80004

SFCs

Mosley, Fred L.
210 Inca Road
Savannah, GA 31406

Mueller, David J.
OMC/AV Apache TAFT
Unit 64901, Box 18
APO AE 09839

SSGs

Blair, Michael G.
163 Bordeaux Lane
Savannah, GA 31419

Sergeants

Morgan, Dennis
2602 S 39th
Apt. 1102
Temple, TX 76504

Specialists

Coleman, Karen R.
B Co, 7/159th Avn Regt
Unit 25405, Box 106
APO AE 09182

Foster, Robert S.
5183 Bradshaw Road
Hopkinsville, KY 42240

Knight, Robin B.
3535 Rebecca,
No. D
Colorado Springs, CO 80917

Corporals

Villavicencio, Angelo B.
21st Adj Gen Repl Det
No. WHD201
Fort Hood, TX 76544

PFCs

Sliger, Clarence J.
D Trp, 5/9 Cav, Box 647
Schofield, Barracks, HI 96857

PV1s

VanDeMark, David J.
2/377th Med Co (AA)
Unit 15461
APO AP 96271

DACs

Hammond, English G. Mr.
Unit 15238 (K-16)
Box 510
APO AP 96205

Lillkes, Fred F. Mr.
3/501st Avn
Unit 15568, Box 526
APO AP 96297

Retired/Other

McTigue, Tommy 1LT
49/3 Henry Hudson Pky.
Bronx, NY 10471

Schuster, Michael W. LTC
5339 Cotton Bay Drive W.
Indianapolis, IN 46254

Shaver, Dan E. CW4
1801 18th Street
Lake Charles, LA 70601

Siples, William E. MSG
Rolling Hills Circle
Route 4, Box 136
Ozark, AL 36360

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1LT Robert C. Dees
SPC Raymond Kyle Drew
WO1 Emmett Shead, Jr
CW2 Brian K. Stoner
CPT Paul E. Stote
CW2 Steven W. Woodfint

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MESA, AZ

Mr. Floyd Row

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WO1 Paul T. Adamson
PV2 William W. Albin
WO1 Daniel J. Alexander
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2LT David K. Almquist
Mr. Jaime A. Ambler
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2LT Kevin J. Byrne
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WO1 Robert E. Carlisle
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PVT Reynaldo R. Carson
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CW2 Greg Chandler
2LT Chad A. Collier
CW3 Wendall A. Condon
2LT James C. Cook
2LT Krista L. Cooper
WO1 Gregory A. Coots
Ms. Elsie P. Copes
CW2 Luis F. Cornejo
WO1 Christopher Courtland
WO1 James L. Coxwell
2LT David E. Crenshaw
WO1 Daniel A. Cross
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SFC Terry M. Cullen
Mr. Mark A. Cuskey
CW3 David P. Garrity
WO1 David A. Davis
CW3 Sumner J. Davis
SGT Walter M. Detrinidad
Ms. Monserrate Diaz-Melendez
SFC Todd D. Geronimo
SPC Mark K. Ditty
2LT James A. Dobias
2LT Christina C. Dosler
WO1 Kevin M. Drew
COL D. Marty Duke, Ret.
2LT Jason A. Ellington
2LT Jon E. Ellis
2LT Ronald L. Ellis
CW3 Jerry D. Embry
CW4 Phillip E. Estabrook
WO1 Clint J. Estes
CW3 Arthur Estrada
SPC Candace S. Everts
WOC David A. Fallon
2LT Eric R. Faulkner
2LT John M. Ferrell
CW2 Jeffery W. Fields
Mr. David M. Fonda, Jr.
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LTC Jerrold Forester
SPC Joseph R. Frasier
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SFC Nestor I. Garcia
CW2 Greg S. Gardner
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WO1 David P. Gates
PFC Gloria A. Gesner
2LT Octavious L. Gibbons
2LT Charles A. Gibbs
1LT Juan R. Gonzalez
MSG Plinio V. Gonzalez
SGT Loren G. Gray
SSG David L. Green
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PFC Rosalind K. Harvey
2LT Glen E. Heape
WO1 Steven A. Hebert
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Mr. Harvey A. Johnson
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2LT Danford A. Kern
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WO1 John C. Leet
WO1 Richard Stuart Lindfors
1LT Brian K. Lovemore
Mr. Richard S. Maccabe
WO1 Sean C. Magonigal
2LT John D. Marinaro
WO1 Jeffery S. Marler
Mr. Michael C. Marler
1LT Kent M. Marohl
PFC Dela J. Martinez
CW3 John W. Martin
Ms. Betty B. Mauldin
WO1 Kent A. May
MAJ Glenn A. McCall
WO1 Robert D. McCall
WO1 Richard B. McCormick
Ms. Constance B. McInnis
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1LT John B. McNally
WO1 Sean E. McNeal
WO1 James D. Mellinger
WO1 Daniel J. Miller
CPT Mark A. Miskovic
CPT James A. Moffatt
SSG(P) Clyde J. Moore
MAJ Frankie D. Moore
WO1 Keenan C. Moore
CW2 Craig R. Mowitz
2LT Andrew J. Muench
2LT Paul D. Mullins
PV1 Timothy A. Murphy
WO1 Dann G. Myers
WO1 Johnathan F. Nabinger
WO1 Craig D. Neubecker
2LT John Noh
CPT Angie D. Norman
WO1 Toby A. Norris
PVT Linda F. Nunn
PV2 Jason S. Oglesby
WO1 Domnaill O. O'Kane
WO1 Eric M. Oleson
2LT Carl R. Ott
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CPT Keith A. Peterson
WOC Kimberly A. Peters
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CW3 Russell G. Phillips
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PFC Carolyn A. Romero
SPC Lee S. Russell
WO1 Michael J. Salemi
CW2 Michael A. Scheel
WO1 Joseph C. Schneider
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PVT Tabitha L. Schuettpelz
Ms. Carole J. Schumaker
WO1 Jessie P. Scruggs
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2LT Jennifer A. Smith
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CW3 Brenda G. Speller
WO1 Larry A. Staley
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2LT Natalie M. Steadman
2LT Timothy M. Steckel
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CW4 Douglas W. Trampler
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Ms. Linda D. Tupper
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WO1 Ernest Lee Waller, Jr.
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CPT Steven F. Weigel
SGT Dante T. Weir
WO1 Michael L. Wesolek
WOC Virginia M. Williams
WO1 Frederick A. Wilson
SPC Warren E. Wilson
2LT Kevin E. Wisniewski
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PFC Jimmy Lamar Wood
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WO1 Geoffrey E. Hennig
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CDT Spencer T. Kympton

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PV1 Robert C. Beer
PV2 Stanley J. Butler, II
PV1 Charles D. Chandler
PFC James L. Dunlap
PV2 Gary J. Gaubatz
PV1 Paul H. Gitschel
PV2 Evelyn M. Parker
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STRATFORD, CT

WO1 David E. Page

CORPUS CHRISTI CHAPTER
CORPUS CHRISTI, TX

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Mr. Jaime V. Quinones
Mr. Ernest N. Ramirez

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Mr. Henry M. Belman
Mr. Robert F. Fenlon
Mr. James Wehri

FLYING TIGERS CHAPTER
FORT KNOX, KY

SPC Gerald Fleming
CW2 Steven L. Sanders

GREATER CHICAGO AREA CHAPTER
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CW3 William L. Stone, Jr.

INDIANTOWN GAP CHAPTER
INDIANTOWN GAP, PA

PVT Michael J. Hippensteel

IRON EAGLE CHAPTER
HANAU, GERMANY

Ms. Carolyn M. Prickett

IRON MIKE CHAPTER
FORT BRAGG, NC

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CW2 David T. Gibson
WO1 Richard R. Villa, Jr.
WO1 Brian S. Yoder

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

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ST. LOUIS, MO

Mr. Brian R. Anderson
MAJ Steve G. Bonkedes
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Ms. Kathleen A. Jaeger
CDT Matthew A. Kienke
COL William L. Lawrence, Ret.
Ms. Teri Lesicko
1SG Bruce C. Sumner, Ret.
Mr. Robert X. Tansey

MACARTHUR CHAPTER
NEW YORK/LONG ISLAND, NY

WO1 Brian P. O'Connell

MIDNIGHT SUN
FORT RICHARDSON, AK

CW3 John F. Amerson
2LT Melanie Plair

MONMOUTH CHAPTER
FORT MONMOUTH, NJ

Mr. Thomas W. Tremper

MORNING CALM CHAPTER
SEOUL, KOREA

MAJ Brian R. Selling

NARRAGANSETT BAY CHAPTER
N. KINGSTOWN, RI

CPT Paul J. Tilley

NORTH COUNTRY CHAPTER
FORT DRUM, NY

CW2 Jeff A. Butler
SFC James C. Sumner

NORTH TEXAS CHAPTER
DALLAS/FORT WORTH, TX

CW4 Otis Lynn Morgan
Mr. H. Ross Perot, Jr.

NORTHERN LIGHTS CHAPTER
FORT WAINWRIGHT/ FAIRBANKS AK

CW3 Lee M. Tutin

PHANTOM CORPS CHAPTER
FORT HOOD, TX

WO1 Nicholas A. Chiaro

PIKES PEAK CHAPTER
FORT CARSON, CO

1SG Leon Kinder

RAGIN' CAJUN CHAPTER
FORT POLK, LA

WO1 Eric J. Feazell

SAVANNAH CHAPTER
FT STEWART/HUNTER ARMY AIRFIELD, GA

MAJ John A. Powell

SOUTHERN CALIFORNIA CHAPTER
LOS ANGELES, CA

WO1 David Garcia
CPT John S. Wright

TARHEEL CHAPTER
RALEIGH, NC

SPC Walter Y. Christopher, Jr

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WASHINGTON, DC

MG Ronald K. Andreson, Ret.
SGT Laura A. Brissette
SFC Eddie Davis
CW3 Darren F. Donica
Mr. Fritz Hooft
SPC Matthew C. Jensen
Mr. Michel Popelier
LTC David Regan
Cadet John M. Reynolds
GEN William R. Richardson, Ret.
Mr. Maarten van Eeghen

WINGS OF THE MARNE CHAPTER
ANSBACH, GERMANY

2LT Jo D. Phillips

MEMBERS WITHOUT CHAPTER AFFILIATION

CPT Shaun P. Abbott
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CDT Thomas E. Carlson
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Mr. Allons A. Schoeps
Mr. Sam Seery
WO1 Stephen P. Smeltzer
CPT Harlan G. Sparrow, III
MAJ Robert F. Staake
WO1 Jeffrey S. Stretauskt
PV2 Deen H. Walker

NEB MINUTES

AAAA's National Executive Board (NEB) conducted its Spring meeting during the AAAA Annual Convention in St. Louis, MO, 20-24 April 1994. Major actions included:

ESTABLISHMENT OF AAAA FIXED WING UNIT AWARD. A motion was approved to establish an AAAA Fixed Wing Unit Award. Sponsored by FlightSafety International, this AAAA National Award will be presented "to the unit or detachment with fixed wing aircraft that has achieved the highest level of excellence in training, safety, logistics, operations and support during the awards period encompassing September 1, 1993 through August 31, 1994." [See page 78 for details.]

ESTABLISHMENT OF AAAA ARMY AVIATION MEDICINE AWARD. A motion was approved to establish an AAAA Army Aviation Medicine Award. Sponsored by AAAA, this AAAA National Award will be presented "to the flight surgeon or aeromedical physician assistant who best exemplifies the contribution of Aviation Medicine to Army Aviation during the awards period encompassing September 1, 1993 through August 31, 1994." [See page 78 for details.]

PETITION TO AMEND BY-LAWS 3.3.1 AND 3.64. MG Harrison referred the NEB to the signed Petition in the Agenda to amend the necessary sections in the AAAA By-Laws to establish a new position on the National Executive Board, that of National Member-at-Large Emeritus. A motion was carried to approve the By-Laws amendments as outlined in the Agenda. A motion was then approved electing Mr. Joseph P. Cribbins and COL John J. Stanko, Jr., Ret., as National Members-at-Large Emeritus.

REVIEW OF AAAA'S CHAMPUS HEALTH SUPPLEMENT INSURANCE PROGRAM. BG Hesson briefed the Board that in September 1989, the AAAA entered into an agreement with Membership Services, Inc., authorizing Membership Services, Inc., to provide its CHAMPUS Health Supplement Insurance to AAAA members. BG Hesson recommended that AAAA renew the agreement with Membership Services, Inc. A motion was approved accepting the recommendation of BG Hesson and authorizing the President to renew the agreement with Membership Services, Inc.

AAAA SUPPORT OF WOMEN'S MEMORIAL AT ARLINGTON NATIONAL CEMETERY. A motion was approved to pledge $10,000 to establish a Theater Chair at the Education Center, Registry, and Hall of Valor of the Women's Memorial at Arlington National Cemetery.

AAAA PARTICIPATION IN THE "MILITARY COALITION". A motion was approved in support of AAAA joining the "Military Coalition". MG Charles F. Drenz, Ret., AAAA Past President, volunteered to serve as the AAAA representative.

AWARDS AND HONORS

The AAAA provides awards to the Distinguished Graduates of the Initial Entry Rotary Wing Aviator Course and certain enlisted, warrant officer, and officer courses at Fort Rucker, AL and Fort Eustis, VA, that have been determined by the Aviation Center Chapter's Executive Council to merit a Distinguished Graduate Award.

Course 37N8—50993 (01/03/94): PV1 T. Cahill.
Course 37P8—01293 (01/05/94): SGT J. Bosley.
Course 37N8—51093 (01/13/94): PV1 R. Graham.
Course 37P4—50194 (01/19/94): SGT G. Smith.
Course 37P4—00194 (01/19/94): SSG R. Jones.
Course 37L8—00194 (01/19/94): SSG M. Stastny.
Course 37L8—00294 (01/19/94): SSG D. Maddox.
Course 37P4—01593 (01/19/94): SGT G. Womack, Jr.
Course 37T1—01593 (01/25/94): PV1 M. Lowe.
Course 37L6—00594 (01/26/94): PV2 J. Adams.
Course 37L6—00694 (01/26/94): SPC S. Musgrave.
Course 37S2—00294 (01/27/94): SPC J. Kamm.
Course 37W7—00194 (01/27/94): SGT G. Vanduyn.
Course 37S5—00194 (01/31/94): SGT M. Rudney.
Course 37W4—00294 (01/31/94): SGT J. Lumbra.
Course 37I2—00394 (02/02/94): SPC J. Crownhart.
Course 37P8—00294 (02/02/94): SGT J. Spencer.
Course 37T1—00194 (02/04/94): PV1 T. Hayden.

Above: Four Order of St. Michael Bronze Awards were presented at the Korean AAAA Membership's Annual Christmas Dinner, 14 December 1993. From left to right: Rhee, Min Hee, President, Korean Membership of the Morning Calm Chapter; Lee, Jung Keun, Senior Korean Advisor to the Morning Calm Chapter; CSM John E. Walker, VP, Enlisted Affairs, Morning Calm Chapter; Mr. John H. Bae, VP, Membership, Morning Calm Chapter.

Below: BG John N. Dailey (right), Commanding General of the Fourth ROTC Region, received the Order of St. Michael Silver Award from MG William M. Matz, Jr., Deputy Commanding General of I Corps and Ft. Lewis, WA, during the Fourth ROTC Region's Dining Out on 19 March 1994.

New AAAA Chapter Officers

Black Knights:
MAJ Jeffrey A. Upchurch (Treasurer).

North Country:
COL Lawrence E. Casper (President); LTC Ellis W. Golson (Senior Vice President); 1LT Jeffery A. Libby (Secretary); 1LT Christopher E. Hornbarger (Treasurer); 1LT Hugo Lentze (VP, Membership).

Life Members

CW4 Marty L. Anderson
CW4 Thomas S. Brandli
1LT David G. Clark
LTC Elliot G. Fishburne III
CW2 Timothy J. Larz
Dr. Daniel P. Schrage
Mr. Rickey C. Simmons
COL Charles H. Wilson
SSG David B. Worthen

Aces

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

1LT Timohty W. Anderson
LTC John F. Bithos
CW3 William A. Campbell
CW3 Paul H. Clarke
CW3 Ernest W. Frost
CPT James L. Jacobson
1LT Sarah P. Klimkowski
COL Albert L. Patterson
CPT James R. Schenck
CW2 Michael L. Spanier
CW3 Dale E. Stroud
CW3 Eddie L. Sullivan
CPT Vincent L. Vannoorbeeck
Ms. Sandra W. Woodham

AAAA NEWS

AAAA Soldiers of the Month

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

SPC Christopher T. Glatz
Central American Chapter
March 1994

SGT James R. Hamm
Central American Chapter
April 1994

2 for 1 Offer

AAAA now offers a two year membership for the price of one for all first-time new members

Join the Professionals!

Join AAAA

Above: During the Aviation Center Chapter's 10 February 1994 professional session, Ms. Sheila Warren (left), of Time Out for Travel, is recognized by BG John M. Riggs, DCG, USAAVNC, and CSM John M. Morrison, Command Sergeant Major, Aviation Training Brigade, for donating a round-trip airline ticket to the 1994 Annual Convention, held in St. Louis. Mr. James E. Speigner was the lucky winner.

Below: LTG H.G. (Pete) Taylor (center), CG, III Corps, was presented with an Order of St. Michael Bronze Award on 25 October 1993 prior to his retirement. Attending the ceremony were COL Gerald D. Saltness, Commander, Combat Aviation Training Brigade, COL Jan E. Callen, Commander, 1st Cavalry Division Aviation Brigade, COL Richard E. Allenbaugh, Commander, 504th MI Brigade, and COL Michael K. Mehaffey, Commander, 6th Cavalry Brigade.

Above: Russell N. Robinson (right), President of the Bonn Area Chapter, presents a Certificate of Appreciation to COL Robert Sherman, Ret. (left), Chapter Treasurer, on 23 March 1994 during the Bonn Area Chapter's Professional Dinner Meeting. COL Sherman was being honored for his many years of faithful service to the Chapter.

Below: On 5 November 1993, a dining-in was held at Ft. Campbell, KY. Guest Speaker COL Robert Dees (left), Commander, 3rd Brigade, 101st Airborne Division, presented LTC Rodger Matthews (right), Commander, 7th Battalion, 101st Aviation Regiment, with an Order of St. Michael Bronze Award.

"Digitizing Tomorrow's Battlefield" AAAA Monmouth Chapter Aviation Electronics Symposium and Sports Day

15-18 August 1994
Gibbs Hall (Officers Club)
Ft. Monmouth, NJ

The AAAA's Monmouth Chapter is presenting its biennial aviation electronics symposium. The theme for this event is "Digitizing Tomorrow's Battlefield". Three rounds of technical sessions will be presented, each with its own focus. Each session will have a chairman, and several invited speakers will make presentations in areas of electronics applicable to Army Aviation.

The preliminary program includes:

15 August 1994:

Technology Reception and Registration.

16 August 1994:

Session I: *Perspectives on Digitization of the Battlefield* Session Chairman: Mr. John Niemela.

Luncheon Speaker: MG Otto Guenther, CG, CECOM.

Session II: *Situation Awareness.* Session Chairman: Arno Linder.

Reception and Banquet. Banquet Guest Speaker: BG Orlin L. Mullen, RAH-66 Comanche PM.

17 August 1994

Session III: *Information Management and Distribution.* Session Chairman: John Respass.

AAAA NEWS

AAAA AEC Symposium Set

The 12th Annual Aviation Electronic Combat (AEC) Symposium will be held at the Adam's Mark Hotel, Charlotte, NC, 8-9 November 1994. This year's theme is "Electronics for the 21st Century".

The 1994 Symposium is open to all interested AAAA members and will NOT be classified this year. Contact the AAAA National Office at (203) 226-8184 for Registration and Housing Forms.

Avionics Award and ASE Award Nominations Open

Sponsored by Cubic Defense Systems, Inc., the AAAA Avionics Award will be presented at the 1994 AEC Symposium to "the person who has made an outstanding individual contribution to Army Aviation in the area of Avionics during the awards period encompassing 1 August 1993 through 31 July 1994."

Sponsored by Loral Electronic Systems, the AAAA Aircraft Survivability Equipment Award will also be presented at the 1994 AEC Symposium. It will be presented "to the person who has made an outstanding individual contribution to Army Aviation in the area of ASE during the awards period encompassing 1 August 1993 through 31 July 1994."

Contact the AAAA National Office at (203) 226-8184 for official forms. Suspense Date is **1 September 1994.**

New AAAA Functional Awards Announced

The **Army Aviation Fixed Wing Unit Award**, sponsored by FlightSafety International, and the **Army Aviation Medicine Award**, sponsored by AAAA, have been approved by the AAAA National Executive Board. These two new AAAA National Functional Awards will join the existing **AAAA Army Aviation Trainer of the Year Award** and the **AAAA Army Aviation Air/Sea Rescue Award** in being presented at the 1 December 1994 AAAA Army Aviation Center Chapter Annual Awards Banquet at Ft. Rucker, AL.

Nominations are now open for all four of these awards covering the awards period from 1 September 1993 to 31 August 1994. Membership in the AAAA is not a requirement for consideration. Contact the AAAA National Office at (203) 226-8184 for the official nomination forms and requirements. The suspense date for all nominations for these awards to be received at the AAAA National Office is **30 September 1994.**

CALENDAR

A Listing of Recent Chapter Events and Upcoming National Dates.

July, 1994

- **July 15.** AAAA Scholarship Board of Governors Executive Committee Meeting, Best Western, Arlington, VA.
- **July 16.** AAAA National Scholarship Selection Committee Meeting to select 1994 scholarship recipients, Best Western, Arlington, VA.

August, 1994

- **Aug. 15-18.** Army Aviation Electronics Symposium, "Digitizing Tomorrow's Battlefield", sponsored by the AAAA Monmouth Chapter, Gibbs Hall, Ft. Monmouth, NJ.

October, 1994

- **Oct. 17.** AAAA National Executive Board Meeting, Sheraton Washington Hotel, Washington, D.C.
- **Oct. 17.** AAAA Scholarship Board of Governors Executive Committee Meeting, Sheraton Washington Hotel, Washington, D.C.

November, 1994

- **Nov. 8-9.** AAAA Aviation Electronic Combat Symposium, Adam's Mark, Charlotte, NC.
- **Nov. 9.** AAAA ASE and Avionics Award Presentations, Adam's Mark, Charlotte, NC.
- **Nov. 30.** AAAA National Executive Board Meeting, Ft. Rucker, AL.

December, 1994

- **Dec. 1.** AAAA Army Aviation Trainer of the Year Award Presentation, AAAA Army Aviation Air/Sea Rescue Award Presentation, AAAA Army Aviation Fixed Wing Unit Award Presentation, AAAA Army Aviation Medicine Award Presentation, and AAAA ROTC Award Presentation, Ft. Rucker, AL.

March-April 1995

- **Mar. 29-Apr. 2.** AAAA Annual Convention, Atlanta, GA.

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*MIL-STDs are ECCM 188-148, ALE 188-141A, Modem 188-110A.

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