

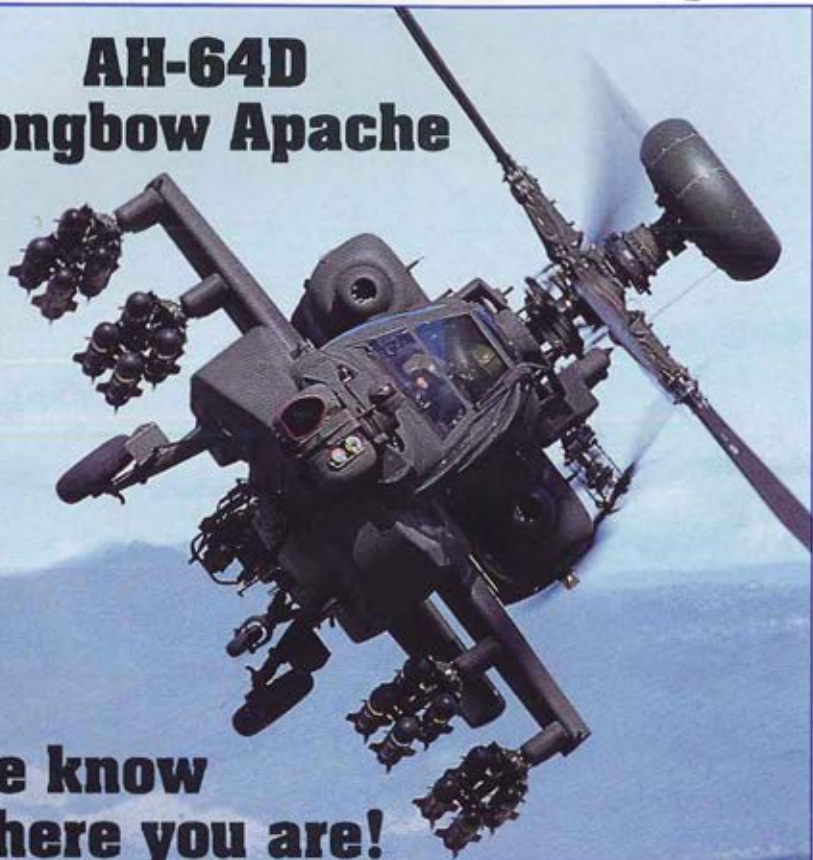
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FOCUS: PEO, AVIATION AND
U.S. ARMY ATCOM

ARMY AVIATION

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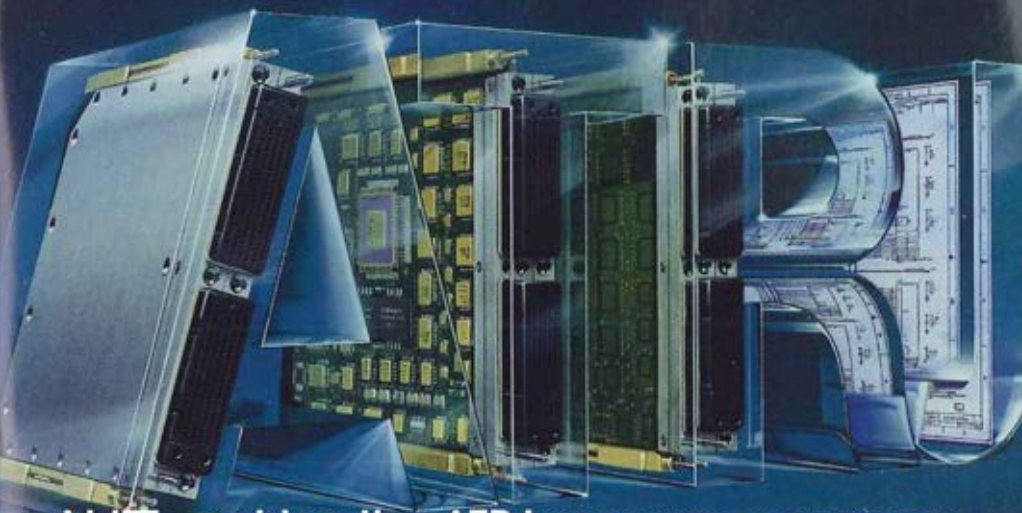
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FRONT COVER

***Paid advertisement: McDonnell Douglas.** The AH-64D Longbow Apache, under development for the U.S. Army by McDonnell Douglas Helicopter Systems, is the next-generation version of the combat proven AH-64A Apache multi-role attack helicopter. Photo by Mike Goettings.*

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FORTHCOMING ISSUES

December 1993 — 40th Anniversary Edition of ARMY AVIATION Magazine.

January 1994 — C⁴ and Electronic Warfare Special Focus.

Briefings

Eighteen soldiers were killed in action during a daylight raid in South Mogadishu, Somalia, on 3 October 1993. They are: **CW3 Clifton P. Wolcott**, 36, 160th Special Operations Aviation Regiment (Airborne), Ft. Campbell, KY; **CW3 Donovan L. Briley**, 33, Company D, 1st Battalion, 160th SOAR(A); **SGT Thomas J. Field**, 25, Company D, 1st Battalion, 160th SOAR(A); **CW4 Raymond A. Frank**, 45, Company D, 1st Battalion, 160th SOAR(A); **SSG William D. Cleveland, Jr.**, 34, Company D, 1st Battalion, 160th SOAR(A); **PFC James H. Martin, Jr.**, 23, 10th Mountain Division, Ft. Drum, NY; **PFC Richard W. Kowalewski, Jr.**, 20; **SGT James C. Joyce**, 24; **CPL James M. Cavaco**, 26; **SPC Dominick M. Pilla**, 21; **SGT Lorenzo M. Ruiz**, 27; **SPC James E. Smith**, 21, all of 3d Battalion, 75th Ranger Regiment, Ft. Benning, GA; **MSG Timothy L. Martin**, 38; **SFC Earl R. Fillmore**, 28; **SSG Daniel D. Busch**, 25; **SFC Randall D. Shugart**, 35; **MSG Gary I. Gordon**, 33, all assigned to U.S. Army Special Forces Command, Ft. Bragg, NC; and **SGT Cornell L. Houston**, 31, Company C, 41st Engineer Battalion, Ft. Drum, NY. Additionally, **CW3 Michael J. Durant**, 32, 160th SOAR(A), was captured near his MH-60's crash site and released after 11 days of captivity. He is back at Ft. Campbell undergoing treatment for various injuries suffered in the crash.

Photonics Corp., a wholly-owned subsidiary of Diagnostic/Retrieval Systems, Inc. has received a contract valued at approximately \$7 million from U.S. Army Aviation and Troop Command (ATCOM) to provide Captive Boresight Harmonization Kits (CBHKs) for the AH-64 Apache attack helicopter. CBHK is a portable ground support system that aligns the aircraft's navigation, targeting, and weapons systems with the pilot's optical sighting gear to assure high accuracy in target acquisition.

CW2 Curtis Hoagland, Company A, 3d Battalion (Assault), 25th Aviation, 10th Aviation Brigade, Ft. Drum, NY, received the Army's "Broken Wing" Award on 10 November 1992 for safely landing his aircraft which had suffered an inflight mechanical failure. During the 10th Mountain Division's deployment to south Dade County, FL for relief operations following Hurricane Andrew, Hoagland's UH-1H Iroquois suffered an engine failure at an altitude of 400 feet. Immediately initiating an autorotation, Hoagland overflew a set of high-power utility lines separating the aircraft from the only suitable landing area, an undeveloped housing site approximately one-half mile distant. Hoagland landed the aircraft with only an eight foot ground run, with no injury to the occupants or additional damage to the Huey. The award was presented to Hoagland by BG R. Dennis Kerr, Commander, U.S. Army Safety Center, Ft. Rucker, AL during a visit to Ft. Drum.



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A LOOK BACK, A LOOK AHEAD

The defense needs of our nation are markedly different today than they were just a few years ago. We won the Cold War — we no longer face a monolithic threat. However, as Secretary of Defense Les Aspin has stated, we still face grave threats to our national security — the “four dangers”.

These are the dangers of regional threats to U.S. interests, the proliferation of weapons of mass destruction, the possible failure of democratic reforms, especially in the former Soviet Union, and continued poor economic performance at home that impacts our long-term security.

To select the right strategy, force structure, modernization programs, and supporting industrial base to combat these four dangers of the post-

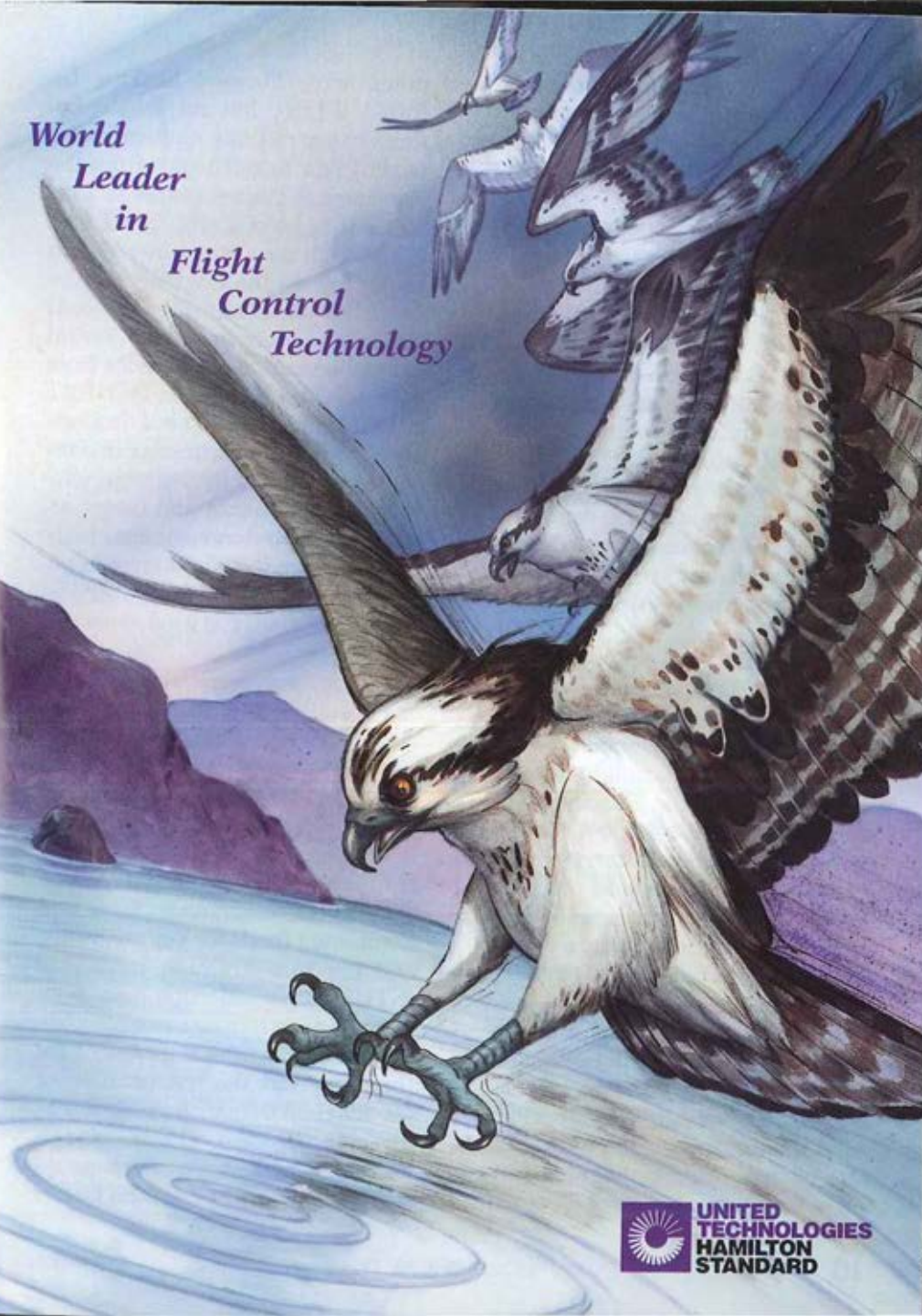
A review of modern Army acquisition strategy from the Army Acquisition Corps perspective.

Cold War era, the Department of Defense undertook the “Bottom-Up Review” of defense needs which began last spring and was completed in late summer. This comprehensive assessment of our near-term defense needs provides detailed guidance for re-

shaping America's defense posture and will culminate in the Fiscal Year 1995 (FY95) DoD budget and the FY95-99 Future Years Defense Program.

Our military success has taken us in a new direction and success has provided us with new challenges as well as opportunities. A major part of the Bottom-Up Review scrutinized key modernization programs within the Services. Is there a need for a particular weapon system in the current world environment? Is there money to

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build it or upgrade it? As resources decline, how can we make the best possible use of every dollar?

The RAH-66 Comanche armed reconnaissance helicopter and the Longbow upgrade to the Apache attack helicopter, two critically important Army Aviation programs, were re-examined as part of the Bottom-Up Review. We are indeed pleased that the Bottom-Up Review validated the Army's strong position that both are essential to the new defense environment. The Longbow's all weather target acquisition systems provides for long-range detection and automated classification, prioritization, and target hand-over for the modernized Apache team.

For the first time ever, a coordinated, rapid fire, precision strike capability will be available to the maneuver force commander on a 24-hour basis in day/night/adverse weather conditions. The ability to direct the massive firepower of the Apache at 16 different targets nearly simultaneously, while reducing the possibility of fratricide through improved situational awareness is an awesome capability for our combined arms team.

Tactical reconnaissance and battlefield coordination will be enhanced significantly by the rapidly deployable Comanche. Not only will it have the target acquisition capabilities of the Longbow radar combined with an advanced capability focal

plane array Forward Looking Infrared (FLIR), but its self-deployment range of 1,260 nautical miles is sufficient to self-deploy from the Continental United States to Europe, Africa, and the Middle East.

Although the Comanche program began during the Cold War, its capabilities were defined by regional conflicts as much as by the Central Europe scenarios. Experience from JUST CAUSE and DESERT STORM reinforce the need for Comanche and the importance of improved deployability, night/adverse weather reconnaissance and target acquisition, deep reconnaissance without detection, increased mission generation and deep precision strikes with survivability as good as we can make it.

We successfully met other challenges to our aviation programs within the last year. The restructure of the Comanche program was completed; we met the Congressional mandate to complete a Tactical Aircraft study before obligating Research, Development, Test and Evaluation funds for key programs; and the New Training Helicopter (NTH) source selection was completed and a contract awarded.

A major program adjustment for the Army was the restructuring of the RAH-66 Comanche program as directed by the Office of the Secretary of Defense. Demonstration/Validation was extended by two

Is It Really Worth Spending Over A Billion Dollars On The Huey To Get Better Gas Mileage?

It's time we put this whole Huey upgrade program into perspective. It's time we stop talking about gas mileage and horsepower and which engine has what features.

And it's time we start looking at the big picture.

Replacing the T53 engine currently in the Huey will mean retro-fitting hundreds of helicopters. It will mean re-training thousands of mechanics, and building a new parts inventory. It's a process that will cost America over a billion dollars.

As for gas mileage? It will take a more fuel-efficient engine over thirty years of continuous flying to recoup this

billion dollar investment. Thirty years, just to get us back to zero. Somehow it just doesn't add up.

Of course, there's more to the Huey upgrade program than money. The T53

is the only engine that has a proven track record in a single engine environment. No matter how much you spend, you can't replace that.

All told, we think you'll agree: the argument for switching away from the T53 engine doesn't hold water. Or gas, for that matter.



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years in order to concentrate on building prototypes, developing avionics, upgrading the T-800 engine, and early integration of the Longbow Fire Control Radar (FCR) developed for Apache. Restructuring the Comanche program to include these requirements at reduced near-term funding levels was a challenge to both government and contractor management.

One of the primary reasons for this successful restructure is Team Comanche, headed by a joint government/industry oversight group comprised of the prime contractor CEOs and senior Army leadership. This group meets quarterly to address and resolve issues and to determine the appropriate course of action for the future. The team concept extends downward through the working levels where it functions in the form of Product Development Teams. This is the right way to manage complex programs and "teaming" has become Army Acquisition's primary management structure.

The Army successfully completed its source selection process for the NTH and awarded a procurement contract for the first 102 of 157 helicopters. This was a non-developmental item and commercial standards were encouraged wherever feasible. The NTH is a more economical helicopter for

training than the UH-1 we now use and provides our flight students with increased training effectiveness. Part of its economy derives from the streamlined acquisition approach — maximum use of commercial/Federal Aviation Administration standards and elimination of no/low value added requirements resulting in a Request for Proposal of only 96 pages.

A comprehensive Tactical Aircraft study was undertaken and, as required, the final report was submitted to Congress. In it, we examined the military and fiscal validity of the attack and reconnaissance elements of the Army's aviation fleet — the Comanche, Longbow Apache, and Apache C programs. The Army's objective for Apache upgrades follows a policy of continuous improvement of fielded systems through technology insertion.

Operational improvements and system reliability upgrades derived from recent operations, including DESERT STORM, are being applied to the entire Apache fleet. These improvements will create a variant referred to as the AH-64A+. All AH-64As will be modified to the AH-64A+. Subsequently, one-third will be D model and Longbow configured and the remaining two-thirds of the fleet will be C model configured, receiving the Longbow Apache electronics upgrades (without the fire

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control radar or the enhanced engine) to extend digital technology to the entire attack helicopter fleet. Thus all Apaches will be a part of the digital battlefield of the future.

This digital battlefield of the future will enable us to pass information on enemy and friendly locations rapidly, and in many cases automatically, among our combat forces. It will allow us to maximize sharing of battlefield information for decision support and reporting purposes.

Warfighters and command centers will be linked digitally through advanced modems to emerging systems like the Joint Surveillance Target Attack Radar System (J-STARS) and Satellite Communications relays in order to provide commanders and their staffs with a shared picture of the battlefield and combat crews with more effective situational awareness.

Rigorous enforcement of standards and protocols for data transmission, receipt and filtering will improve compatibility across systems and across Services, providing quantum improvements in real time command and control

and battlefield focus.

In practical terms, this will allow the RAH-66 Comanche armed reconnaissance helicopter to share its sensors' view of the battlefield with artillery fire support elements, with M1A2 Abrams tanks and upgraded Bradley fighting vehicles, allowing direct synchronization of fire and maneuver in real-time — speeding the tempo of the battle while minimizing both overkill and fratricide.

All of this is possible through the

use of digital systems and common data protocols incorporated into existing and developmental systems. The Army demonstrated the capability to pass digital data from an OH-58D Kiowa Warrior with an Improved Data

Modem to upgraded Abrams and Bradley vehicles on 25 March 1993, at Fort Knox, KY. We have no doubt that digitization of the battlefield is attainable and will revolutionize the way our forces fight.

A vital instrument in digitizing the battlefield is the concept of Horizontal Technology Integration (HTI). HTI is the simultaneous integration of compatible technology into all the systems that must fight

"We have no doubt that digitization of the battlefield is attainable and will revolutionize the way our forces fight."

and operate together on the battlefield. The best example is the integration of data modems operating with standard formats, data rates and protocols with Longbow Apaches, M1A2 Abrams, upgraded Bradleys and the Advanced Field Artillery Tactical Data System — as discussed above.

In addition, advanced technologies such as combat identification devices and second generation FLIR will be inserted into all elements — tanks, fighting vehicles, reconnaissance and attack helicopters, and artillery systems — that make up our combined arms task forces within a division. HTI will increase the capabilities of the force rather than simply increase the capability of an individual system, and it is particularly suited to modernization during a period when we will have many more upgrades to fielded systems than new starts.

Although application of HTI Army-wide is a new concept, it should be no surprise to Aviation — the A Kit/B Kit technique used to apply and then upgrade standard aircraft survivability equipment across the fleet was the model.

While our aviation programs have been restructured, reviewed, and re-examined one more time, there is satisfaction in knowing that their importance to our na-

tion's future defense has been confirmed. The future battlefield requires both a modern armed reconnaissance and a heavily armed attack helicopter capability. The modernized Apaches and later, the Comanches, will provide America's Army an unmatched capability. In the near-term, the Army will continue to use the OH-58D Kiowa Warrior as the armed scout in cavalry units and light forces and Apaches in our attack units. Our aviation team — industry and government — is meeting every challenge. Army combat aviation is in good shape thanks to their successes. Our next challenge will be to look beyond Comanche and find an affordable way to modernize combat support aviation.

In these times of uncertainty and fiscal austerity, we must remain committed to our enduring principle: the Army's ultimate purpose is to fight and win our nation's wars. Today, our soldiers have the finest military equipment in the world. We have the decisive edge. We cannot maintain that edge in this period of competing priorities and reduced defense funding unless we continue to work hard, work smart, and work together. We owe our soldiers no less.

★★

LTG Forster is the Military Deputy to the Assistant Secretary of the Army for Research, Development, and Acquisition, Army Acquisition Corps, Washington, D.C.

AVIATION RESTRUCTURE INITIATIVE (ARI): AVIATION IN YOUR FUTURE

Before the end of this century, Army Aviation units will experience a metamorphosis which will better equip us to efficiently fight and win on any battlefield throughout the continuum of military operations. The bold effort spearheaded by the United States Army Aviation Center's Directorate of Combat Developments (DCD) to improve our warfighting organization is called the Aviation Restructure Initiative (ARI).

For several years, Aviation has accomplished its mission as a member of the combined arms team with austere organizations and aging systems. Recent operations have re-emphasized the need to examine the way aviation units are structured and resourced. The end of the cold war and growing fiscal constraints resulted in a re-

*The Branch
Chief describes
the new
post-AOE
Aviation
Force
Structure.*

quirement to reduce the size of the Army, both in manpower and cost. In a creative approach to resolve the problems associated with downsizing and resourcing, DCD redesigned the aviation structure from the ground up. The effort was not to simply downsize ... it was to *restructure* our forces in order to tailor them to meet the challenges in our changing world. The ARI was approved by the Chief of Staff of the Army in February 1993 for implementation as soon as possible.

Five major objectives were accomplished by the redesign. First, the aviation structural design deficiencies created by the 1985 Army of Excellence (AOE) were corrected. Second and third, logistics requirements and cost were significantly reduced.

Fourth, the entire aircraft fleet was modernized by retiring obsolete airframes. Finally, all objectives were to be accomplished while remaining within the resource constraints.

In 1985, AOE designs accepted trade-offs to implement the Aviation Brigade structure. The sacrifice was the depth of personnel in critical aviation warfighting and logistics support positions. The reductions in personnel were not accompanied by a corresponding reduction in numbers of aircraft or scope of mission requirements. Aviation unit headquarters were reduced to the point that it was not possible to maintain 24-hour operations for more than a few days nor could it deploy and maintain critical Tactical Operations Centers (TOCs).

Additionally, critical staff planning functions could not be accomplished. Pilot to seat ratios were significantly reduced, thus requiring primary staff officers to fill aircraft seats during important missions. Scout aircraft in attack helicopter battalions were limited to one aviator per cockpit, which severely degraded their ability to reconnoiter, inhibited them from conducting aided night operations, and reduced the safety margin.

Logistical support personnel were reduced, and shortfalls as much as 40% below the Minimum Mission Essential Wartime Requirements (MMEWR) were common. Aircraft maintenance personnel at both the unit and intermediate maintenance levels were required to work exorbitant hours just to meet the minimum DA standards for readiness. The reduced number of fuel and ammunition handlers limited Forward Arming and Refuel Point (FARP) operations. Automotive maintenance

personnel were staffed well below MMEWR. Also, increased complexity and technology in Aviation Life Support Equipment (ALSE) required a dedicated technician which, under AOE, was not authorized.

"[Under AOE] ... critical staff planning functions could not be accomplished. Pilot seat ratios were significantly reduced, thus requiring primary staff officers to fill aircraft seats ..."

The requirements authorized in ARI addresses all of these AOE deficiencies by manning all positions to AR 570-2, Manpower Allocation Requirement Criteria (MARC). The redesigned aviation units are fightable and sustainable.

The goal of reducing logistics requirements and cost was accomplished by developing homogenous/single type aircraft units. This was accomplished by consolidating low density utility aircraft at division

and corps. Consolidating aircraft reduces overhead in both personnel and repair parts. The most significant cost savings are found in reducing structure.

Utility aircraft were taken out of the Attack Helicopter Battalion (AHB) and moved to the divisional General Support Aviation Battalion (GSAB). The aviation brigade commander may allocate their use through GSAB missions. The scout aircraft were replaced with attack aircraft in the interim design and will be replaced by the RAH-66 Comanche in the objective design. Current AHBs are resourced with 13 OH-58s, 18 AH-64s or 21 AH-1s (light division), and three UH-60s for a total of 34 or 37 aircraft, respectively. The ARI interim design standardizes the heavy division AHB to 24 single type aircraft, either AH-64 or AH-1, based upon availability of aircraft.

Of the 24 aircraft, nine will be configured to perform the scout mission, while the remaining 15 will perform the attack mission. The objective design will replace the nine scout aircraft with the RAH-66 Comanche. For the light division AHB, the interim design provides 24 OH-58D or 24 AH-1, based on aircraft availability, and the objective force will have 24 RAH-66.

The current heavy division cavalry squadron is designed with two air cavalry troops. Each has six OH-

58A/C scout aircraft and four AH-1 attack aircraft. The squadron Headquarters and Headquarters Troop (HHT) is assigned one UH-1 or UH-60 utility aircraft. The total number of aircraft in the squadron will equal 21. The interim restructure design provides the cavalry squadron with 16 scout aircraft, either OH-58D or AH-1 organized into two troops of eight aircraft each. All utility aircraft will be consolidated in the aviation brigade GSAB. The objective design provides each air cavalry troop with 12 RAH-66 for a total of 24 aircraft.

Combat and Combat Support utility assets (general support aviation battalion, assault battalion, command aviation battalion, combat support aviation battalion, light utility helicopter battalion, and the command and control battalion at theater) were designed consistent with unit missions.

The utility structure for the heavy division is the GSAB with 24 UH-60s (3 x 8 UH-60 companies). The light division will have an assault battalion with 30 UH-60s (2 x 15 UH-60 companies) and the eight aircraft UH-60 command aviation company. The utility structure for corps is the command aviation battalion with 24 UH-60s (3 x 8 UH-60 companies), the assault battalion with 30 UH-60s (2 x 15 UH-60 companies), and the light utility helicopter battalion with 32

LUH (4 x 8 LUH companies). The theater aviation combat support is composed of one 24 aircraft (3 x 8 UH-60 companies) command aviation battalion.

To fully capitalize on the improvements made to the structure of aviation units, the combat service support had to be restructured as well. The creation of the Division Aviation Support Battalion (DASB) in heavy divisions streamlines and focuses logistics support for the aviation brigade. The DASB provides a single logistics point of contact for the brigade and houses aviation intermediate maintenance and aircraft recovery, wheeled vehicle and ground support equipment maintenance, and the brigade supply of Class I, II, III, IV, V, VII, and IX (air and ground) supplies.

The aviation modernization objective is to replace older, technologically obsolete aircraft with fewer, more capable systems. ARI reduces the total aircraft inventory from approximately 8,000 to 5,000 aircraft by retiring the obsolete airframes. Helicopter types are reduced from the current 10 in use to five (UH-60, CH-47, OH-58D, AH-64, and RAH-66). The TH-67 Creek will replace

the UH-1 as the primary training helicopter at USAAVNC. DCD is developing the light utility helicopter (LUH) operational concept. They are currently studying potential airframes to fill the mission requirement.

The ARI is an innovative and bold effort to ensure that our aviation forces are structured to meet the requirements of today and tomorrow. It provides a capable and more affordable total aviation force. Signifi-

"The ARI is an innovative and bold effort to ensure that our aviation forces are structured to meet the requirements of today and tomorrow."

cant cost reductions are achieved by removing obsolete aircraft, creating homogenous units, and streamlining maintenance. AOE deficiencies are fixed, and the restructuring supports the Army modernization objectives. Our

warfighting capability is enhanced by investing manpower and force structure to manage and maintain modern systems with more capable organizations. Through ARI, aviation units will be flexible, fightable, sustainable, and will remain lethal members of the combined arms team.

★★

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.

ARMY AVIATION: A POLITICAL AGENDA FOR THE 1990s AND BEYOND

The first of two essays which tied for Second Prize Winners in the First Annual AAAA Essay Contest. The other essay will appear in a future issue.

Of all the military services, the U.S. Army is perhaps the worst at playing the political game on Capitol Hill. In the past, this may not have been such a bad strategy. While other services lobbied on behalf of expensive weapons programs, the Army chose to remain on the sidelines, committed first and foremost to preserving personnel and force structure. Unfortunately, times are rapidly changing.

In today's and tomorrow's declining budgetary environment, new strategies are necessary for Capitol Hill. Force structure and personnel may be cut regardless of individual service desires, leaving only those who adapt themselves to this new environment ready to win both in the halls of Congress and on the battlefield.

*Using the
political
arena
to secure
the future
of Army
Aviation.*

In today's budgetary atmosphere, the Army can no longer afford to stay on the sidelines. Defense reductions threaten to reduce the Army to just ten active divisions while personnel continue to be cut in order to meet budget, not force structure, requirements.

Meanwhile, other services have embraced high technology programs as the solution to retaining their importance in future budgets and future military operations. The Air Force, Navy, and Marine Corps have all put forth major aviation modernization programs as their top procurement priority for the future. In order for the Army to maintain an important role both in the future defense budgets and future military operations, it too must embrace high technology programs, namely aviation moderniza-

tion programs, as its top procurement priority.

Recent reports confirm that air power will be the key to the future. According to officials at RAND, a California-based military think tank, the U.S. military should be able to fight and win two nearly simultaneous conflicts "if it relies more heavily on air power."¹ Each service has identified a single high tech aviation program as their top priority.

The Air Force, for example, has identified the F-22 air superiority fighter as its number one procurement objective. Meanwhile, the Navy has adopted the F/A-18E/F as its top acquisition program. In fact, the Navy is even willing to sacrifice force structure (a lower number of surface ships) in order to preserve a 12 carrier force of strike aircraft. Even the Marine Corps, similar to the Army in its dedication to preserving force structure and personnel, continues to champion a replacement for its CH-46 medium lift helicopter, primarily the V-22 tiltrotor.

As recently as June 1993, Marine Corps Commandant General Carl Mundy told the Senate that a replacement for the CH-46, namely the V-22 Osprey, remains the Marines' top priority.² In all cases, service support for these individual programs has helped keep not only the programs, but the importance of each individual service, alive and well on Capitol Hill

despite the growing budget cuts.

To its credit, the Army has gone to great lengths to join this political fight. Despite the cancellation of other high tech programs, such as the armored modernization system, service officials have remained committed to the RAH-66 Comanche helicopter program. As recently as June 1993, official Army spokesman Harvey Peritt confirmed "... the RAH-66 Comanche scout helicopter is the Army's top modernization priority."³ The RAH-66 is just as revolutionary in its capability as the F-22, F/A-18E/F, or the V-22. It gives the Army leverage not only on the battlefield, but also in Congress.

Unfortunately, the RAH-66 lags behind its other service counterparts in one very important area: demonstrated performance. Meanwhile, Army procurement funding continues to dwindle. According to Army Chief of Staff General Gordon R. Sullivan at the recent Army Aviation Association of America (AAAA) convention, the FY 1994 budget request of \$60.7 billion submitted by the Clinton Administration was more than \$37 billion less than the Army had actually programmed.⁴ Without clearly demonstrated performance, the RAH-66 Comanche may find itself a simple victim of numbers due to a lack of available funds.

Meanwhile, the F-22 prototype has clearly demonstrated its ability to cruise supersonic and easily out-

maneuver adversaries with its vectored thrust exhaust. The F/A-18E/F is an improvement upon the already combat proven A/B and C/D versions, which performed both as fighter and attack aircraft in DESERT STORM. Finally, despite a recent accident, the V-22 has started flying again and demonstrating the speed and flexibility of the tiltrotor concept.

Against the performance of these aircraft, the RAH-66 still remains mostly a design. As such, it will be quite vulnerable to cancellation by Congressional and Pentagon budget cutters. The Navy's AX attack jet and its predecessor, the A-12, are good examples of just what can happen to "paper" designs. The A-12 was cancelled not only because of cost, but also because of lack of demonstrated performance. In testimony before the House Armed Services Committee, General Accounting Office (GAO) officials confirmed that the Secretary of Defense sought to cancel the program due to "difficulties the Team (contractor) had in performing the contract," namely performing a first flight.⁵

In addition, the AX, despite the remaining clear requirement for Navy deep strike aircraft, has lost much of

its support in the ongoing tactical aviation review because it is so far from actually flying either as a prototype or production model.

Recent reports from Pentagon officials confirm the potential danger of Comanche cancellation. According to an April 1993 Defense News article, "Cancelling the U.S. Army's estimated \$40 billion RAH-66 Comanche scout helicopter program and upgrading existing helicopters and unmanned aircraft is one option in

a high-level U.S. Department of Defense review of the future affordability of Army Aviation programs ..."⁶ Additionally, according to Mark Bobbi, a military aircraft analyst, "Logically, Comanche is not necessary for the next 10-15

years because of Longbow Apache and armed OH-58D."⁷

Does this mean the RAH-66 has no chance? No, but it does mean that in order to survive both as a program and as a requirement, the Army may need to relook its current approach. Rather than embracing the Comanche as the solution, perhaps the Army should take a step back and instead embrace the armed reconnaissance mission as its number one procurement priority. Then it

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should seek to meet this requirement through a procurement plan that would include but not be limited to the RAH-66 Comanche.

In order to keep armed reconnaissance procurement a near-term reality, the Army should make completion of the OH-58D Kiowa Warrior program a top funding priority. The problem is not that the OH-58D may compete with the RAH-66; the problem is that armed reconnaissance may lose its relevance as a vital Army Aviation mission, at least in the eyes of Congressional budget cutters, without some adequate platform to perform the mission.

The Army already has approval for 351 out of 507 required OH-58Ds. According to the January 1993 Army Aviation Modernization Plan, "The Secretary of the Army's approval to arm the OH-58D reduces the near-term warfighting risk associated with the production gap of reconnaissance aircraft prior to Comanche."⁸ Besides reducing near-term warfighting risk, the OH-58D can also reduce near-term budgetary risk by competing favorably with the F-22, the F/A-18E/F, and the V-22 as affordable programs within the Department of Defense aviation modernization plan. Unlike these other programs, however, the OH-58D procurement could be completed quite quickly without costing the Army the bulk of its already dwindling procurement budget.

Where does that leave the RAH-66? Based upon current and projected budget constraints, the Army may be forced to examine cost-savings measures in the program including reducing its capability. However, as Rhett Flater, executive director of the American Helicopter Society warned, "Comanche is a very advanced rotorcraft program, and I don't think the Army can compromise those requirements very much."⁹ Instead, the Army should use the RAH-66 as leverage for the next step in weapon modernization, a step that all the other services must also eventually come to grips with.

One part of aviation modernization that has been lost in recent debate, at least for the time being, is the next generation of light jet attack aircraft. The Air Force must continue to rely on the F-16 in lieu of a Multi-Role Fighter (MRF) which appears highly unlikely to survive the Pentagon's "bottom up" review. The Navy, unable to guarantee production of the AX, will likely seek to procure an advanced technology replacement to the multi role F/A-18, which looks to be the main type of aircraft on carrier decks well into the next century. Finally, the Marine Corps, currently relying on the AV-8B for much of its close air support operations, will soon need a new ASTOVL design to replace this aging aircraft.

A leading option to fulfill all of

these requirements, especially if the F/A-18E/F and F-22 win out in the Pentagon's aviation review, would be a new lightweight fighter design that could be developed into three separate models, one for each service. From one basic low cost design could come a multirole fighter for the Air Force, a long range strike fighter for the Navy, and a VSTOL Harrier replacement for the Marine Corps.

Meanwhile, the Army will face the same predicament it does today: how to compete with other services in a game where it has no players? In order to avoid this likely outcome, the Army should be more aggressive in developing the RAH-66 as its next generation modernization program. Besides armed reconnaissance, the RAH-66 could also replace early Apache models as dedicated attack aircraft. The RAH-66, or at least its technology, could even be re-examined as a light utility replacement, a mission which remains important but still lacks an adequate replacement airframe. Even the Marine rotary wing CAS mission, currently performed by the AH-1, could be a future candidate for RAH-66 production.

***"The RAH-66,
or at least its
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By planning for the future rather than the present with the RAH-66, the Army can then dedicate its resources to fully developing a working RAH-66 prototype rather than immediately committing resources to full production. The first RAH-66 prototype is not scheduled to fly until August 1995, at least two years from now.¹⁰ This delay in production of even a prototype is plenty of time, two full budget cycles worth of time, for Congressional and Pentagon budget cutters to terminate

the program because it is too costly and unproven.

The Army could instead adopt Secretary of Defense Aspin's idea of developing technology first before committing to production. Last year, in outlining his new defense resource strategy for his congressional colleagues, Aspin called for what he termed "rollover-plus". Under this concept, the Department of Defense would continue to prototype new systems and components but not put them into production until stringent criteria are met. These criteria are A) that the technology works, B) that it was required by the development of the threat, or C) represented a breakthrough that

would alter battlefield operations.

Once the Comanche begins flying as a prototype, it definitely will prove that the technology works. Regarding the threat, one needs to look no further than the recent Paris Air Show to see that the proliferation of advanced attack helicopters such as the Mi-28 Havoc or Ka-50 Werewolf will give even Third World countries high-tech rotary wing forces. Finally, the breakthrough of optics, armament, communications, sensors, and stealth technology contained on the Comanche will ensure its value as a prototype that deserves production. By proving its capability first as a prototype, the Army can then sell the RAH-66 as a real technology rather than only a good theory. One can easily speculate how different the outcome may have been for the A-12 or the AX had they actually been flying.

Meanwhile, the OH-58D could continue to validate the armed reconnaissance mission in real world operations. Whether it would be anti-armor operations in the Middle East, humanitarian operations in Africa, low intensity operations in Central America, or counter narcotics operations on our own borders, there are real world missions today that demand the power, speed, armament, optics, and communications that only a new scout aircraft can provide. In this way, the OH-58D can actually validate the need for the RAH-66.

Besides the RAH-66 and OH-58D, the other major program the Army should pursue is the V-22. Unfortunately, even Army consideration of this program appears unlikely at this time. According to Army Chief of Staff GEN Sullivan, "The Army has no requirements for the V-22. The V-22 does not meet the mission profile that the Army flies."¹¹

However, the Army does not need to immediately program funding for the V-22 replacements to its UH-60 and CH-47 fleets. Instead, it should merely rejoin the program with the Marine Corps in order to ensure the V-22 remains a joint program recognizing peculiar Army requirements. According to a recent news article, there still may be hope: "Army Aviation officials, however, would assess the V-22 for its future Advanced Cargo Aircraft (ACA) program if the aircraft is procured for the Marines, and the technology continues to mature. ACA is seen as a replacement for the Army's current CH-47D cargo helicopter beyond 2005."¹²

The V-22 has great political support on Capitol Hill and is very likely to survive as a program in one form or another. If the RAH-66 is successful in being adopted as the Army's future armed reconnaissance and light attack platform, a new lift program also will eventually be needed. By staking an early claim in the V-22 program, the Army can position itself to use this technology

as a basis for both light and heavy lift aircraft replacement designs. The speed, range, and armament of a RAH-66 and V-22 fleet could guarantee the Army the mobility and firepower necessary for the Army to dominate the battlefield of the future.

All of the military services will be faced with difficult decisions over the next few years as ever increasing defense cuts by both the administration and Congress force budget priorities within each service. Those services which choose programs wisely, programs that are affordable in cost and revolutionary in performance, are destined to remain active and important players in future military operations. Aviation programs, due to their rare combination of mobility and firepower, will be especially valuable.

By making aviation modernization its number one priority, the U.S. Army can guarantee its value in future defense budgets. By making OH-58D procurement and RAH-66 prototype development its main priority in the short term and RAH-66 procurement and tiltrotor development its priorities in the long term, both the Army and Army Aviation can guarantee their dominance of the battlefield, both today and tomorrow.

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JOINT INITIATIVES AT U.S. ARMY ATCOM

Army green has turned purple — the color of “jointness” — by blending with Marine Corps green and Air Force and Navy blue. Jointness is the message in the Army’s new Field Manual 100-5, *Operations*. “America’s Army is a member of the joint team,” declares the manual’s opening sentence.

The Army never emphasized that concept in previous doctrines. Yet, joint and combined operations will now be the norm because the Army recognizes that it must operate in combination with its sister services to achieve the overall strategic aim of decisive land combat.

This is due to the evolution of Army warfighting ideas. The Army has gone from the unequivocal claim of service independence in the 1954

A review of the effectiveness of Tri-Service programs at the Aviation and Troop Command.

manual to service interdependence in the 1993 guide. This new doctrine reflects the shift to stronger joint service operations.

At Aviation and Troop Command (ATCOM), joint operations in logistics and technology aren’t new to its Aviation Re-

search, Development and Engineering Center (AVRDEC) or its Integrated Materiel Management Center (IMMC) and their Weapons Systems Management Directorates.

One of the more involved ATCOM joint initiatives is the AVRDEC’s Integrated High Performance Turbine Engine Technology (IHPTET) Joint Turbine Advanced Gas Generator (JTAGG) Program. This is a joint Department of Defense (DoD), NASA, and industry effort to provide innovative advancement in aircraft

propulsion performance and operational capability. The JTAGG goals are in sync with IHPTET's three phases and will focus on improvements in core technology with a long-range goal of achieving about a 40% decrease in specific fuel consumption and an approximate 120% increase in power-to-weight for an engine of any given size.

Another ATCOM joint initiative in the AVRDEC is the Advanced Boresight Equipment Program. This program seeks to replace the glut of boxes and adapters used to bore-sight military aircraft with a portable system that can be easily modified to the Army AH-64A Apache, the Air Force F-15 Eagle and the Air Force F-16 Fighting Falcon.

On the IMMC side of the house, ATCOM is playing a key role in the process of maintaining military readiness through joint cooperation. Representing this emphasis on process in the aviation community is the Aviation Logistics Board (ALB) which identifies and develops cost-effective processes assuring combat effectiveness through joint logistics in-

itiatives. The board seeks out and develops process improvements in depot support and the acquisition and management of logistics support resources.

It oversees and provides guidance to seven joint service subgroups that have been formed to look at specific areas with high potential for process improvement. They are:

- depot concept;
 - integrated logistics support;
 - training;
 - logistics commercial survey;
 - aviation inventory reduction;
 - operations and support;
 - common metrics.
- The board's membership includes representatives from the four armed services, the Defense

Logistics Agency, the U.S. Coast Guard, and the Aerospace Industries Association. ATCOM plays a principal role in the ALB and its subgroups.

Staying on the IMMC side of the house, their weapons systems management directorate performs an important function in the DoD National Airspace Systems (NAS) Program. This major joint service program provides for a compre-

"ATCOM is playing a key role in the process of maintaining military readiness through joint cooperation."



MG John S. Cowings, right, Commanding General, U.S. Army ATCOM, stands with Marine pilot Capt. Craig Bowers, Air Safety Officer for the U.S. Navy Test Pilot School, Patuxent River Naval Air Station, MD. Bowers had just given Cowings a flight aboard an F/A-18 Hornet at the station, where the General was attending a recent conference of the Joint Aeronautical Commander's Group. (U.S. Navy Photo)

hensive modernization of all air traffic control facilities operating within the NAS. It involves all four services and the Federal Aviation Administration. Although the Air Force is the lead service, the program is supported by the Army and Navy. The program includes the procurement of new approach control automation, tower automation, digital airport surveillance radar, voice switch, and the military airspace management systems.

ATCOM is the executive agent for procurement of all military production model C-12 transport aircraft, as well as the initial Life Cycle Contractor Support (LCCS). ATCOM originates all initial LCCS procurement actions for more than

400 multiservice aircraft. ATCOM then reviews and consolidates individual service requirements and issues a competitive request for proposal. The current contract is a five year firm fixed price contract with Beech Aerospace Services, Inc. valued at more than \$600 million.

During this effort and on an annual basis, the Joint Service Program Manager (JSPM), a working group under the joint logistics commanders, meet to discuss and share individual service plans or problem areas of their fleets. The JSPM is especially active during the procurement process for a new LCCS contract. Although each service has unique requirements, the

consolidation for contracting for LCCS maintenance allows the government to receive the best price for the fleet. The Air Force and Navy participate during contract negotiations for their segment of the contract with the ATCOM contracting officer orchestrating the action. After consummating the contract, the Air Force and Navy separate their portions of the contract for administration.

ATCOM's other Fixed Wing Joint Sustainment Programs include the Gulfstream C-20 LCCS contract, the Army Lear Jet LCCS contract and the Army National Guard Fairchild C-26 LCCS contract.

Another ATCOM joint service program is enhancing the firepower capability of the AH-1F Cobra fleet. To keep the Cobra's bite lethal, a joint and combined program between the Army, the Marine Corps and the Israeli Air Force is addressing parts obsolescence and vendor base deterioration on the airborne M65 Tube-launched Optically-tracked Wire-guided (TOW) anti-tank missile system.

The majority of the investment

dollars have been funded by the Marines as part of their AH-1W SuperCobra Program with the design mandated to work not only in the AH-1W, but also in the Army's and Israeli Air Force's AH-1Fs. The critical design review was completed this July, with testing of prototypes expected early in fiscal year 1994.

This new design will eliminate the electronic power supply, digitize the Stabilization Control Amplifier, and give the AH-1F the

capability to launch the entire family of TOW 2 missiles, including the TOW 2B. Cost avoidance in parts replenishment and depot maintenance burden are estimated by the U.S. Army Missile Command to exceed several mil-

lion dollars annually.

These joint service initiatives give an idea of the width and depth of ATCOM's involvement in jointness. ATCOM's policy is never judge an armed service by the color of its uniform. The only color that matters to ATCOM is gray ... as in gray matter.

★★

MG Cowings is the Commanding General, U.S. Army Aviation and Troop Command (ATCOM), St. Louis, MO.

***"This new design
will ... give the
AH-1F the capability
to launch the entire
family of TOW 2
missiles, including
the TOW 2B."***

New fangs for the Cobra.



Photo By Kurt Lengfield

The Maverick missile, developed by Hughes Missile Systems Company. Reliable, low cost, and deadly accurate, it has proven itself time and again over the past 20 years.

Now, it could become a vital weapon for the U.S. Marine Corps' Cobra helicopter.

The Marine Corps has conducted feasibility tests to evaluate the potential of the AGM-65 Maverick for its AH-1W Cobra weapons system.

Maverick is a fire-and-forget, air-to-surface missile that is currently carried on tactical aircraft of the U.S. Air Force, Navy, and Marine Corps. Its effectiveness has been proven repeatedly against a broad spectrum of targets, including tanks, bunkers, ships, runways, revetments, command centers, and air defense units.

Maverick is produced with three optional seekers (TV, IR and Laser) and two warheads

(a 125 lb. shaped charge and a 300 lb. penetrator with three fuze settings). For future high value threats, the U.S. Air Force is also developing an autonomous millimeter wave seeker.

To date, approximately 50,000 Maverick missiles have been delivered to the U.S. Air Force, Navy, Marine Corps, and 18 nations abroad. In nearly 11,000 launches, Maverick has been right on target 85% of the time.

The pilot's weapon of choice—Maverick. Now, Hughes' choice for new "fangs" on the Cobra.

HUGHES

Hughes Missile Systems Company

THE DOD NATIONAL AIRSPACE SYSTEM PROGRAM (NAS)

The DoD National Airspace System (NAS) Program is a major joint service program which will provide for a comprehensive modernization of all the air traffic control facilities operating within the NAS. It involves all military services and the Federal Aviation Administration (FAA). The Air Force is the lead service; however, the program is also manned and supported by the Army and Navy. The program includes the procurement of new:

- Approach Control automation
- Tower automation
- Digital Airport Surveillance Radar (DASR)
- Voice switch
- Military Airspace Management System (MAMS)

The NAS is comprised of both FAA

The details of a partnership between the DoD and FAA, and how the Army and ATCOM fit into the program.

and DoD elements. It consists of the airspace over the continental United States, Alaska, Hawaii and Puerto Rico. It also involves all airports, landing areas, air navigation facilities and equipment, aeronautical services and informa-

tion, and the rules and procedures developed to manage this complex system. The FAA is the largest provider of air traffic control services in the world. It should be noted that the DoD is the second largest provider of air traffic control services in the world. DoD air traffic control facilities and personnel are totally integrated in and interoperable with the FAA. The services provided by the FAA and DoD to an airplane (civil or military) traveling from one location to another are transparent

as to which agency is actually providing the particular service. In fact, 33% of all air traffic control facilities in the NAS belong to DoD and approximately 23% of all air traffic controlled are handled by DoD personnel at DoD facilities. Currently the military are handled by DoD personnel at DoD facilities. Currently the military operates 63 radar approach controls, 206 control towers, and 91 ground control approach facilities.

The current system of equipment used at the existing facilities has evolved over the years to meet the local needs of that facility. As such there is a wide variety of systems used which have become expensive to maintain and provide little adaptability to changing requirements. The Army, Air Force, and Navy have different systems. In most cases this equipment also differs from that used by the FAA. Consequently, no common logistical support system exists. Deregulation of the airline industry caused a rapid growth in the number of aircraft flying within the NAS. This strained the current systems (which had limited capacity for

growth) and the personnel using the equipment. The advent of new technologies and the increasing age of the current systems found the DoD and the FAA using obsolete equipment which was very expensive to maintain.

In 1982 the FAA developed a comprehensive plan for modernizing the facilities and equipment used for air traffic control. This modernization effort involved over 100 programs and costs in excess of \$16

billion. Many programs have been completed but the major programs are still ongoing with anticipated fielding of new equipment continuing until 2005. The DoD became a partner in this effort with the FAA in 1988 and established the DoD National Airspace System Program.

The DoD NAS Program is estimated to cost in excess of \$800 million of which the Army's share is approximately \$110 million. There are 34 Army facilities being modernized. The first Army facility to be modernized will be operationally ready in 1999 with the last facility completed in 2003.

The equipment being developed

"The DoD NAS Program is estimated to cost in excess of \$800 million, of which the Army's share is approximately \$110 million."

ARMY NAS LOCATIONS



under the NAS program will replace the obsolete analog equipment currently in use with state of the art digital systems. The approach controls will receive new color Controller workstations allowing for electronic flight hand-offs and improving capability to handle increasing traffic loads. There will be an additional auxiliary console at each controller work station to display current airport information. A new suite of digital automation equipment, called the Advanced Automation System (AAS) will replace the ARTS IIA, ARTS IIIA, PIDP, TPX-42 and other processing

systems currently fielded within the DoD and FAA. The vendor for this equipment is IBM. This equipment will have a high degree of reliability and be supported through a national support system established by the FAA.

These approach controls will also receive a new voice switching system enhancing the communication capability of the approach controls. The vendor has not been selected for this new voice switching system.

The control towers will receive an upgraded systems with new digital displays, Flight Data Input/Output (FDIO) and a Control Tower Automation system which will pro-

vide electronic flight strips and automated handoffs between tower controllers and approach control facilities.

The old analog radars currently fielded will be replaced with a new digital radar. The vendor has not been selected. The Army has already purchased 3 new ASR-9 radars from the FAA and intends to upgrade the FPN-66 radars recently fielded.

The DoD will also procure hardware and software to implement the MAMS which will schedule and coordinate the DoD use of Special Use Airspace (SUA). This program is currently in source selection with an expected award in September 1993.

The NAS Joint Program Office is also actively involved in several evolving national issues which will affect the DoD. Some of these issues are:

- Military requirement for Mode S secondary radar.
- Military requirement for Threat Collision Avoidance System (TCAS).
- Mode S transponder requirement in Europe on all aircraft in 1999. (Military Mode S interrogators may not be allowed.)

- Satellite based navigation system replacing TACANS, VORS, etc.

- Use of Differential GPS as the precision approach for Category I and II instrument approaches. The FAA intends to use 1030 MHZ frequency and Mode S message protocol for sending differential GPS corrections for GPS precision approaches.

- Implications of wide-area differential GPS for navigation and precision approach.

"The joint procurement and fielding of ATC systems provides a coordinated systems approach to the acquisition of cost effective equipment."

The joint procurement and fielding of ATC systems provides a coordinated systems approach to the acquisition of cost effective equipment. This is a true national effort to modernize the NAS. With the

DoD and the FAA jointly procuring the same equipment and implementing a national logistical support concept, the next generation ATC system will truly be interoperable between all providers of ATC services and transparent to all users.

★★

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ARMY COMMAND AND CONTROL: PEO AVIATION'S REVOLUTIONARY VISION

*Date: July 3, 1863
Place: Gettysburg,
Pennsylvania*

General Lee has launched the greatest infantry attack America has ever known against the reinforced center of the Union lines. Under the leadership of General Pickett, 15,000 of the Confederate's best soldiers will march across open rolling fields on a warm summer day into a defensive line that has been tested several times over the past two days of battle — and has not shown signs of yielding. Before this day is over, 4,300 men from both sides will pay the price for the promise of victory on this battlefield.

Since that day, soldiers and statesmen alike have marveled at the bravery and valor displayed by those men — "Pickett's Charge" has become synonymous with the spirit of the

*PEO Aviation
Command
and Control
initiatives
to overcome
the historical
"tradition
of carnage".*

American soldier.

At the same time, professional soldiers who study our profession of arms have found "Pickett's Charge" to be representative of all the bad characteristics of modern warfare — unacceptable casualties, bad intelligence, inade-

quate logistics, poor planning, and ill-advised execution.

This battle is also a classic operational warfare failure — after this battle, the campaign was lost — the South never recovered and was forced to fight defensively for the rest of the war. At the generalship level — the war was lost that day at Gettysburg. It was a battle that GEN Lee should not have fought — but he did not have the tools to tell him so (he did know what he didn't know). In the end, it was a classic meeting engagement that cost

far more than anyone could know.

The scary part of the lesson from Gettysburg is that there remains today a "ghost" in our warfighting philosophy that says that the acceptance of "carnage" of our ground forces is a necessary evil on the battlefield. "Closing with the enemy and destroying him in detail" by traditional definition means soldier to soldier or tank to tank battles where soldiers must fight with blood on their hands. We, in 1993, will continue to walk across fields at the end of battle with the moans and cries from broken brave soldiers ringing in our ears with victory as our only comfort — just as the Union leaders did in 1863.

T*ime: February 1991*

Place: Kuwait

The Iraqi Army had dug into strongly fortified positions to await the Coalition force's frontal attack. They expected to either hold the Coalition forces, or at least inflict heavy casualties. The "good fight" that both sides were equipped and ready to conduct did not occur. The body bags purchased and on-hand were sent back empty. The carnage of wars past did not happen. Was this the beginning of a new era in warfare? I hope so — but the jury is still out.

The question before the Army now is do we want to continue to hone our edge on the "close-in fight" or do we want to break that "friendly carnage

is necessary" mentality and invest in those weapon systems that destroy the enemy in detail without even getting eyeball to eyeball. We cannot afford to develop and procure both — and after the last war — the American people won't accept the carnage of our troops as a way of war again. It is my opinion that their demand for a change in the way we fight is justified.

There are numerous examples of Army Aviation assets closing with enemy armor and infantry columns far in front of our advancing forces and destroying them in detail before they ever got to the American lead ground forces. Kills of 8KM+ were routine sometimes over hundreds of kilometers deep in enemy terrain — speed, agility, firepower, and shock were the hallmarks of the aviation battles fought there.

Unlike Lee, our commanders had the tools necessary to choose the right fight at the right place at the right time. The war was a series of "meeting engagements" — usually a high carnage combat situation — but this time, our commanders had the tools to win without our troops paying the price. As LTG Ronald H. Griffith recently stated in the June 30th issue of ARMY AVIATION Magazine, "Not only did we get our money's worth in terms of killing targets, but also the Apache and scout crews provided us with real-time intelligence gathering, a great boon to a com-

mander struggling to see through the 'fog of war'." We have the opportunity to change the way we fight — if we are to overcome the tradition of carnage.

Why was the battle for Kuwait fought differently? What were the key ingredients which made it successful? And, how can we insure that the trend continues? The Army leadership is studying and reflecting upon the 89 hours of our intense conflict to find answers to these questions. The answers to these questions will undoubtedly change the way we fight forever.

All the changes to be made are not known yet — but some clear trends are emerging that we in Aviation should capitalize on. I believe these trends are essential to Aviation and for our Army to win in the next battle — and finally free ourselves from the carnage of the close battle.

Our Chief has stated these trends and thoughts as Project/Sustain the Force, Protect the Force, Win the Information War, Conduct Precision Strikes, and Dominate Maneuver — Our Army's Modernization Overmatch Areas. FM 100-5, *Operations*, is highlighting our new Army's

statement of doctrine — not only do we fight "heavy", but we also fight in peacekeeping, disaster relief, and anti-drug operations. The Army as a whole is wrestling with this new doctrine — slowly but surely we are ripping ourselves out of the AirLand Battle mold — and fitting ourselves into the mobile, lethal, multi-role Army that is prepared to meet the needs of our country's defense in the 21st Century. The challenge for us is to mold Aviation so that it can fulfill

its role as the centerpiece of this new 21st Century Army.

Aviation is wrestling to incorporate the philosophy of Maurice de Saxe who said, "It is not the big armies that win battles, it is the good ones."

It is ability and

capability that is the true measure of our fleet — not our aircraft count.

Approximately 1,300 RAH-66 Comanche helicopters will have the equivalent combat power of over 3,000 Vietnam aircraft while being lighter, more survivable, and more supportable than any aircraft the Army has known. Our Longbow Apache will have more lethality, versatility, range, and greater ability to see across the battlefield

***"The challenge
for us is to mold
Aviation so that
it can fulfill
its role as
the centerpiece
of this new
21st Century Army."***

than we have ever known before. The aviation fleet being built over the next decade will fundamentally change the way we fight as an Army. This "smaller but more versatile and lethal" fleet philosophy is true for aviation, it is true for tanks, and it is true for our whole Army.

This central theme of superior ability and capability threads its way throughout all of the five Modernization Overmatch Areas. A new vocabulary has sprung up to support this theme and philosophy — the terms Horizontal Technology Insertion, Horizontal Integration, and Digitization of the Battlefield have taken on a life of their own and are challenging the acquisition strategy in our PEO. There is no question that our new and modernized aviation fleet systems are setting the pace for the Army in meeting the challenges of modern warfare. We are leveraging every horizontal technology integration and digitization opportunity we have in our fleet modernization efforts, but something is still missing from the story.

We in Aviation are going to fall in to the close-in fight investment mentality if we don't realize that our fleet is much more than just another "killer on the battlefield". "Stored kills" is a critical measurement tool in our weapon system investment strategy. I would like to extend the discussion.

The weapon systems and capa-

bilities we should be investing in for our new Army should be those that support as many roles as possible. Systems that are single scenario dependent should be viewed as a high capital investment with low ROI. With an analysis from the bottom up, using this type of business tool should yield some very new budget decisions.

I am convinced every dollar given to Aviation is a very high ROI to our Army and our country. As you read this article today, your fleet is actively participating in all of the modern roles and missions for our Army laid out by our Chief. We are supporting disaster relief missions along the thousands of miles of small and large towns along the Mississippi River — we are supporting the multi-national peacekeeping efforts in Somalia — we are supporting the efforts in counter-drug operations in South America — we are prepared to help in the fight in Bosnia — and we are still in Kuwait ready to fight again if required.

If we are to be the centerpiece of the new Army, we must be the best in the world in all these roles — not just the traditional large land battle. This means that we in PEO Aviation no longer view our aircraft acquisition process as management of distinct separate systems — rather there must be a complete coherent "system of systems" approach to our total fleet. We must

press for advances in the Command and Control systems for Army Aviation, in the combat service support systems for our fleet, in the training and use of simulators for our aviators, etc. I am convinced that this "system of systems" philosophy is larger than just PEO Aviation. The Army is grappling with the integration of all our assets — Infantry, Armor, Artillery, Aviation, Tactical Operation Centers, Intelligence, and Support elements into an architecture that supports the Maneuver Commander with a totally integrated and synchronized direct and indirect fires force and provides a common picture of the battlefield that allows us to project our force, to win decisively, and to achieve "land force dominance" anywhere and anytime.

The goal for the PEO's "Team Acquisition" becomes defining and delivering a complete fleet infrastructure that provides all Commanders the required critical battlefield capabilities and information in a timely manner when and where they need it. Aviation is absolutely key in providing this battlefield information — and this information is absolutely key to winning the battle before it becomes a close-in fight. The carnage on the battlefield we all desire to avoid is not only accomplished by better armor, better gun tubes, better armored information systems, heads up displays on infan-

try soldiers, etc. It is accomplished by better strategic deep battle systems, such as aviation, Joint STARS, UAVs, and deep FA systems.

However, before the benefits of the aviation architecture utilizing Horizontal Technology Integration and digitization can be realized, there must be major shifts in the basic paradigms resident within the whole Army. Our doctrine, force structure, design, and training to fight should not be sacrosanct "rice bowls". We must use our limited RDA dollars for those weapon systems whose return on investment is maximized. For example, a lack of vision across all battlefield functional areas on how to digitize the battlefield, destructive competition for scarce resources, our broke budget process done without an in-depth knowledge of the interdependencies among systems in the architecture, etc. makes every step forward unnecessarily complex and burdensome. There is real danger of doing what the Chief has warned should not happen — that's breaking the Army while trying to make it better.

Our soldiers must be foremost in our minds; their protection and their capability to fight and win while avoiding the carnage of the past must be our vision, and that vision must be clearly in focus with every dollar we spend.

★★

MG Irby is the Program Executive Officer, Avn, St. Louis, MO.

APACHE: WHERE VISION BECOMES REALITY

Where is Apache going? What is our vision for the end-state fleet? How will we operate? How will we maintain? How will the system fit into the Theater Commanders' fight?

To answer these questions, the PM must step back a few paces from the day to day activities of the Production, Modification, and Engineering Manufacturing Development (EMD) Programs and take a more idealistic view of his program. What do we see in the crystal ball for the end-state modernized Apache fleet?

Let's start with the vision of a commonly configured aircraft. These are simple words, but a monumental task. If we really want to learn lessons from the past, we in the PM business, in conjunction with the

*What changes
lie on the
horizon for the
world's most
lethal
advanced
attack
helicopter.*

TRADOC System Manager must insure we do not put seven or eight configurations of Apaches in the field. From the users standpoint, we already have three. These are the AH-64A with 701C engines (versus the 701) and what has been unofficially

dubbed the "A+."

The A+ is an interim configuration designed to incorporate reliability upgrades and correct operational deficiencies the commanders in Operation DESERT STORM believed to be the most critical. These are deficiencies which could not be overcome by different tactics or training, but could be corrected by a material change.

Included in the former category are reliability initiatives for the TADS/PNVS and the 30mm gun. The latter consists of: integration of Global Posi-

tioning System (GPS) and high frequency radio, improvements to Nap-of-the-Earth (NOE) communications, and IFF. Additional major upgrades include Alternate Laser Coding, being added as a counter countermeasure (a Hellfire II feature as well) and Fire Control Computer (FCC) throughput and memory enhancements.

The continued need to maintain Apache readiness while simultaneously implementing modifications to the fleet (such as A+) and developing Longbow creates some unique challenges. The Apache PMO, under COL James Snider, has responsibility for the A, the A/701C and the A+ series Apache. This is primarily a modification program, but also controls FMS and the end of the production line for the AH-64A. The Longbow PMO, under COL Robert Atwell, has the responsibility for Engineering Manufacturing Development and Testing of the C/D series.

To ensure tight coordination between the Apache and Longbow Program Offices, PEO Aviation created Team Apache Modernization, which includes: Longbow PMO, Apache PMO, PEO Aviation, ATCOM Log Center, Joint Venture — WEC/MMA, TRADOC System Managers, ATCOM Acquisition Center, Air To Ground Missile PMO, Westinghouse DPRO, Martin-Marietta DPRO, McDonnell Douglas Helicopter Sys-

tems DPRO, Cdr, Aviation Training Brigade, USAAVNC, AMSAA, OP-TEC, HQDA, DCSOPS, HQDA, ODCSLOG, Aviation RDEC, PM AGMS, TECOM. Team Apache Modernization coordinates A+ and Longbow design efforts. A fundamental Team Apache Modernization tenet is to make no A+ modifications that will ultimately be "throwaways" to the Longbow configuration (C/D). Additionally, where possible, the A+ program endeavors to provide cost and risk reduction to Longbow Apache as it comes into production. This precludes expensive retrofits and removing, changing, or discarding components when Apache is modified into a C/D.

We're not being visionary yet, you say? We disagree. A common configuration is perhaps not as exciting as digitizing the battlefield, but it does allow us to standardize TM's, training, tools, spare parts provisioning and inventory management. Standardizing any one of these would help conserve precious dollars, and make the field commander's job a lot easier. Ask someone who had five or more different types of Cobras in the same unit.

In addition, we still have to clean up some of the anomalies from the first production lot of Apaches. For example, we have more than one configuration of TADS/PNVs in the field, as well as both the 701 and the 701C engines.

New arrows for the Apache.



For years, the Maverick missile, developed by Hughes Missile Systems Company, has been a mainstay on U.S. Air Force, Navy, and Marine Corps tactical aircraft. It's reliable, low-cost, and deadly accurate.

Now, it could become a vital weapon for the U.S. Army's AH-64 Apache helicopter. Tests at McDonnell Douglas Helicopter Company have demonstrated that the Maverick missile integrates well with Apache's Target Acquisition and Designation Sight (TADS).

A fire-and-forget, air-to-surface missile, Maverick has proven to be effective against high value hard targets such as bridges, bunkers, runways, and air defense units.

Maverick is produced with three optional seekers (TV, IR and laser) and two warheads (a 125 lb. shaped charge and a 300 lb. penetrator with three fuze settings). An autonomous millimeter wave seeker is also being developed.

To date, over 50,000 Maverick missiles have been delivered to the U.S. Air Force, Navy, and Marine Corps, and 18 nations abroad. In nearly 11,000 launches, Maverick has been right on target 85% of the time.

Maverick—the pilot's weapon of choice. Now, Hughes' way of sharpening the Apache's firepower.

For more information, contact: Tactical Systems Marketing, Hughes Missile Systems Company, P.O. Box 11337, Tucson, AZ 85734.

HUGHES

Hughes Missile Systems Company

The current plan keeps the 701 engines in the AH-64C, and puts the 701C engines on the AH-64D. Ideally, a uniform engine configuration is what is needed. (Remember, vision is not constrained by resources.)

What about maintenance? What we would like to see is truly automated electronic maintenance. This includes electronic record keeping, troubleshooting, configuration tracking, TBO tracking, all on electronic logbooks (perhaps a 3½" diskette). This data could be linked to the aircraft data base memory and downloaded via bus ports or remotely through a radio controlled access to a Portable Maintenance Aid (PMA). The PMA would be lightweight (or on board), capable of transferring historical information, parts requests, or work orders directly to the unit, AVIM, or wholesale supply system through the Unit Level Logistics System (ULLS-A), as required. The crew chief would perform all his troubleshooting, repair, and even MOCs through the PMA, hopefully without ever having to leave the aircraft. Gone are the breakout boxes, cumbersome test sets, et al.

Again, another task seemingly simple to describe in words but difficult to accomplish. However, sufficient memory and advanced processing capabilities, better built in test, and reliability will be available in the next few years to eliminate

weight penalties and permit a full range of diagnostics and prognostics in maintenance aids, either portable or onboard.

Millions of dollars and countless hours could be saved by reducing spares inventory and reducing administrative down time (i.e., time spent retrieving manuals, searching for part numbers, getting the right test equipment, waiting on tools, trying to find the PLL clerk etc.).

So far, this probably sounds boring unless you are a wrench turner. In fact, the technology available today is precisely what makes these kinds of visions feasible in Army Aviation, some as near as the first Longbow production lot.

What about the steely eyed killer? We haven't forgotten you. This is where Horizontal Technology Integration (HTI) comes into play.

You've heard the buzz words, but what exactly does it mean? This is simply spreading the wealth of technology into as many systems as possible that will fight together. In other words, instead of just putting a new radio, like SINGCARs, into the whole Apache fleet, HTI would dictate we put it into every fighting system in V Corps. This allows units that must fight together to capitalize on the latest technology available as units. The commander then has the technology to integrate and synchronize the battlefield across his entire combined arms team, task

force, brigade, division, corps, or MACOM.

HTI may force us to occasionally make less than optimum business decisions, but resource constraints and declining budgets simply make it impossible to field everything to every unit. Instead, we field the most advanced technologies to the units who are first to fight or most likely to fight.

What is our vision for Longbow in an HTI unit? Examples of several exciting upgrades are our design efforts for GPS and Alternate Laser Coding. These technology insertions illustrate A+ engineering adherence to Longbow Apache design considerations.

Since inception, Apache GPS integration design designated the Miniature Airborne GPS Receiver (MAGR) as the "black box" of choice. Through Team Apache Modernization, the A+ program refocused its efforts toward an Embedded GPS Inertial (EGI) which embeds GPS capability (on a circuit card) into an inertial navigation system. Not coincidentally, Longbow Apache will employ the identical EGI system. It must be noted that delays in the MAGR program and subsequent Congressional budget restraints enabled us to pursue the Apache A+ EGI initiative.

Initial testing of the GPS/INU/Doppler navigation suite has been so good the pilots testing the system

have argued over which of their seats was directly over the initialization point at the end of a 250km course. A great example of vision becoming reality.

Alternate Laser Coding, (frequency hopping for laser codes) has long been a popular countermeasure improvement to Apache and Laser Hellfire. The design alternatives evolved to a choice of two. One was less costly but included modifications to the remote Hellfire electronics unit, FCC, and the backup bus controller, all of which are throwaways to the Longbow program. Consequently, the favored design option requires more early funding, but provides cost reduction for the Longbow program, reducing overall Apache program costs.

The combination of the Fire Control Radar (FCR) capabilities linked with the digital communications transfer of the Improved Data Modem (IDM) give the Longbow unprecedented flexibility. The vision is that Longbow Apache Aircraft will send FM, UHF, VHF, voice, data, clear or secure traffic to every other system on the battlefield. This includes linking combat units (Black Hawk, Kiowa, Comanche, Abrams, Paladin, Bradley, Patriot, ATACMS, MLRS), command and control systems (AMPS, MCS, MSE), intelligence systems, (J-STARS, Quickfix, Guardrail, etc).

The continued miniaturization

and packaging of electronics, micro processors, and MIMIC technology will permit us to not only send a target or a free text message, but an entire tactical situation display from ship to ship, system to system and unit to unit. Video imaging (Photo-telesis) down link has already been demonstrated from an Apache in Europe via satellite into a ground station module at Ft. Belvoir.

Joint Precision Strike capability is not far off. Longbow's FCR would detect a target signature for an erected SCUD missile launcher, and provide the targeting data to an MLRS battery. Similarly, Longbow FCRs of the future will recognize friendly ground combat ID emitters and partition no fire zones to the shooters to prevent fratricide.

As HTI spreads across the Joint Arena, Apaches will conduct Joint Air Attacks via digital target transfers. Longbow FCR will supplement J-STARS targeting and vice versa. Longbow Apaches en route to deep attacks will receive real time intelligence updates from J-STARS. Pilots will know where to go, and where not to go. Conversely, targets which are visible to Longbow but masked by terrain from J-STARS could be passed up to J-STARS, then down to the GSM. The Corps commander will have real time information on named areas of interest, and potential engagement areas. The force commander's planning time

will increase. Engagement times and friendly casualties will decrease.

Carry this vision one step further to the Combined arena. Should the UK decide to adopt the Apache as its attack helicopter, the same types of digital and electronic force integration would be possible on the combined or coalition battlefield. An unstoppable force under any conditions.

Vision becoming reality? We shall see. So how do you realize these visions in a resource constrained environment? Simply by investing in simulation. Simulation offers us a realistic, now relatively inexpensive method to determine which visions will have the most payoff on the real battlefield.

The Longbow program has used the MDHC Engineering Development Simulator (EDS) for several years to this end. The EDS consists of two Domes representing pilot and copilot/gunner crew station, four auxiliary player stations and two communication player stations. The pilot/CPG crew stations completely replicate the AH-64D in both hardware and software functions, providing out the window displays, sensor displays, and interaction with the tactical (flight hardware) mission computer system. The EDS is capable of duplicating the AH-64D FCR functions in all three modes (ground targeting, air targeting and terrain profiling), and includes



**Team Apache Modernization
United States Army Aviation and
Lockheed**

- The Lockheed Family of Companies Provides the Most Complete, Total Quality, and Best Value Alternative for the Modernization and Sustainment of the Apache Fleet
- Lockheed's Approach Minimizes Impacts on Operational Readiness by Providing a Full Range of Responsive Capabilities for Modernization of the Apache Fleet
- Lockheed is Committed to Supporting our Customers' Needs in the Most Positive and Direct Manner from Our "Leadership Through Technology" Heritage

***Lockheed – Part Of The Army Team
– Anywhere, Anytime***

When performance is critical – Lucas

Lucas has designed and manufactured its new Electrically Powered, Externally Mounted Personnel Rescue Hoist to meet the needs of the U. S. Army Medevac Community. When performance is critical, Lucas is the answer.



Lucas

weapons fly out models. These features permit company level nap-of-the-earth flight and mission exercises in adverse weather, day or night.

The EDS has evolved from its initial use as an engineering tool for MANPRINT/Human Factors optimization of crew station design to a validation of the design by TRADOC pilots. It was then used by FORSCOM/TRADOC pilots to develop tactics, techniques, and procedures (TTP) for FDTE. Most recently, it was utilized as a crew qualification trainer for the Aviation Qualification Test Directorate pilots prior to the Preliminary Airworthiness Evaluation tests in the prototype aircraft. It is currently being

upgraded to serve as the primary aircrew qualification trainer until the Army procures a Longbow Crew Trainer (LCT).

Our vision includes the capability to network the EDS to the Defense Simulation Interconnect (DSI) via Long Haul Communications Link to the Aviation Test Bed at Ft. Rucker. Long term, the LCT will be a trainer capable of front seat only or crew (both seats) training, with full out the window displays, selectable terrain databases, and capable of being networked to other LCTs, much like the Apache Crew Trainer is today.

The Apache Crew Trainer System is the operator trainer piece of the (APACHE — continued on p. 85)

BLACK HAWK — LOOKING TO THE FUTURE

Since the delivery of the first aircraft in 1978, the Black Hawk has participated in every combat, humanitarian, and disaster relief operation for the U.S. Army. Today the Black Hawk series serves proudly in the Army, Air Force, Navy, Marines, and Coast Guard. It is also present in 16 international applications. The Army fleet has matured with more than 1,200 aircraft that have flown more than 1,512,128 flight hours.

The UH-60 is in its fourth multi-year procurement making the Black Hawk program the Army's most successful multi-year program. The current five-year multi-year contract for procurement of 300 UH-60Ls through FY 96 will bring the total quantity of fielded UH-60s to 1,447.

A breakdown of the continuing developments occurring within the Black Hawk PMO.

The Army's latest Aviation Restructuring Initiative (ARI) supports a requirement for over 2,000 UH-60s.

The current fielding plan places the latest and most capable UH-60L aircraft in the first-to-fight units. This

fielding plan displaces 300 UH-60A aircraft currently assigned to contingency units and redistributes them to other Reserve, National Guard and active units.

The redistribution of the early configuration UH-60As requires some basic refurbishment and standardization efforts for those aircraft to bring them up to an acceptable transfer criteria. This refurbishment/standardization program will bring the oldest aircraft up to the 1985 through 1989 configuration

which is our baseline UH-60A.

An essential element of the Black Hawk's success has been continuous improvement of the aircraft and its subsystems. While the Black Hawk enjoys the reputation as the premier utility helicopter in the world, we are working to make it even better. We constantly evaluate mission performance, component reliability, and user recommendations with the goal of making cost-effective improvements to the aircraft. Our focus areas for improvement include:

- Increased sustainability.
- Decreased operation and support (O&S) costs.
- Increased performance.
- Improved safety.
- Increased survivability.

During Operations DESERT SHIELD and DESERT STORM, the UH-60 performed a full range of missions, including transporting troops, supplies and artillery, command and control, search-and-rescue, and aeromedical evacuation (MEDEVAC). While aircraft performance was outstanding in most respects, the Army identified deficiencies from these operations in the areas of MEDEVAC and command and control.

The evolving national strategies for power projection and operations other than war have caused changes to MEDEVAC mission profiles. The missions are not limited

to the evacuation of sick and wounded and movement of medical personnel. The missions also include movement of surgical teams and equipment, theater class XVIII medical resupply, Naval hospital ship support, combat search and rescue and humanitarian/disaster relief.

To support the evolving missions, a more capable and survivable aircraft is required. The UH-60Q will fit this role with enhancements for: improved patient care, communications, navigation and survivability.

The UH-60Q will be equipped to support up to six critical litter patients, seven ambulatory patients or a combination thereof. The medical package includes an oxygen generation system, nasal-pharyngeal suction, patient monitoring equipment, medical equipment storage and an environmental control system for patient stabilization. The intercom system will allow hands-off communication between medical attendants and will allow for crew communications during externally mounted rescue hoist operations.

The UH-60Q features MIL-STD 1553B data bus management of an enhanced avionics and navigation package which includes: multi-band and HF radios, Have Quick, Improved Data Modem, Inertial Navigation System, Global Positioning System, doppler and pilot

locating system. In addition, TACAN has been added to assist in locating Naval hospital ships.

To aid in safe navigation, improve reduced visibility operations and locate downed crew members and personnel on the ground, the UH-60 features forward looking infrared, weather radar and Storm Scope. These enhancements will ensure safety during frequent single ship MEDEVAC operations. Also, the addition of a laser warning receiver will increase aircraft survivability when coupled with existing survivability equipment.

The UH-60Q is an exciting example of new technology insertion which will allow the Army Medical Department to support the warfighter well into the 21st century. These new capabilities in an air ambulance will increase casualty survivability through a higher standard of medical care while performing the global aeromedical evacuation mission.

Digitization of the Battlefield and horizontal integration of aviation assets requires improvements in situation awareness, command and control, and the execution of missions. During DESERT STORM, the AN/ASC-15B Command and Control systems installed in the UH-60s were used to coordinate close air support, artillery, attack and maneuver elements.

Experience with these systems

and emerging technology has resulted in a recognized need for improvements. The Project Manager for Aviation Electronic Combat is working with the Project Manager for Utility Helicopters to integrate the future Army Airborne Command and Control System (A²C²S) into a new command and control Black Hawk. Planned improvements include:

- MCS and AMPS (Maneuver Control System and Aviation Mission Planning System)
- SATCOM (Satellite Communications)
- HF NOE COMM with ALE and ECCM
- UHF-M/FM with ECCM (HAVE QUICK II)
- VHF-FM (SINGARS)
- VHF-AM
- IDM (Internal Data Modem) and FAX
- Commander's Tactical Terminal (CTT)
- Near real time video imagery
- A digital map display
- Mobile Subscriber Equipment (MSE)
- A new Commander's Workstation

Faced with reduced budgets and a drawdown in combat strength, we will have to depend more heavily on upgrading our current equipment rather than developing new weapon systems. The UH-60 was designed to have a service life of 30

years versus the normal 20 year service life design requirement of most helicopters. However, many of the earliest fielded aircraft are already reaching 15 years in age. In lieu of developing a new utility helicopter replacement for the Black Hawk, we are beginning to develop a modernization strategy which will improve sustainability, survivability, performance and safety of the aircraft.

Candidate systems being considered for upgrade include:

- Growth of main rotor blade to increase lift. The blade will have a 15% wider chord than the current blade and its tips will be swept down in an integral fashion. The new blades will also require development of a new spindle.
- A 1553B Integrated Data Bus system to incorporate digital avionics including: Global Positioning System (GPS), High Frequency Radios, and the Voice Altitude Warning System. The Data Bus will also ensure compatibility with future avionic/ASE designs.
- A MANPRINT cockpit with increased visibility, Integrated AN-VIS/HUD, and NVG lighting.
- Sealed main rotor dampers and pitch change rod end bearings with elastomeric bearings designed to combat the effects of sand intrusion and corrosion.
- Reliability and Maintainability improvements including a higher

reliability battery and particle separators to protect the helicopter's engines and auxiliary power units from the blowing sand and harsh environmental conditions.

● Other areas under consideration include an improved Automatic Flight Control System computer, a growth engine and limited 10,000 pound cargo hook to improve lift capability.

Looking toward the future of Black Hawk change, we are excited about the prospects for improving the UH-60 through MEDEVAC and command and control upgrades as well as planning a modernization program for the entire fleet. While the UH-60 is recognized as the world's best utility helicopter, we know that only through continuous improvement can we keep it the best.

★★

COL Rees is the Project Manager, Utility Helicopters PMO, St. Louis, MO.

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OH-58D KIOWA WARRIOR: BRIDGE TO THE FUTURE

The OH-58D helicopter has come a long way since its debut in 1986. Conceived initially as a pure (unarmed) scout helicopter with day and night capability, it has evolved into the Army's first true armed reconnaissance aircraft. The OH-58D began as the Army Helicopter Improvement Program (AHIP) and featured leap ahead technology which created for the first time the capability to conduct effective scout operations during night/reduced visibility. It was the first Army helicopter with a fully integrated, 1553 data bus, Night Vision Goggle (NVG) compatible cockpit and a night target acquisition/designation system.

The AHIP soon expanded into the armed configuration in response to urgent security requirements in the

*Developments
in the
U.S. Army's
interim
armed
reconnaissance
helicopter
program.*

Persian Gulf. Reflecting the namesake of this important national mission, the early armed variant of the OH-58D became known as the PRIME CHANCE configuration. Building on the OH-58D's superior target acquisition and designation system

(thermal imaging and low light television), the PRIME CHANCE configuration added firepower by incorporating existing weapon systems — Hellfire missiles, .50 caliber machine gun, and 2.75" rockets.

The Army now had its first scout aircraft capable of effectively conducting armed reconnaissance missions. This configuration allowed the Army to safeguard friendly vessels through the treacherous waters of the Persian Gulf during the Iranian hostilities of 1987-1988.

The overwhelming success achieved by the armed OH-58D during Operation PRIME CHANCE led to an Army decision to arm all OH-58Ds. Concurrently, its name was officially changed to the Kiowa Warrior to specifically designate its armed configuration.

Today, there are two concurrent programs managed by the Kiowa Warrior Project Management Office which produce identically configured armed Kiowa Warriors: 1) the basic modification program at 36 aircraft per year, and 2) the retrofit program which will reconfigure all 185 previously delivered unarmed OH-58Ds (AHIPs) to the armed configuration by the end of 1996. At that point, the OH-58D fleet will once again consist of a common configuration — all armed Kiowa Warriors.

The current procurement authorization calls for a total of 351 aircraft against a validated requirement of 507 aircraft. The intent is to continue to produce 36 Kiowa Warriors a year until the required 507 is achieved, subject, of course to continued Congressional support.

As the Army focuses on the advanced technology of Comanche to meet its armed reconnaissance aircraft requirement for the future, the OH-58D Kiowa Warrior brings a capability to the battlefield today which will bridge the Army's need for armed reconnaissance aircraft well into the 21st century, when

Comanche will replace the Kiowa Warrior. This "bridge" will be sustained through the judicious application of new technology as it matures and as it fits within the Army's overall modernization strategy. This strategy has been expressed in terms of five specific areas, often referred to as "modernization overmatch". They are:

- Project and sustain the force;
- Protect the force;
- Win the battlefield information war;
- Conduct precision strikes;
- Dominate the maneuver battle.

It is within this context that materiel developers/combat developers approach their task of continuous improvements.

Fundamental to the Army's modernization strategy is digitization and horizontal integration of the battlefield — the ability to collect and distribute battlefield information both in text and graphic format instantaneously for the use of all air, ground, and space participants using digital (non-voice) communications. Figure 1 shows the Kiowa Warrior on a typical digital battlefield. The current (funded) improvements and the planned improvements will enhance the digital capability of the Kiowa Warrior. Each will be discussed briefly in the context of the five modernization overmatch areas. However, since "digitization" touches all of the overmatch areas



Army Aviation's "Digitization of the Battlefield"

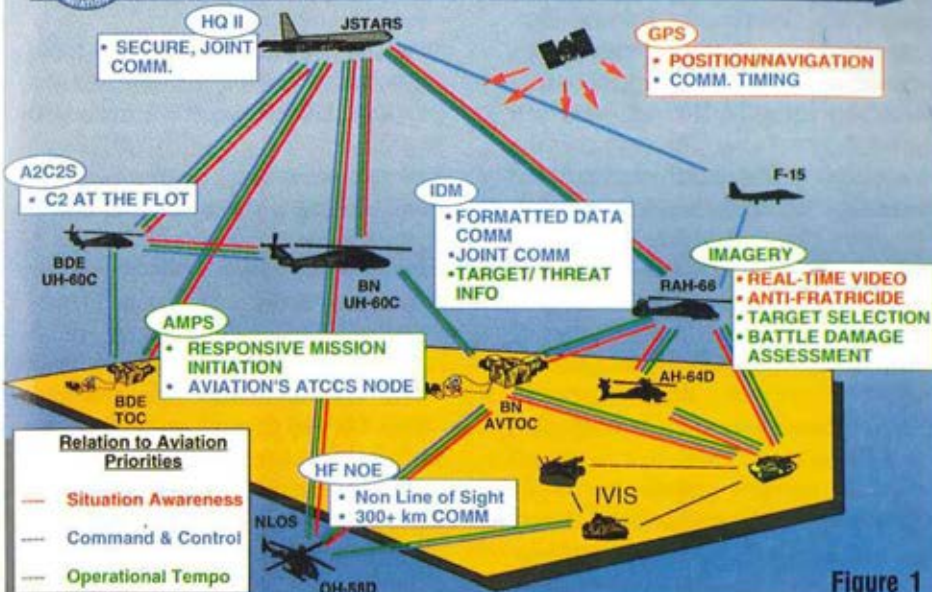


Figure 1

to some degree, and since computer processing is so critical for full exploitation of future digital technology, we will begin with a brief discussion on planned upgrades to Kiowa Warrior's computer processing.

The current MCPU design is approaching its limits. The mission equipment package and control system software requires more than 90% of the existing systems capability to function. Supportability of the existing processor is also a growing concern as technology continues to advance and production sources dry up for unique military requirements

which fail to keep pace with the application of technology in the commercial sector. The proposed MCPU upgrade incorporates JIAWG Standard 80960 state-of-the-art processor technology and will significantly enhance life cycle software support costs by converting to Ada software language. The upgrade will provide an over 100% increase in system capability over the current system. Even with all projected and potential systems integrated, there will still be a 25% margin for future growth.

The upgraded processor will replace three unique line replaceable units (LRUs) with two common

chassis LRUs. This will result in a weight savings of approximately 20 pounds; a 70 watt reduction in power required; an estimated 5-15% reduction in shipset recurring cost; and reduced operating and support costs.

In short, the MCPU upgrade will provide the Kiowa Warrior with the necessary processing throughput and memory capacity to fully exploit emerging digital technology; to eliminate a potentially significant supportability cost problem caused by rapid technology obsolescence; and to provide capability for future growth.

The Kiowa Warrior's contribution to "Project and Sustain the Force" focuses on improvements to its deployability; Reliability, Availability, Maintainability (RAM); and operating and support cost reductions. The Multi-Purpose Light Helicopter (MPLH) capability features four specific kits which provide commanders with the unique ability to configure the aircraft to meet a myriad of requirements.

The rapid deployment kit allows commanders to load two Kiowa Warriors aboard a C-130 transport aircraft for long distance movement to an undeveloped theater of operation and be operational within fifteen minutes after landing. The cargo hook, troop seats, and emergency casualty evacuation kits give commanders the flexibility to expand, develop, and sustain operations until follow-on forces (AH-64, UH-60,

and Comanche) arrive. First field deliveries of the rapid deployment and cargo hook kits are scheduled for December 1993.

Other system improvements key to sustainment include the Reliability, Availability, and Maintainability Engine Program (RAMEP) and mast mounted sight upgrades. Each will aid in the reduction of operating and support costs while increasing availability rates. -

The Kiowa Warrior has several improvements which protect its crews and the commanders they support. The ANVIS display symbology system attaches to the night vision goggles and provides pilots with critical heads up flight information. This system contributes to safer operations at night by allowing the pilot to focus outside the cockpit during flight without the distraction of looking inside the cockpit for flight and navigation data.

The Data Transfer System (DTS) allows the pilot to preplan and program three complete missions onto a data transfer cartridge which he uploads into the onboard mission computer for flight. This capability increases the commander's flexibility in planning and reacting to battlefield dynamics. An additional system planned for installation on the Kiowa Warrior to aid commanders in protecting the fleet is the Battlefield Combat Identification System (BCIS). The BCIS will in-

crease situational awareness, providing aviators with a means of discerning friendly from threat forces.

Key to winning future conflicts is an ability to transmit and receive clear, concise threat and friendly information. This information flow affords commanders time to properly develop a scheme of maneuver, distribute it to subordinates, and adjust to new developments. The technologies that will provide commanders with this strategic and tactical edge include digitization of the battlefield and enhanced sensors.

The Kiowa Warrior played an integral role in the Army's Battlefield Synchronization Demonstration (BSD) at Ft. Knox during March 1993, validating the Aviation concept for the Digitization of the Battlefield. During this live fire exercise, a combined arms team demonstrated the ability to conduct effective maneuver solely by passing digital information (no voice) between ground and airborne maneuver platforms. Digital messages were transmitted from the Kiowa Warrior via an Improved Data Modem (IDM).

The IDM replaced the OH-58D's standard Airborne Target Handover System (ATHS). The IDM allowed the crew to digitally transmit target locations and various reports to an Armored ground force that maneuvered to destroy targets totally without voice communications. The BSD demonstrated that digital techno-

logy increased situational awareness, the ability to pass real-time intelligence information, and to hand-off targets from one battlefield functional area to another; ie., armor to aviation to artillery. The IDM is the cornerstone of the digital battlefield which ties Air Force, Army Aviation, and other national intelligence gathering assets together to pass information to tactical ground and aviation forces. IDM is one of many technologies being initially installed on the Kiowa Warrior as a risk reduction program applicable to all present and future aviation platforms.

Other Kiowa Warrior enhancements will also ensure success in the information war. Video Downlink will provide crews the capability to transmit TV or thermal images via secure VHF-FM, UHF, or HF communications to ground stations. A crew has the option to store the images for transmission at a later time or transmit images as displayed to the crewmembers. Charged Coupled Device (CCD) camera will replace the current Vidicon camera. The CCD camera is a solid state device that provides better picture resolution, improved reliability (doubling MTBF), and improved detection range.

The MMS processors will incorporate gallium arsenide technology which greatly improves the quality of the video and target tracking of

the MMS. The Kiowa Warrior is also the *first* aircraft to utilize the Aviation Mission Planning System (AMPS). The AMPS enables the crew to plan a mission, enter all navigation and communication data onto the DTS cartridge, and rehearse missions. E Troop, 2-229th Aviation Battalion utilized the AMPS effectively during the FDT&E that concluded this November.

Numerous technologies that will be first utilized on the Kiowa Warrior will improve the accuracy of direct and indirect fire weapons. The AMPS with its imbedded digital map, threat data, and mission rehearsal capability will afford Kiowa Warrior crews opportunities to "fly" missions and see the terrain prior to actually breaking friction with the ground. The Embedded Global Positioning System with Inertial Navigation System (EGI) will increase the accuracy of the onboard navigation system, thereby enhancing situational awareness and enabling pilots to be safer and more precise with weapon systems employment.

Domination of the maneuver battle is essential to winning on the modern battlefield. The Kiowa Warrior's ability to perform as the eyes and ears of the Commander will allow commanders the ability to synergistically integrate effective fire power at the right time and place. The EGI will enhance the

heading, attitude, and navigation inputs to the Kiowa Warrior crew. With this improvement, crews can precisely locate targets for engagement by organic and supporting friendly forces. The BCIS system will drastically reduce the potential for fratricide.

As you can see, the Kiowa Warrior provides a bridge to the future through technology insertion from which all Army Aviation will gain valuable tactical and technical insights during early employment on the Kiowa Warrior. Some would ask, why insert all this technology into a system that will ultimately be replaced by Comanche? There are several answers. One, the Kiowa Warriors will continue to fulfill critical armed reconnaissance and attack roles for at least another 20 years. Perhaps more importantly, however, is that it provides an ideal test bed for technology that has broader application than just a single weapons system.

Now that the Army finally has a true armed reconnaissance helicopter in the Kiowa Warrior, the effectiveness of the combined arms team on the battlefield will only improve. Kiowa Warrior's unique mission equipment package is already changing tactics, techniques, and procedures of Cavalry Squadrons and Attack Helicopter Battalions, enhancing the combat effectiveness of the combined arms team.



PROJECT MANAGER, KIOWA WARRIOR ORGANIZATIONAL CHART



AS OF 2 AUG 93

OFFICE OF THE PROJECT MANAGER

PROJECT MANAGER	COL ED GOOSEN
DEPUTY PROJECT MANAGER	JOHN SHANNON
ASSISTANT PM FOR RDTE	LTC LARRY THOMAS
ASSISTANT PM FOR LOGISTICS	LTC HANK ATWOOD
ASSISTANT PM FOR FORCE MOD	LTC CHRIS WHEELER
ASSISTANT PM FOR PROGRAMS	MAJ CHUCK COUTTEAU

NEW TRAINING HELICOPTER

PRODUCT MGR
MAJ BILL LAKE

(4)

PROGRAM MANAGEMENT DIVISION

CHIEF
GM-14

CHUCK LINES

(10)

LOGISTICS MANAGEMENT DIVISION

CHIEF
GM-14

RICK BROCK

(13)

TECHNICAL MANAGEMENT DIVISION

CHIEF
GM-15

JACK VANKIRK

(12)

We are proud to announce the newest members of the Kiowa Warrior team: COL Dave Ahearn assumed the duties as the TRADOC System Manager, OH-58D Kiowa Warrior at Ft. Rucker during June 1993; MAJ Bill Lake assumed duties as the Product Manager, New Training Helicopter (NTH) during July 1993.

The NTH program is under the PEO Aviation and has recently been integrated into the Kiowa Warrior Project Manager's office. The acceptance ceremony for the first NTH, designated the TH-67A Creek, was held at Fort Rucker in October. This event marks the shortest time between contract award and an Army aircraft delivery since the Vietnam

buildup when Cessna delivered T41 aircraft. This also marks the start of NTH deliveries at one per month, ramping up to six per month in January 1994.

The Army intends to purchase 157 of the NTH for a total contract value of \$137 million. Training Initial Operational Capability (TIOC) will be reached in April 1994 when 29 aircraft will be present at Fort Rucker and the first class of aviators to use the NTH initiates a new chapter in the history of U.S. Army Aviation.

The NTH procurement was a fine example of streamlined acquisition. There were no military specifications or standards included in the (OH-58D — contined on page 69)

SUSTAINING THE CH-47 FLEET

The CH-47D has been and will continue to be a proven performer in war and peace. The aircraft contributed immeasurably during Operations DESERT SHIELD/DESERT STORM (ODS) and PROVIDE COMFORT, as well as in operations "other than war" such as disaster relief, civil assistance and nation building. However, the CH-47 Modernization Program is nearing the end and we are now faced with insuring the sustainment of this critical capability.

In December 1993, we are scheduled to take delivery of the last modernized CH-47D from the U.S. Army's inventory of previous CH-47A/B/C aircraft. During January and February 1994, Boeing is scheduled to deliver two new production CH-47Ds which

*The latest
developments
in the Army's
CH-47D
Chinook
medium-lift
helicopter
program.*

will replace losses from ODS. These will be the only new production CH-47Ds in the inventory. There are also 26 MH-47Es being delivered over the next year to U.S. Army Special Operations Command (USASOC) under a separate effort managed by

LTC Mike Rogers and the Special Operations Aircraft (SOA) Product Manager's Office. Finally, Boeing will modernize seven CH-47Cs for the National Guard which were purchased from Australia. Delivery of these CH-47Ds will begin in May 1995. The only unit which remains to be fielded will be assigned to the Hawaii National Guard.

As we transition from production and fielding, our office will transition from Program Executive Office for Aviation control in October 1994 to

CH-47D MODERNIZATION, PROJECT MANAGER'S OFFICE

POSITION		EXT.
PM	LTC Paul Dvorsky	1411
Ch, Tech Div.	James Winkeler	1411
Ch, Logistics Div.	Ronald Dalton	1440
Proj. Off., Improved CH-47	CPT Mark Larrabee	1415

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Army Aviation and Troop Command as a fielded system; we have already reduced our staffing to two military and 18 Army civilians effective October 1993. Key individuals for the organization are shown in Figure 1. Our primary efforts are now refocused on sustaining the fielded fleet of CH-47D aircraft. At the same time we must look to the future needs of maintaining a medium lift helicopter capability.

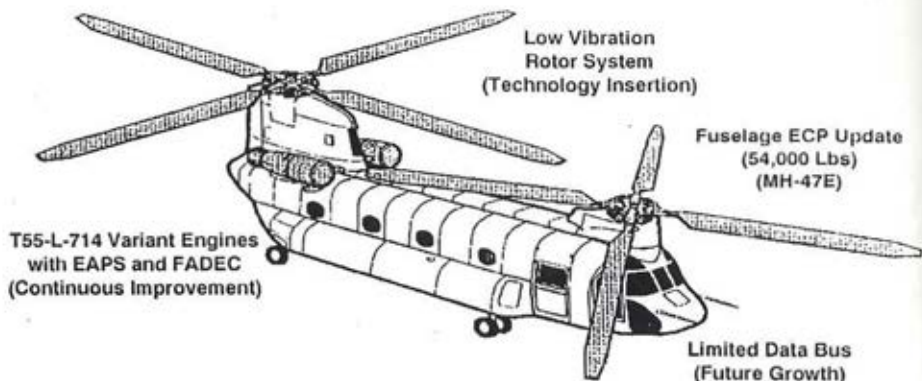
With this in mind the current fleet was evaluated against the modernization categories of safety, capability, survivability and sustainment. Safety is a requirement which commanders and materiel developers must work to maintain on a continuous basis. That will not change as we manage this program. ODS identified potential areas for improvement in capability, and survivability requirements are always

being reviewed based on mission requirements and potential future threats. In these two areas, there are improvements that will be evaluated to determine if they are required, cost effective and affordable.

However, in the area of sustainment, the CH-47D is considered "red" in the far term (beyond 2002). This is primarily due to the age of the CH-47 airframes which will begin reaching 40 years of age (20 years as a D model) in 2002. Sample Data Collection (SDC) and lead-the-fleet records have documented the rise in unscheduled maintenance actions as the fleet ages. Even if units could afford the increased requirement for parts, the increased maintenance burden and downtime will eventually impact operational readiness. Herein lies the challenge: sustain the fleet by reducing O&S costs and scheduled and unschedul-

Figure 1

Sustainment Configuration



ed maintenance actions.

In concert with the U.S. Army Aviation Center, we are developing a program to meet these requirements with an Improved CH-47. We believe the major area for improvement lies in reducing vibration levels. This should benefit both airframe structures and all onboard components. Second, improvements to the current powerplant are readily available which would benefit both maintenance and performance. Finally, we need to prepare the aircraft to readily accept future improvements which are being programmed for electronic systems. The management approach we are taking is to capitalize on using current technology insertions and horizontal integration opportunities from other programs. This will allow us to mi-

Figure 2
minimize program costs while maximizing benefits.

In the area of vibration reduction, the rotor system is one of the areas that we feel requires attention. The CH-47A was initially fielded with a Maximum Gross Weight (MGW) of 33,000 lbs. That same airframe is currently modernized to the CH-47D and flown to an MGW of 50,000 lbs. Along with high gross weight operations, which were critical to the productivity of the CH-47D in ODS, comes increased vibration levels. This problem is compounded by an inherent harmonic resonance between the current three-bladed rotor system and the airframe. However, since 1962 the rotor system has not changed significantly, with the exception of changing to Fiberglass Rotor Blades.

Boeing is considering continuation of an IR&D effort which would fly a prototype four-bladed Low Vibration Rotor (LVR) on a CH-47D. This LVR should significantly reduce rotor vibrations and have a secondary benefit of improving speed and maneuverability at higher gross weights. Also included is a new coincident hinge dry rotor hub which reduces the number of parts from 641 to approximately 99 and promises to reduce the maintenance burden.

The next area for improvement is the current T55-L-712 engine. Installation of the T55-L-714 engine, developed for the MH-47E, along with a Full-Authority Digital Electronic Control (FADEC) will reduce Specific Fuel Consumption, reduce torque measuring system problems, improve reliability and reduce maintenance. The engine that we would eventually install would be a variant of the original T55-L-714 engine because of changes being developed as we continuously improve this system. A secondary but significant benefit from this engine would be the increased power which would improve performance at high altitudes and temperatures. This change, along with minor airframe modifications, would also enable us to increase the MGW to 54,000 lbs and improve payload. The MH-47Es and CH-47s produced by Boeing for foreign customers currently operate

at 54,000 lbs MGW. This increased payload capability was requested during ODS to meet the needs of the 7th Battalion, 101st Aviation Regiment.

The final area of concern currently being studied is the need to incorporate future electronic systems. We must develop an architecture using data bus technology which will meet the needs of future communication, navigation, survivability and other electronic systems which are in development for all modernized Army aircraft. This effort will be limited to those hardware changes which will add value to the aircraft mission or are required to sustain a required capability.

By incorporating these changes, we are currently proposing the aircraft as shown in Figure 2 as the baseline Sustainment Configuration for the Improved CH-47. Initial deliveries could occur as early as 2003. The need to sustain the CH-47D capability is recognized throughout the Army. However, because of the current need to reduce the defense budget, the major issue now becomes the availability of funds to execute such a program. We will continue to review our program and to look for alternative means which would enable us to sustain the CH-47 fleet well into the 21st century.

★★

LTC Dvorsky is the Project Manager, CH-47D Modernization Program Project Manager's Office, St. Louis, MO.

AVIATION LIFE SUPPORT EQUIPMENT: SUSTAINING OUR AIRCREWS INTO THE FUTURE

Product Manager Aviation Life Support Equipment (PM ALSE) continues to be a viable part of the PEO Aviation organization. The importance of ALSE takes on new meaning when you consider the increasing interface between man and machine in the cockpit. Information must be processed rapidly and translated into action that instantaneously influences the battle. ALSE enhances mission accomplishment by reducing crew stress and improving crew comfort.

It's intuitively obvious that PM ALSE must work closely with the aircraft PMs in the PEO — Comanche, Apache, Black Hawk, Kiowa Warrior, and Chinook. Most ALSE items require consideration of "A" Kit provisions or at least concern for

*New and
innovative
developments
from the
ALSE Product
Management
Office.*

weight and space availability. Accordingly, PM ALSE has remained a PEO PM.

The PM ALSE FY 94 TDA authorizes staffing as reflected in Figure 1. Although we were hit pretty hard by the recent VERA/VSIP early retirements, we have re-

placed some of our retirees with young engineers and logisticians that have brought in fresh ideas and are excited about being a part of the PEO/PM ALSE Team. We are also in the process of getting authorization to convert the PM position from military (LTC) to civilian (GM). This initiative will provide an opportunity for civilian members of the acquisition corps to gain critical career enhancing experience as a PM.

The PM's job is to acquire ALSE to meet the needs of Army Aviation.

PM ALSE

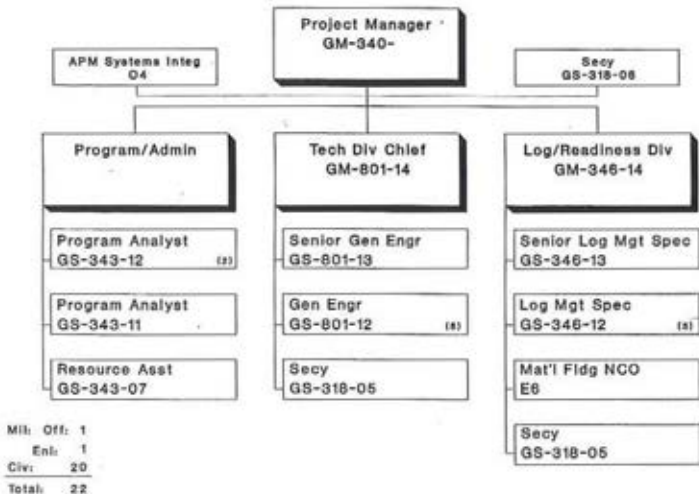


Figure 1

To do this job properly, we must look beyond the short term and consider a concept or vision for the future. The following is our vision as extracted from the ALSE Business Plan: *"The vision of the ALSE PM is to provide the Army Aviation Team with the latest state-of-the-art ALSE used to sustain Army aircrews and passengers throughout the entire flight profile. ALSE will enhance mission performance and aircrew survivability during operational missions, in crash situations, and during post crash/prior-to-rescue conditions. All equipment will be acquired using the most effective means of acquisition. Maximum use will be made of contractor/Government teaming, joint service programs, NDI, value engineering, and 8a set-asides."*

The road map we currently are using to achieve the above vision is made up of nine main routes:

- M43A1 Aircrew Protective Mask (P3I)
- Lightweight Motor Blower
- Vision Correction
- HGU-56/P Aircrew Integrated Helmet System (AIHS)
- Air Bags/Inflatable Body and Head Restraint System (IBAHRS)
- Aircrew Microclimatic Conditioning System (AMCS)
- Aircraft Modular Survival System (AMSS)
- Helicopter Oxygen System (HOS)
- SRU-37/P Individual Life Raft
- Helicopter Emergency Egress Device (HEED)
- Aircrew Integrated Ensemble (AIE)

Each of the above programs has an importance of its own, but the Air Bag Program and the Aircrew Integrated Ensemble (AIE) Program are the "Interstates" on the ALSE road map. These two programs are aimed at enhancing life support in the Apache, Longbow, and Comanche helicopters and thus linked to Army aviation well beyond the year 2000.

The Joint Aeronautical Commanders Group (JACG) tasked the Army to "make the Helicopter Air Bag Crash Protection System a

Joint Program." The Air Bag Program is currently in Phase II of a Small Business Innovative Research (SBIR) program funded by the Aviation Applied Technology Directorate (AATD), Fort Eustis, VA. Simula, Inc is doing the research for AATD. The Air Bags program will dovetail with the ongoing IBAHRS that PM ALSE has been working for several years.

Both Air Bags and IBAHRS incorporate automotive Air Bag technology. As much IBAHRS technology as possible, such as the crash sensor, will be used in the Air Bags Program. Both of these systems are aimed at increasing protection for crewmembers in our attack aircraft with potential fleet-wide application. The IBAHRS is to be installed on the Army AH-1F and Marine Corps AH-1W fleet. Air Bags are planned for Apache and Comanche.

The AIE program is in an initial study and analysis phase. The objective is to integrate all ALSE and mission equipment to give the aircrews improved cockpit synergy and mission capability. PM ALSE has funded the initial study effort with the Navy to analyze existing and emerging technologies (ALSE — cont. on p. 73)

AIRCREW INTEGRATED ENSEMBLE (AIE)

PHYSIOLOGICAL LIFE SUPPORT

- MICROCLIMATIC CONDITIONING
- OXYGEN MASKS
- WATER PURIFICATION
- NUTRITION
- WASTE MANAGEMENT

VISIONICS

- INTEGRATED HELMET
- VISOR DISPLAYS



C³ (MAN-MOUNTED)

- C³ RADIO
- MICROPHONES
- HEADPHONES
- ANTENNA
- COMPUTER INTERFACE
- COMBAT IDENTIFICATION

SURVIVAL

- ANTI-EXPOSURE ENSEMBLE
- UNDERWATER EMERGENCY O₂
- FLUTATION
- EMERGENCY LOCATOR
- SURVIVAL VESTS
- SURVIVAL EQUIPMENT

AIRCRAFT INTERFACE

- POWER BUS
- DATA BUS

PERSONAL PROTECTION

- NOISE
- BALLISTIC
- NBC
- LASER EYE
- CRASHIMPACT
- FLAMES/HEAT
- NUCLEAR FLASH
- CONCEALMENT

SENSING

- CB DETECTORS
- LASER WARNING

TODAY'S WARRANT OFFICER: A NEW BREED

Are you aware of the dramatic changes in the Warrant Officer Corps lately? Maybe you haven't noticed the confidence expressed in the way they walk, the manner in which they express themselves or the humility when sharing their many years of acquired technical and tactical genius.

Don't feel guilty if you haven't detected the changes in this new breed of warrant officer. It is an ongoing transformation that started with the Total Warrant Officer Study (TWOS) in 1985, followed by enactment of the Warrant Officer Management Act (WOMA) in 1992. It is continuing today with implementation of the initiatives contained in the Warrant Officer Leader Development Action Plan

***An update
on Warrant
Officer affairs,
and a glimpse
at their history,
achievements,
and future.***

(WOLDAP).

Allow me to share a brief historical perspective of the Warrant Officer Corps so you will better appreciate this transformation.

For most of its 75 year history, warrant officers were selected from the senior non-

commissioned officer ranks and appointed "Warrants" as a reward for long service. Early warrant officers were officers, but moved more easily within the NCO Corps, from where they came, than within the Officer Corps.

In more recent years, warrant officers have been selected from the best high school and junior college graduates or from the brightest and most competitive junior NCO ranks. This later group of warrant officers often felt out of place in both the

NCO Corps and the Officer Corps. Consequently, many warrant officers "did their own thing" or were described as "different" by others when asked what warrant officers were. However, when pressed to explain what they really did in the Army, they were always acknowledged to be "the Army's technicians."

The Army leadership recognized the growing importance of Warrant Officers as leader-technicians as their role evolved beyond simply caring for highly sophisticated equipment and complex systems. The Chief of Staff, Army, established a study group — TWOS — to review the roles, missions, and functions of this "new officer". As a result, the WOMA and WOLDAP initiatives aligned warrant officer personnel management with commissioned officer management under the Defense Officer Personnel Management Act (DOPMA) and became the cornerstone of the "new and improved" Warrant Officer Corps.

Aviation leaders agree that today's complex aircraft, communications, and maintenance

systems require full time commitment. In most cases, this is warrant officer business because commissioned officers must devote a great deal of their time to other commitments and commanders' "priorities". This leaves little time to maintain the proficiency levels required to be an expert in these systems.

Warrant Officers, who serve more time in the field than any other officers, became leaders, trainers, and mentors to commanders and other officers in these particularly demanding areas.

What has happened with this new breed of Warrant Officers that you haven't seen?

The new rank of Chief Warrant Officer Five (CW5) is

the most visible change. There are no more "candidates" in flight school; all warrant officers are now appointed to WO1 immediately upon completion of Warrant Officer Candidate School. If they do not successfully complete flight school, their appointment is vacated and they revert to their previous enlisted grade or civilian status. Civilian education has been the biggest change; 70% of the senior warrant officers have at

"There are no more 'candidates' in flight school; all warrant officers are now appointed to WO1 immediately upon completion of the Warrant Officer Candidate School."

least two years of college and 6% have masters degrees. The Army has approved degree completion programs for up to 18 months; applications have never been higher.

The entire military education system has also been revamped. The Warrant Officer Basic and Advanced Course, Warrant Officer Staff Course, and Warrant Officer Senior Staff Course provide leader development at critical career points and are designed to establish commonality with courses, subjects, and titles more familiar to the entire officer corps.

Today's warrant officer is a "new breed", an officer who has mentored more commanders and young commissioned officers than either are aware. They have mastered complex technical skills, honed their tactical skills, acquired advanced degrees and become officers to the fullest extent.

Take care of this very valuable resource. With the Army getting smaller and equipment getting more complicated, you can't afford to not take full advantage of your warrant officer; to paraphrase a popular credit card commercial, "Don't deploy without 'em."

★★

COL Crews is the Chief, Warrant Officer Branch, U.S. Total Army Personnel Command, Alexandria, VA.

OH-58D (continued from page 59)

solicitation, and the burden of proof was on inclusion rather than exclusion. Proposals were thoroughly evaluated across several criteria, and from September through November 1992 the Army conducted a Training Effectiveness User Evaluation (TEUE). The TEUE was essentially a "flyoff" in which competitors demonstrated the suitability of their aircraft for training flight maneuvers. Additionally, safety, human factors, available student margin for error and other considerations were evaluated.

From the time the acquisition strategy was changed from lease to purchase in November 1991, the NTH was on contract in approximately 16 months. This rapid fielding will enable the Army to realize savings in operating costs much sooner than with a typical procurement.

The Bell 206, with over 25 million flight hours logged around the world including the Navy's one million Class A accident free flight hours in a training environment, will provide the reliable, inexpensive and very safe training helicopter the Army needs.

★★

COL Goosen is the Project Manager, Kiowa Warrior PMO, St. Louis, MO.

LTC Thomas is the Assistant Project Manager for Systems Integration, Kiowa Warrior PMO, St. Louis, MO.

THE CH-47 FLIGHT SIMULATOR

The first CH-47C Model Flight Simulator was installed at Fort Rucker, AL, on 15 January 1977. It was the first helicopter training device that used a high-resolution, color, visual system. Three additional CH-47C devices were installed at Fort Hood, TX, Fort Campbell, KY, and Mannheim, Germany.

The model-board visual systems used in the early, "C" version of the CH-47 Simulator were replaced by computer-generated imagery in two "D" models for which the Army contracted in 1983 and installed at Fort Lewis, WA, and Camp Humphreys, ROK. After the installation of those two simulators, the conversion from the C to the D models took place.

Among the noteworthy features of the CH-47D Simulator are:

A review of the current status and future developments of the Chinook flight simulators.

- its visual system
- force-motion and auditory cuing
- instructor-operator station
- night scenes
- crash simulation
- leadship mode.

The D model Chinook trainers are equipped with the Army Tactical Digital

Image Generators (ATACDIGS). The ATACDIG is an interactive visual system with full color imagery for day, dusk, and night operations. The imagery is presented on six monitor displays — two in the front, one on each side, and one for each chin window. The CH-47D trainer has a real time display in the chin bubble which assists the pilot in slingload, pinnacle, and Nap of the Earth (NOE) operations.

The ATACDIG, unlike the model board trainers, has the ability to



generate "generic" terrain beyond the 80km x 100 km boundaries of the data base. The generic terrain prevents the "edge of the world" problem that characterized model boards. The difference between generic terrain and the data-base terrain is the absence of the man-made features in the generic terrain. A TAC map is provided on the Instructor-Operator (I-O) console as a means for keeping the I-O from becoming disoriented. The TAC map is a scale representation of the gaming area with a symbol that indicates the location of the simulated CH-47.

A six degree-of-freedom motion system provides pitch, roll, yaw, lateral acceleration, vertical accele-

ration, and longitudinal acceleration cues. The pilot's seat shakes to simulate continuous and periodic oscillations that the crew experiences during flight maneuvers.

The simulator also has three sets of speakers to provide realistic sound characteristics that are correct with respect to the location and frequency of the aircraft.

The Instructor Operator Station (IOS) is the heart of the trainer. The IOS is located within the simulator compartment to provide complete crew evaluation and training. The IOS comprises a control panel and two CRTs from which training scenarios are monitored and controlled. The instructor can alter the environmental conditions and can

program any of 234 simulated malfunctions up to ten at a time.

Producing a night scene on a CRT is more complicated than just turning down the brightness, because ambient brightness and human color perception are not perfectly correlated (Purkinje Phenomenon and Doppler Effect). All objects that are not light points are therefore represented in the CH-47D as different colors during night and day. Adjustments in moon and overcast combinations allow the color and light levels in the night mode to replicate a true night condition, which can be made so dark that all versions of night vision goggles may be used as they are in the aircraft.

The ATACDIG visual system, unlike the C model visual system, allows contact with objects and presents two kinds of indications to the pilots. If either of the rotor blades or the fuselage contacts an object, the simulator will receive a motion cue (bump) referred to as a soft crash. If both the rotor and the fuselage contact an object, the simulator will produce a crash indication which will "freeze" the trainer. The crash capability allows for realistic slingload, confined area, and NOE operations.

When the leadship function is activated, every movement or flight path is recorded for up to 60 min-

utes. When played back, the leadship feature allows pilots to analyze their aircraft or multiship performance, sortie, or linkup operations. The leadship features also can be used in training to demonstrate students' performance of particular maneuvers. The visual demonstration can be replayed as many times as necessary to evaluate the maneuvers.

The most recent modification of the CH-47 Simulator was completed in 1993 replacing the aging main computational computers with state-of-the-art, commercial, off-the-shelf computers. This change in host computers was accompanied by a simultaneous change in re-writing the old Assembler and FORTRAN software languages in ADA. The flight simulator operator and the pilot will see few changes in the operation of the simulator as a result of the language and computer changes, but the impact of the modifications are great. These changes, which occurred at Fort Hood, Fort Lewis, Fort Campbell, Mannheim, Camp Humphreys, and Fort Rucker, will ensure improved maintainability of the hardware and software into the next century and will allow for system growth in the years to follow.

As the Chinook fleet increases and is distributed throughout the

total force, so does the requirement for increasing the number of flight simulators. The Eastern Army Aviation National Guard Aviation Training Site (EAATS) at Indian-town Gap, PA, conducts a 10 week advanced qualification course in the CH-47D aircraft. A requirement exists during that 10 week course to fly approximately 13 hours in a CH-47D flight simulator. The hours are currently flown at Fort Campbell, KY.

One hopes that a device will be funded in the near future with a total-force initiative in mind. The addition of a CH-47D Flight Simulator at EAATS would significantly increase the National Guard's capabilities, from a regional perspective, a CH-47D Simulator would increase both Reserve and Active Components' training capabilities by providing a needed resource in the Northeastern U.S.

As the Chinook aircraft is modified and improved, so too will the flight simulator be modified to provide the best possible training.

The CH-47D high-fidelity simulator precisely replicates the Chinook instruments and controls required to perform all the tasks listed in the Aircrew Training Manual. The simulator provides transition and refresher training in instruments and contact environments for flight operations, emergency procedures, and combat tactics. With the ongoing improve-

ments to the system, the Chinook flight simulator will continue to be the premier cargo helicopter training system in the world.

★★

CPT Shelton is the Project Director, CH-47D Flight Simulator, STRICOM, Orlando, FL.

ALSE (continued from page 66)

to define the AIE requirements through the year 2003 and beyond. On the preceding page is an artist's concept of what the AIE air crewman will look like. AIE will be a joint service program.

PM ALSE will continue modernization of ALSE to take advantage of the latest technology to enhance the survival of aircrew personnel. We must integrate ALSE in the Army's close combat aircraft to counter the ever changing battlefield threats (NBC, laser, etc), crash forces, and cockpit climatic environments. All of these efforts require extensive teamwork with Navy, USAF, contractor, and other Army agencies — such as PM Soldier and the Chemical Biological Defense Agency (CBDA). We owe it to our aviation soldiers to continue ALSE initiatives as long as a threat exists and they can be called into harm's way.

★★

Mr. Lorenz is the Acting Deputy Product Manager, Aviation Life Support Equipment (ALSE) PMO, St. Louis, MO.

1993 DAC PACK

The professional-personal roster of Dept. of the Army Civilian members of AAAA that returned their questionnaires by September 17, 1993.

ROSTER CODE

Last Name, First Name, MI
(Date of Joining AAAA)
(Nickname)
Address
Duty Phone

Residence Phone
Name of Spouse
Job Description
Current GS (GM/WG) Grade
AAAA Offices held

STANDARD ABBREVIATIONS

AMC - U.S. Army Materiel Command
DPRO - Defense Plant Representative Office
ASE - Aircraft Survivability Equipment
ASF - Aviation Support Facility
ATCOM - U.S. Army Aviation & Troop Command
EID - Electronic Integration Directorate
CCAD - Corpus Christi Army Depot
CECOM - U.S. Army Communication & Electronics Command

CONUS - Continental United States
FW - Fixed Wing
MICOM - U.S. Army Missile Command
OASA - Office, Assistant Secretary of the Army
ODCSLOG - Office, Deputy Chief of Staff for Logistics
PEO - Program Executive Office
PMO - Project (Program/Product) Manager's Office
USAALS - U.S. Army Aviation Logistics School
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Anderson, Phil A., (M85) (Andy) 5826 Wicklow, Corpus Christi, TX 78413. Dy: (512) 939-2095. Res: (512) 852-2946. S: Mary Helen. Job: WIC 50BIA OCA, CCAD, SYCIO Assy. Line.

Andrews, Joseph L., (M82) 1407 Roy Reynolds Drive, Killeen, TX 76543. Dy: (817) 287-0943. Res: (817) 690-4525. S: Hedy. GS: 12.

Andujar, Jose L., (M92) (Bear) C2SID, ATTN:AMSEL-RD-C2-CA, Fort Monmouth, NJ 07703-5603. Dy: (908) 532-0095. Res: (908) 892-5177. Job: Electronics Engr, GS: 12.

Anello, Salvatore F., (M90) 85 Salem Hill Road, Howell, NJ 07731-2135. Dy: (908) 544-2985. Res: (908) 901-0332. S: Judith Ann. Job: Electronics Engr, Command/Control & Systems Integration Directorate. GS: 12.

Armstrong, Richard N., (M84) (Dick) 3363 Augusta Street, Enterprise, AL 36330. Dy: (205) 255-3303. Res: (205) 347-3800. S: Margaret. Job: ARL-HRED. GS: 14.

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Arnold, Matthew M., (M89) 4142 Lee Avenue, St. Louis, MO 63119. Dy: (314) 263-1456. S: Barbara. Job: Electronic Engr, ATCOM. GS: 11.

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Aten, Charles W., (M90) (Charlie) 5146 Cheltenham, Florissant, MO 63033. Dy: (314) 263-3736. S: Marilyn. Job: Auditor, ATCOM. GS: 12.

Aumuller, Robert W., (M88) (Bob) CECOM-NVFS Directorate, AMSEL-RD-NV-SE, Fort Monmouth, NJ 07703. Dy: (908) 544-3106. GS: 15.

Aussicker, Barbara, (M91) (Aussie) HQ CECOM, ATTN:AMSEL-LC-LM-EA, Fort Monmouth, NJ 07703-5007. Dy: (908) 544-5597. Res: (908) 222-7376. S: Curt. Job: Logistics Mgmt Spec, Dept. Army. GS: 12.

Austin, R. Davis, (M85) 2105 Bonroyal Drive, Des Peres, MO 63131. Dy: (314) 263-2788. Res: (314) 821-3299. Job: Supv Insp Engr, AVSDCOM. GS: 13.

Avenevoli, Vicki L., (M83) (Vicki) Lindbergh Chapter Secy, 3191 Donnyca, Maryland Heights, MO 63043. Dy: (314) 263-5861. Res: (314) 739-7549. Job: ATCOM AMSAT-1SBOP, Maintenance Management Specialist. GS: 11. Secretary, Lindbergh Chapter.

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ministration, US Dept of Commerce. SES: 5.

Ball, Robert E., (M84) (Bob) Naval Postgrad School, Dept. of Aeronautics, Monterey, CA 93943-5000. Dy: (408) 656-2885. S: Rana. Job: Naval Postgraduate School.

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Barrientes, Pete, (M81) 1126 Harbor Village, Corpus Christi, TX 78412. Dy: (361) 939-2069. Res: (512) 993-7084. Job: Aircraft Engine Mechanic, CCAD. Past Chapter Officer.

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Bashaw, Bruce L., (M93) 1658 Skiffles Crk Circle, Williamsburg, VA 23185. Dy: (804) 878-3259. Job: AATD, Fort Eustis.

Baskett, Barry J., (M82) 790 Boone Street, Florissant, MO 63031. Dy: (314) 263-1100. S: Pamela. Job: Dir of Engrg, USAAVSCOM. SES: 6.

Bassier, Robert F., (M88) 5420 Mandel, St. Louis, MO 63109. Dy: (314) 268-6039. Job: Supply Clerk, ATCOM. GS: 5.

Baxendale, James F., (M90) (Jim) CECOM NV & ES Directorate, ATTN: AMSEL-RD-NV-SE-EWD, Fort Monmouth, NJ 07703-5206. Dy: (908) 544-3108. Job: Project Leader, ATRICOM, USA CECOM Night Vision Elect. Sensors Dir. GS: 13.

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Bernatinski, Donald M., (M82) 413 Saint Francis Street, Minersville, PA 17954. Dy: (908) 544-3873. Res: (717) 544-5493. Job: CECOM, Fort Monmouth. GS: 12. Life Member.

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Boenker, Matthew C.F., (M92) (Matt) 11916 Old St. Charles Rd., Bridgton, MO 63044. Dy: (314) 263-1666. Res: (314) 739-5130. S: Jo Lynn. Job: Value Engineering Program Manager. GS: 14.

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Boon, Garfield W., (M86) 14925 Alshari's Circle, Florissant, MO 63034. Dy: (314) 263-3208. S: Connie. Job: Chief, CH-47/UH-60F/M&O Branch, Contract Ops Directorate. GS: 14.

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Bowersox, Wilbur, (M82) (Bud) 15917 Chowning Court, Chesterfield, MO 63017. Dy: (314) 263-3221. Res: (314) 394-9301. S: Lili. Job: Div Chief, P&P, Bell/Apache Div, ATCOM. GS: 15.

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Brady, Pamela L., (M82) 8 Parkside Lane, Troy, MO 63379. Dy: (314) 263-1903. Res: (314) 528-4680. Job: Prog Analyst, Apache ATE PMD. GS: 13.

Brandman, Candace J., (M92) (Candy) Building 2525, ATTN: AMSEL-RD-SE-SY-AI-A, Fort Monmouth, NJ 07703. Dy: (908) 544-3711. Res: (908) 369-5558. Job: Computer Scientist, SED Avionics Branch. GS: 12.

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Brooks, Jack H., (M91) 5050 Merganser, Corpus Christi, TX 78413. Dy: (512) 939-3561. Res: (512) 892-8695. S: Nancy. Job: Corpus Christi Army Depot. GS: 13.

Brown, Dorothy L., (M87) (Dot) 4260 Brampton Lane, Bridgton, MO 63044. Dy: (314) 263-6010. Res: (314) 291-3038. Job: Dir Matl Mgmt, Act Sys Div, CH47 Br, 755 Section, ATCOM. GS: 12.

Brown, Eva C.H., (M91) Route 3, Box 302B, Robstown, TX 78380. Dy: (512) 839-2404. Res: (512) 241-1911. Job: Act Records Clerk, CCAD. GS: 5.

Brown, Mary E., (M84) 235 Weeks Drive,

Enterprise, AL 36330. Dy: (205) 255-3804. Res: (205) 347-9405. Job: Training Management Officer, DPTMSEC. GS: 13.

Buckner, Randy L., (M91) 27 Club Grounds North, Florissant, MO 63033-4110. S: Camille. GS: 14.

Buhrkuhl, Robert L., (M87) (Bob) 9370 White Avenue, Brentwood, MO 63144. Dy: (314) 263-1921. Res: (314) 962-9926. S: Bonnie. Job: Assistant PED for Business Mgmt. Avn PED. GS: 15.

Bulger, Leslie H., (M88) 494 Wyn Drive, Newport News, VA 23602. Dy: (804) 878-6122. Res: (804) 887-8943. S: Bruce. Job: Instructional Systems Specialist, Avn Logistics School, Fort Eustis. GS: 12.

Burgess, Robert A., (M88) (Bob) 23 Shadow Ridge Drive, St. Peters, MO 63376. Dy: (314) 263-1078. Res: (314) 441-1423. S: Doris. Job: Aerospace Engr, AVSCOM. GS: 14.

Burke, John J., (M66) 9 Chapman Avenue, Neptune, NJ 07753. Dy: (908) 544-2023. Res: (908) 922-3442. S: Rita. Job: Avionics Project Ldr, CH-47D & UH-1, CECOM RD&E Center, C2SID. GS: 12.

Burnette, Christopher, (M83) (Chris) 756 Bristol, Corpus Christi, TX 78418. Dy: (512) 939-2431. Res: (512) 939-9440. S: Kerry. Job: Fil Test Opns, X2431. GS: 13.

Burns, Bobby J., (M83) (Bob) P.O. Box 275, Bartlett, TX 76511. Dy: (817) 287-5102. Res: (817) 527-4413. S: Barbara. Job: Dep. Instl Avn Off, Ft. Hood. GS: 13. Life Member.

Burwell, James M., (M61) (Jim) 2 Shingle Oaks Drive, Edwardsville, IL 62025. Dy: (314) 263-5502. Res: (618) 288-3646. S: Gudrun. Job: Electronics Engineer, Pm Aviation Electronic Combat (AEC), PEO Avn. GS: 14. Charter Life Member.

Byrnes, Merium M., (M84) 3911-A Brittany Circle, Bridgeton, MO 63044. Dy: (314) 263-1955. Res: (314) 770-1274. Job: Quality Assurance Spec (AVSCOM). GS: 12.

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Calve, Jack W., (M88) (The Vol) Lindergh Chap VP Publ., 3021 Dale Avenue, Granite City, IL 62040. Dy: (314) 263-1164. Res: (618) 451-7650. Job: Public Affairs Spec, ATCOM. GS: 9. VP, Publicity, Lindergh Chapter.

Campbell, Bobbi, (M82) (Bobbi) 256 Third Street, Fair Haven, NJ 07074. Dy: (908) 544-2781. Res: (908) 842-3243. Job: Writer, USA AVRA. GS: 9.

Campbell, Charlotte W., (M93) (Char) 2921 Washburn Road, Lot 18, Corpus Christi, TX 78418. Dy: (512) 939-2009. Res: (512) 937-5110. Job: Corpus Christi Army Depot. GS: 5.

Campbell, Dennis W., (M92) 3402 Ocean, Apt 33, Corpus Christi, TX 78411. Dy: (512) 939-2515. Res: (512) 855-3605. Job: Education Coordinator, Community Counseling Ctr, CCAD. GS: 11.

Cantrell, Thomas R., (M93) Rt. 3, Box 112,

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Robstown, TX 78380. Dy: (512) 939-3172. Res: (512) 387-8309. Job: Aircraft Mechanic, CCAD.

Canup, W. Cheryl, (M89) 126 Cresent Circle, Madison, AL 35758. Dy: (205) 876-2570. Res: (205) 461-4897. Job: Logistics Mgmt Spec, USA Missile Cnd. GS: 12.

Capetta, Fred E., (M76) 1582 Langholm Drive, Florissant, MO 63031. Dy: (314) 263-1070. Res: (314) 921-0319. S: Linda. Job: Deputy Director, Advanced Systems Directorate. GS: 15.

Carter, Charles R., (M92) 603rd ASB, CMR 454, Box 2455, APO AE 09250. Dy: (DSN) 467-2616. Res: (01149)09802-1392. S: Kim. Job: Equipment Spec (Electronic). GS: 11.

Carney, Shirley R., (M81) (Shir) 911 Sugar Lake Court, St. Peters, MO 63376. Dy: (314) 263-5364. Res: (314) 926-3331. Job: Provisioning Specialist, ATCOM. GS: 9.

Carpenter, Cynthia S., (M92) (Cyndi) 8 Cooks Bridge Road, Jackson, NJ 08527. Dy: (908) 544-4340. Res: (908) 905-2498. S: Howard. GS: 9.

Carter, James R., (M89) 1505 Princeton Drive, O'Fallon, IL 62269. Dy: (314) 263-5539. Res: (618) 624-6342. Job: Logistics Mgmt Spec, SFAF-AV-AEC-L. GS: 12.

Cary, Bill R., (M92) 14621 SPID, No. A1, Corpus Christi, TX 78418-6075. Dy: (512) 939-3478. Res: (512) 949-0108. S: Marie. Job: Supervisor, Production Control, CCAD. GS: 12.

Casey, James H., (M88) (Jim) 3900 Bowen Street, St. Louis, MO 63116. Dy: (314) 263-5100. Res: (314) 352-4262. S: Nancy. Job: Patent Attorney, ATCOM Legal Off. GS: 14.

Castillo, Rodolfo, (M92) (Rudy) 6829 Aswan Drive, Corpus Christi, TX 78412. Dy: (512) 939-2069. Res: (512) 991-1459. S: Irene. Job: T700 Engine Assy BR #2, CCAD.

Cecil, William R., (M92) (Bill) 1675 Shores Boulevard, Rockwell, TX 75087. Dy: (817) 280-7501. Res: (214) 722-2802. S: Becky. Job: Deputy Cdr, DPRO. GS: 14.

Celso, Robert, (M82) (Bob) 114 Atlantic, Corpus Christi, TX 78404. Dy: (512) 939-2009. S: Joan. Job: Corpus Christi Army Depot, Army Materiel Command. GS: 14.

Chapman, Carolyn L., (M79) (Carolyn) 11834 Larry Road, Fairfax, VA 22030-5746. Dy: (703) 697-0487. Res: (703) 273-8026. S: Mail. Job: Log Mgmt Spec, HODA, ODCSLOG, Wash DC. GS: 13. 83 Cad Of The Year.

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Chauvette, Martha W., (M84) (Marty) 649 Blossom Street, Corpus Christi, TX 78418. Dy: (512) 939-2068. S: Richard. Job: Supervisory Inventory Mgmt Spec, CCAD. GS: 11.

Chavez, Ramon, (M93) (Ray) 1215 Stillman Avenue, Corpus Christi, TX 78407. Dy: (512) 939-2178. Res: (512) 888-7742. S: Sarah. Job: Defense Distribution Depot, Corpus Christi.

Childs, William C., (M92) (Bill) 1428 Clairmont Road, Decatur, GA 30033. Dy: (404) 752-3678. Res: (404) 636-6414. Job: Flying Hour Pgr Mgr, USAF. GS: 12.

Cioffi, Charles, (M82) (Chuck) 9130 Wembley Woods Drive, St. Louis, MO 63126. Dy: (314) 263-1672. Res: (314) 842-0447. S: Roberta. Job: Branch Chief/Dir Engr/LH A/C, AVSCOM. GS: 14.

Clark, David J., (M92) 440 N. Daleville Avenue, Unit D, Daleville, AL 36322. Dy: (205) 598-9533. S: Yolanda. Job: Flight Instructor, E Co, 1/212th, Fort Rucker. GS: 13.

Cline, John H., (M88) (John) NASA Langley Research Ctr, M/S 266, Hampton, VA 23681-0001. Dy: (804) 864-3966. Res: (804) 851-4551. Job: Research Engrng Technology Transfer, Army Vehicle Structures Div. GS: 13.

Collier, Patricia A., (M89) (Pat) 8151 Oldfield Road, No. 12, Huntsville, AL 35802-4523. Dy: (205) 876-4745. Res: (205) 882-2706. Job: Supply Mgmt Rep, USA Missile Cnd. GS: 12.

Collins, Carol A., (M92) RR 2, Box 1085, Sinton, TX 78387. Dy: (512) 939-3182. Res: (512) 364-5725. S: Joe. Job: Supply Clerk DODT-VB. GS: 5.

Coiten, Norman E., (M88) 44 Stonehenge Dr., Ocean, NJ 07712. Dy: (201) 544-3872. S: Bernice. Job: Electronic Engr, C2SID, RDEC, CECOM. GS: 13.

Contreras, Lois, (M88) Corpus Christi Chap. Secy, 4445 Cedar Pass, #120D, Corpus Christi, TX 78413-4354. Dy: (512) 939-3600. Res: (512) 850-7867. Job: Protocol Officer, CCAD, Cmdrs Staff. GS: 7. Secretary, Corpus Christi Chap.

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Daszczynski, Warren M., (M86) Westerlea Arms Bldg 9, Apt. 6, Hightstown, NJ 08520. Dy: (609) 544-3563. Job: Integrated Logistics Supp Mgr, C2SID. GS: 13.

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Davis, Warren J., (M88) (Grizzly) P.O. Box 4381, Fort Eustis, VA 23604-0381. Dy: (804) 878-5812. Res: (804) 693-6222. S: Patricia. Job: Trng Spec-Structural/Pneumatics Div, DATT, USAALS. GS: 10.

Decosimo, Lawrence P., (M85) (Larry) 529 S. Cooks Bridge Road, Jackson, NJ 08527. Dy: (908) 544-4261. Res: (908) 905-6433. Job: Chief, EW System Development Team, NVES Div, DECOM. GS: 14.

De La Cruz, Juan G., (M74) (De La) P.O. Box 81044, Corpus Christi, TX 78468. Dy: (512) 939-2001. Res: (512) 993-9620. S: Della. Job: Chief, Logistics Management Div. CCAD. GS: 13.

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Deltmer, Jerry F., (M77) 2011 Wakefield Lake Road, Glencoe, MO 63038. Dy: (314) 263-5526. S: Mary Lou. Job: Deputy Proj Mgr, AEC. GS: 15.

Dick, Calvin F., (M92) RD 2, Box 89, Alles Road, Delta, PA 17314-9608. Dy: (703) 607-7720. S: Lorraine. Job: Supply Mgmt Rep, NGB. GS: 12.

Dieckmann, Tony J., (M83) 4117 Joyful Court, Florissant, MO 63034. Dy: (314) 263-7593. Res: (314) 837-7274. S: Joy. Job: Logistics Mgmt Spec, AVSCOM. GS: 12.

Dixon, Peggy J., (M89) 4904 Sun Lake Drive, St. Charles, MO 63301. Dy: (314) 263-1412. Res: (314) 948-1832. Job: Program Analyst Officer, ATCOM. GS: 12.

Dobbins, Debra A., (M88) 4705 Penrose Street, St. Louis, MO 63115. Dy: (314) 263-3103. Res: (314) 381-1144. Job: Contract Spec, ATCOM. GS: 9.

Dodd, David W., (M72) 144 Bret Harde Drive, Newport News, VA 23602. Dy: (804) 878-8862. S: Virginia. Job: Log Mgmt Spec, Concepts & Studies Div, Direct Combat Dev, USAALS. GS: 12.

Dodd, Robert G., (M83) (Bob) 120 Siege Lane, Yorktown, VA 23692. Dy: (804) 727-4243. Res: (804) 898-2872. S: Carolyn. Job: Ops Analysis, HQ TRADOC, DCSCD, Fort Monroe. GS: 14.

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Eschenbach, Allie N., (M90) (Allie) Colonial Virginia Secy., 224 Robertson Street, Williamsburg, VA 23185. Dy: (804) 678-6303. Res: (804) 253-0611. S: Tom. Job: Writer-TV & Motion Pictures, USAALS, DOTD, DTD. GS: 11. Secretary, Colonial Virginia Chapter, St. Michael Award.

Eveker, Clare A., (M92) 4892 Vermilion Drive, St. Louis, MO 63128. Dy: (314) 263-2250. Res: (314) 892-0496. S: John. Job: Contracting Officer, ATCOM. GS: 12.

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Farias, Leonel, (M91) (Leo) 500 Seco, Portland, TX 78374. Dy: (512) 939-2071. Res: (512) 643-4974. S: Anabella. Job: Chief, FAC Engr Division, DES. GS: 13.

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Fary, Stephen W., (M90) 1739 Belman Blvd., Wall Township, NJ 07719. Dy: (908) 544-2568. Res: (908) 681-0142. Job: Aircraft Installation Branch, CECOM, C2SID. GS: 12.

Fedeles, Dominic C., (M88) 12 Tamarack St., Howell, NJ 07731. Dy: (908) 532-0096. Res: (908) 458-4734. S: Eileen. Job: Chief, Lower Echelon Mission Planning Branch, CECOM, C2SID. GS: 14.

Feder, Earl, (M82) 16 Meyer Road, Edison, NJ 08817. Dy: (201) 544-3907. Res: (201) 985-5582. S: Elaine. Job: C2SID, Fort Monmouth. GS: 14.

Ference, Sue A., (M88) 2 Graystone Court, St. Charles, MO 63303. Dy: (314) 263-1589. Res: (314) 723-6606. S: Edward W. Job: Safety Engineer, AVSCOM. GS: 12.

Feutz, Lester, (M59) (Les) Army Avn. Det., Unit 26777, APO AE 09235. S: Janet. Job: Chf, Ft Sidsm, Avn Det, Berlin Brigade. GS: 13.

Finatrock, John W., (M76) Tennessee Valley VP, 118 Summitridge Road, Madison, AL 35758. Dy: (205) 876-6659. Res: (205) 722-9001. Job: Command Ombudsman, MICOM. GS: 15. Life Member. VP, Programs, Tennessee Valley Chapter. Past Chapter Officer.

Firmant, John A., (M81) 491 Monticello Blvd., Lexington, KY 40503. Res: (606) 223-5928. S: Gretchen. Job: LSA/Technical Writer.

Fiothmeier, William S., (M93) (Bill) 8185 Cheshire Street, Ventura, CA 93004. Dy: (805) 989-1972. Res: (805) 847-3695. S: Beverly. Job: Engineer, Naval Air Warfare Center, Weapons Division, Point Mugu, CA. GS: 13.

Fynn, Robert J., (M82) (Bob) 11752 Benedetta, Bridgeton, MO 63044. Dy: (314) 263-2734. Res: (314) 739-4695. Job: ATCOM, St. Louis. GS: 12.

Foreman, Laverne R., (M82) (Vern) 164 N. 74th Street, Apt. 204, Mesa, AZ 85207. Dy: (602) 891-3579. Res: (602) 981-2974. S: Doris. Job: Chief, Manufacturing Branch, DPRO MCHC Del Contract Mgmt Cmd, DLA. GS: 13. Past Chapter Officer.

Frazier, Mary E., (M88) (Mary) 810 Roseanne, Corpus Christi, TX 78418. Dy: (512) 939-2226. Res: (512) 937-5794. Job: Act Records Clerk, CCAD, DIAFRM PDN, PSA & QCONV. GS: 5. Life Member.

Fries, Richard E., (M92) (Rick) 3141 Baybrook, Corpus Christi, TX 78418. Dy: (512) 939-2651. Res: (512) 937-3518. S: Diane. Job: Act Eng Mech, CCAD.

Fullen, Lester M., (M91) (Les) 3140 South Horizon Place, Oviedo, FL 32765-6931. Dy: (407) 380-8120. S: Bonnie. Job: Training Specialist, STRICOM. GS: 12.

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Gage, Jack S., (M86) (Jack) P.O. Box 18666, Corpus Christi, TX 78418. Dy: (512) 939-3305. Res: (512) 884-4610. Job: Industrial Engr, Tech, CCAD (D&D). GS: 9.

Gaggin, David V., (M85) (Dave) Monmouth Chap. Pres, 12 Roger Ave., Lincolnton, NJ 07738. Dy: (908) 544-4851. Res: (908) 842-2338. S: Judy. Job: Dir., C2SID, CECOM. SES: 6. NEB. Pres, Monmouth Chapter. Past Chapter Officer.

Gallegos, Corando, (M92) 5445 South Alameda, Apt. 17D, Corpus Christi, TX 78412. Dy: (512) 939-2660. Res: (512) 992-8600. Job: CCAD, Dept. of Army. GS: 9.

Garcia, Arthur M., (M82) (Artie) 2034 Silver Sands, Corpus Christi, TX 78412. Dy: (512) 939-2119. Res: (512) 993-3679. S: Gracie. Job: Materials Handling Inspector.

Garcia, David L., (M85) (Mouse) 6205 Preakness, Corpus Christi, TX 78417. Dy: (512) 939-2100. Res: (512) 855-4206. S: Nelda Maria. Job: Integrated Systems Electronics Mechanic, CCAD.

Garcia, Niseboro Jr., (M80) (Forty) 7169 Brookridge Ln., Corpus Christi, TX 78414. Dy: (512) 939-3172. Res: (512) 991-3236. S: Vickie. Job: Chief, Flight/Grnd Check Branch, CCAD. GS: 10.

Garcia, Roxanne L., (M92) 2209 Burgundy, Corpus Christi, TX 78418. Dy: (512) 939-2525. Res: (512) 937-1662. S: Louis. GS: 9.

Garcia, Vickie K., (M84) 7169 Brookridge Lane, Corpus Christi, TX 78414. Dy: (512) 939-2131. Res: (512) 991-3236. S: Niseboro. Job: Management Analyst, CCAD. GS: 11.

Garmon, Janet J., (M83) (Jan) Lindbergh Chapter VP Mem., 1525 Tremont Drive, Florissant, MO 63033-3024. Dy: (314) 263-1117. Res: (314) 921-6251. S: Gary. Job: AMSA-VET Prog Analyst, Dr of Eng, ATCOM. GS: 9. VP, Membership Enrollment, Lindbergh Chapter.

Galica, Ruben, (M92) 1213 Bernice Drive, Corpus Christi, TX 78412. Dy: (512) 939-3679. Res: (512) 993-8184. Job: CCAD.

Gaughan, Wm. G., Jr., (M71) (Bill) 60 Goose-neck Point Road, Oceanport, NJ 07757. Dy: (201) 724-4580. Res: (908) 222-0148. S: Jan-na. Job: Aft. Flt. Instructor. GS: 13.

Gentry, C. Patrick, (M88) (Pat) 4618 Stagecoach Trail, Temple, TX 76702. Dy: (817) 288-2058. Res: (817) 778-6643. S: Nancy. Job: Civilian Personnel Dir., III Corps, Fort Hood, TX. GS: 14.

Gibson, Constance S., (M80) (Connie) 764 Lake-mont Dr., Hampton, GA 30228. Dy: (404) 629-8660. Res: (404) 471-7549. S: William. Job: Safety & Occupational Health Dir., USARC. GS: 14.

Gibson, Madelon C., (M93) Box 1025, Little Meadows, PA 18830-9757. Dy: (607) 751-5404. Res: (717) 623-4200. GS: 11.

Gieski, John G., (M88) 526 Nicholas Road, Bricktown, NJ 08724. Dy: (908) 544-3564. Res: (908) 892-6215. S: Priscilla. Job: Electronics Engr, CECOM. GS: 13.

Gilgithy, Judith L., (M85) (Judy) 23 Con-federate Way, St. Charles, MO 63033. Dy: (314) 263-1440. Job: SFAE-AV-CH-L, ATCOM (PEO). GS: 13.

Gomez, Fernando P., (80) (Nando) Box 517, Gregory, TX 78359. Dy: (512) 939-3262. Res: (512) 543-3774. S: Josie. Job: A/C Engr Mechanic Foreman, CCAD. GS: A/C Engr Spvr.

Gonzalez, Guadalupe, (M92) (Go-Go) 4926 Kasper Street, Corpus Christi, TX 78415. Dy: (512) 939-3660. Res: (512) 853-3715. S: Elvia. Job: A/C Engr Repairer.

Gorman, Harold J., (M86) 2 Carr Place, Forked River, NJ 08731. Dy: (201) 544-4603. Res: (609) 693-7802. S: Dolores. Job: Sup Electronics Engr GM 085514, CECOM, C2SD, Ft. Monmouth. GS: 14.

Griffin, Wade, (M81) 3915 Marietta Drive, Florissant, MO 63033. Dy: (314) 263-1712. Res: (314) 839-8128. S: Constance. Job: ATCOM Competition Advocate (Alternate). GS: 14.

Griffiths, John J., (M93) (Griff) 8355 Racquet Drive, St. Louis, MO 63121. Dy: (314) 263-1713. Res: (314) 261-7095. S: Carolyn. Job: PM, Avn Gnd Spt Equip, ATCOM. GS: 14.

Grossman, Daniel C., (M88) 9701 Duluth Drive, St. Louis, MO 63137. Dy: (314) 263-5542. Res: (314) 869-7797. S: Gail. Job: Electronic Engr, ATCOM. GS: 14.

Guerrero, Gilbert R., (M93) 502 Hutchinson Street, Beaville, TX 78102. Res: (512) 358-3701. S: Lupe.

Guilmette, Richard R., (M85) (Rich) P.O. Box 934, Fort Rucker, AL 36362. Dy: (205) 255-6418. Res: (205) 393-2716. S: Rita Marie. Job: Helicopter Instr. Pilot, D. Co, 1212 ATB. GS: 12.

Gunsalus, Richey A., (M86) RD 6, Box 289-B, Ste. 528, Jackson, NJ 08527. Dy: (201) 532-0246. S: Tina. Job: Electronics Engr, US Army CECOM RDEC, Space & Terrestrial Comm. Dir. GS: 13.

Guy, Patrick, (M87) (Pat) 10866 Pear Blossom, St. Ann, MO 63074. Dy: (314) 263-1988. S: Mildred. Job: Budget Officer, ATCOM. GS: 14.

Guzman, Elida, (M83) (Elie) 725 Belmeade, Corpus Christi, TX 78412. Dy: (512) 939-2001. S: Joe.

Guzman, Jose J., (M78) (Joe) AAAA Scholarship Flt. Bd., 725 Belmeade, Corpus Christi, TX 78412. Dy: (512) 939-3251. Res: (512) 992-1722. S: Elie. Job: Director Engine Produc-

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tion, CCAD. GS: 14. Scholarship Board. Past Chapter Officer.

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Hallmark, Gerald D., (M78) (Jerry) D. Co. 7/159th Avn. Regt., Unit 20142, APO AE 09165. Dy: ETS 322-7650/7485. Res: 011-4918184 55621. S: Betty Ann. Job: AVSCOM Equip Spec, UH-60 LAR. GS: 12.

Halpern, Susan S., (M83) 12132 Fairpark Lane, St. Louis, MO 63148. Dy: (314) 263-1305. Res: (314) 432-2382. S: John. Job: Kiowa Warrior PMO, SFAE-AV-ASH-P. GS: 12.

Hamblin, Don L., (M85) (Don) 2 Amber Jack Court, Ballwin, MO 63021. Dy: (314) 263-3340. Res: (314) 227-0149. S: Paula. Job: Logistics Management Specialist, AVSCOM. GS: 13.

Hannell, Tony M., (M73) (J. Edgar) Building 124, NAS Glenview, IL 60026. Dy: (708) 657-2122. Res: (708) 697-8804. S: Gay. Job: Supr, 86th ARCOM AS/26, USAR. GS: 14. Past Chapter Officer.

Harper, Willie D., (M75) (Dale) 505 Maplehurst Road, Jacksonville, NC 28540. Dy: (919) 451-6618. DSN: 484-6496. Res: (919) 347-5701. S: Joyce. Job: Engrg Tech, NAESU Det New River. GS: 11. Charter Life Member.

Harrison, Darrell L., (M88) 4751 Idecker Drive, St. Louis, MO 63129. Dy: (314) 263-9007. Res: (314) 892-2985. S: Mary. Job: Chief, Sys Engr Div, Comanche PMO. GS: 15.

Hartlin, Howard M., (M92) (Mike) 2234 Chip-pewa Trail, Maitland, FL 32751. Dy: (407) 380-4990. Res: (407) 645-3105. S: Karen. Job: Project Dir, PM TRADE. GS: 13.

Haskin, Norma N., (M92) Route 1, Box 152, Ingle-side, TX 78362. Dy: (512) 939-2921. Res: (512) 778-5091. S: George. GS: 9.

Hatley, Virginia R., (M91) (Tooter) Corpus Christi VP Benefit, 438 Mediterranean Drive, Corpus Christi, TX 78418. Dy: (512) 939-2026. Res: (512) 937-5939. Job: Parts Mgmt Spec, Corpus Christi Army Depot. GS: 7. Vp, Benefits, Corpus Christi Chapter.

Haugabook, Sam, (M92) P.O. Box 14312, Augusta, GA 30919. Dy: (706) 791-3532. Res: (706) 855-5794. Job: Instructor, ASE/Avionics, U.S. Army Signal Ctr. GS: 9.

Hecht, Gregory G., (M91) (Hector) 12611 Silver Lake Road, Highland, IL 62249. Dy: (314) 263-3361. Res: (518) 654-9581. S: Debbi. Job: Aircraft Equipment Specialist. GS: 11.

Henderson, Scott E., (M87) (Scotty) 3 W. Garden Walk Drive, St. Peters, MO 63376. Dy: (314) 263-1813. Res: (314) 278-1459. S: Christine. Job: Comanche RAH-66 PM, ILS Division, SFAE-AV-RAH-L. GS: 12.

Henson, Patricia L., (M88) 200 Springfield, Granite City, IL 62040. Dy: (314) 262-2787. Job: Contract Spec, ATCOM. GS: 13.

Hicks, Darrell T., (M92) (Duke/DJ) 3511 Molare Dr., Pensacola, FL 32503-3142. Res: (904) 438-4136. Job: DynCorp Aerospace Opers. GS: 9.

Hiltman, Ned, (M81) 8454-E Plaza Rock Court, St. Louis, MO 63114. Dy: (314) 263-5732. S: Carol. Job: Command Loan Mgr, ATCOM. GS: 11. Past Chapter Officer.

Hinderthier, Dan R., (M89) (Rick) 630 Wimbledon Drive, Dothan, AL 36301. Dy: (205) 255-3909. Res: (205) 792-9471. S: Emily. Job: ARAC Branch Chief, ATB, 1-11th Avn ARAC Div. GS: 15.

Hingle, Edward C., (M88) 2702 Danforth Drive, St. Louis, MO 63129. Dy: (314) 263-3260. S: Sharon. Job: Contract Price Analyst, ATCOM. GS: 13.

Hoffman, Laurence G., (M91) (Larry) AMCE Unit 25331, Box 308, APO AE 09266. Dy: (49) 6221 57 7174. Res: (49) 6227 50194. S: Mickey. Job: ATCOM, Hammonds Barracks, Seckenheim, Germany. GS: 12.

Hogan, John F., (M87) 1503 Springfield Terrace, Dothan, AL 36303. Dy: (205) 255-4111. S: Mary. Job: DCS, USAFVNC. GS: 13.

Hollman, Edward J., (M85) (Ed) 2733 Boop Road, St. Louis, MO 63131. Dy: (314) 263-2178. Res: (314) 432-4327. S: Marcy. Job: Chief of Safety Office, ATCOM. GS: 15.

Horne, Deborah L., (M81) (Deb) P.O. Box 645, Fallston, MD 21047-9998. Dy: (410) 962-2958. Res: (410) 679-5168. Job: Budget Analyst, Baltimore Corps of Engineers. GS: 11. Past Chapter Officer.

Hubbard, Robert D., (M74) (Bob) 151 Shaelah Court, St. Charles, MO 63304. Dy: (314) 263-1800. S: Sally. Job: Dep PM, Comanche. GS: 6.

Huber, Donald E., (M85) (Don) 2523 England Town Road, St. Louis, MO 63129. Dy: (314) 263-5537. S: Catherine. Job: Chief of Technical and Test Branch, PM for AEC. GS: 14.

Hudson, James M., (M90) (Mike) 106 Tyborne Court, Columbia, SC 29210-4235. Dy: (803) 822-5820. Res: (803) 798-4780. S: Rose. Job: ASF Supr, Avn Spt Jcn (123). GS: 12.

Hughes, Timothy J., (M85) (Tim) 5804 Bristlecone Court, St. Louis, MO 63129-2916. Dy: (314) 263-1860. Res: (314) 487-9396. S: Beverly. Job: Chf, Dev Proj Div, Dir For Engr, ATCOM. GS: 15.

Hulick, W. Hayward, (M85) (Hayward) 495 Winterberry Drive, Edgewood, MD 21040-3533. Dy: (410) 671-5266. Res: (410) 676-7371. S: Vicki. Job: Program Analyst, Chem & Biol Defense Agency. GS: 11. Past Chapter Officer.

Hulse, Joan F., (M92) 261 East End Avenue, Belton, NJ 07718. Dy: (908) 544-3901. Res: (908) 787-4460. S: Frank. Job: Data Management Specialist. GS: 9.

Hunt, April K., (M92) 10522 Aylesford Drive, St. Louis, MO 63138. Dy: (314) 263-2105. Res: (314) 388-3204. Job: Secretary, PEO, AV, UH NTH PM. GS: 5.

Hutchings, Linda S., (M91) (Hutch) 1915 Autumn Hill Drive, O'Fallon, MO 63366. Dy: (314) 263-2995. Res: (314) 261-1128. Job: Contract Spec/Contracting Off. GS: 9.

Hutson, Robert V., (M82) (Bob) 9124 Vassel St, St. Louis, MO 63123. Dy: (314) 542-8809. S: Anna. Job: Dir, PATS Contracts, PRG Inc.

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Irvine, Gerald W., (M81) (Jery) P.O. Box 4200,

Fort Eustis, VA 23604. Dy: (804) 678-3272. Res: (804) 677-5772. Job: Public Affairs Officer, Applied Technology Laboratory, Ft. Eustis, VA. GS: 11.

Irwin, Raymond A., (M88) (Ray) 1 Lloyd Place, Oakhurst, NJ 07755. Dy: (201) 544-4589. Res: (201) 292-4633. S: Kristina. Job: Chief, Tech Demo Team, NVES, CECOM, Ft. Monmouth. GS: 14.

Jackson, John E., (M90) P.O. Box 8521, Corpus Christi, TX 78412. Dy: (512) 939-3440. Res: (512) 992-8633. Job: Accountant, Budget, Accounting, Manpower Division, CADC, GS: 12.

Jaren, Steven C., (M92) P.O. Box 149791, Orlando, FL 32814-9791. Dy: (407) 380-4060. Res: (407) 647-2953. Job: Contract Spec, STRICOM. GS: 12.

Jarman, Alton R., Jr., (M85) (Ray) 619 Cheside Loop Road, Seaford, VA 23686. Dy: (804) 678-5758. Res: (804) 698-5274. S: Judy. Job: Trng Instr-Avionics, USAF/AS, Ft. Eustis. GS: 11.

Jellison, Richard N., (M86) (Jelly) 313 Laguna, Telford, TX 78390. Dy: (512) 939-3199. Res: (512) 528-5274. Job: Corpus Christi Army Depot. GS: 11.

Johnson, Bruce W., (M88) 1220 Avant Drive, St. Louis, MO 63137-2128. Dy: (314) 263-2004. Res: (314) 867-4624. Job: Log Mgmt Spec, Light Observ, Hqtr Project Ofc Mgr Weapon Syst Ofc. GS: 12.

Johnson, Douglas C., (M74) (Doug) 4 Seward Drive, Ocean, NJ 07712-3725. Dy: (908) 544-3284. Res: (908) 922-0568. S: Patricia. Job: Proj Engr, USA CECOM, Fort Monmouth. GS: 14.

Johnson, Sammy R., (M80) 5322 Bromley, Corpus Christi, TX 78413. Dy: (512) 939-3622. Res: (512) 992-2900. S: G. Faye. Job: Chief, Navigation and Communication Division, CADC.

Johnston, Larry D., (M79) (Larry) 394 Pebble Acres Drive, St. Louis, MO 63141. Dy: (314) 263-1702. Res: (314) 434-0771. S: Betty. Job: Deputy PM Utility Helicopters. GS: 15.

Jones, Carmen R., (M89) (Carm) P.O. Box 620695, Fort Rucker, AL 36362. Dy: (205) 255-2105. Res: (205) 774-8049. Job: Item Mgr, DOL. GS: 5.

Jones, Donald H., (M89) (Don) PM TRADE, 12350 Research Parkway, Orlando, FL 32826-3276. Dy: (407) 380-8079. Res: (407) 366-7751. S: Brenda. Job: Deputy Prod Mgr for Air Combat Trng Systems, PM TRADE, STRICOM. GS: 14.

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Kallos, Nicholas C., (M79) (Nick) 209 Roger Webster, Williamsburg, VA 23185. Dy: (804) 678-3507. S: Gay. Job: Deputy Director, AATD. GS: 15.

Kalser, Richard F.D., (M77) (Dick) 11115 Seabury Dr., Apt. A, St. Louis, MO 63138. Dy: (314) 263-2775. Res: (314) 867-5121. Job: Ctl, Distribution & Transportation Div, USAATCOM. GS: 15. Past Chapter Officer.

Kaloud, Andrew S., (M92) 3 Tulip Lane, Holmdel, NJ 07733. Dy: (908) 544-3876. Res: (908)

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946-0775. S: Mary Ann. Job: Electronic Engineer, CECOM RDEC Fort Monmouth. GS: 13.

Karg, Ronald K., (M85) 3 Coventry Square, Holmdel, NJ 07733. Dy: (908) 544-3891. Res: (908) 946-4583. S: Jeanette. Job: Electron Engr, CECOM, C2SID. GS: 14.

Kelm, John R., Jr., (M80) (Randy) Delaware Valley, Treas., 4674 Maiden Drive, Wilmington, DE 19803. Dy: (215) 591-8622. Res: (302) 764-7865. S: Linda. Job: Aero Engr, Comanche Program Integrator, DPPO Boeing Helicopters. GS: 12. Treasurer, Delaware Valley Chapter.

Kelster, Arlie D., (M90) 7903 Lyle Lane, Dittmer, MO 63023. Dy: (314) 263-5511. Res: (314) 285-3683. S: Vicki. Job: Electronic Engr, PM AEC. GS: 14.

Kelley, Karen L., (M82) 1709 Nashua Drive, Delwood, MO 63136. Dy: (314) 263-3307. Res: (314) 867-4695. Job: Supv Contracting Ofc, ATCOM. GS: 13.

Kelly, Gary N., (M91) 7329 Montreal Circle, Corpus Christi, TX 78414-3209. Dy: (512) 939-3648. Res: (512) 992-1437. S: Beth. Job: Mgmt Analyst, CADC. GS: 11.

Kemp, Paulton E., (M90) (Gene) PSC 303, Box 50, APO AF 96204-0050. Dy: 723-8861. Res: (02) 591-9520. S: Brenda. Job: Engr, Palau Electronics Corp. GS: 11.

Kennedy, Joanne M., (M86) 15502 Jost Circle, Florissant, MO 63034-3457. Dy: (314) 263-3186. Res: (314) 638-4445. S: Robert. Job: Supr Contr Spec, AVSCOM. GS: 14.

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Kerby, Paul D., (M83) 5715 Hidden Stone Drive, St. Louis, MO 63128. Dy: (314) 693-2725. Res: (314) 487-5872. S: Darlene. Job: Chief, Avn Sys Div, Weapon Sys Mgmt Ctr. GS: 14.

Khemchand, Frederick, (M80) (Sonny) Army Aviation Det., Unit 26777, APO AE 09235. Dy: (030) 819-5437. Res: (000) 665-2130. S: Beryl. Job: Calibration Coordinator, Avn Det, Maint Element Bde. Vp, Membership Enrollment, Checkpoint Charlie Chapter.

Kichline, Lynn M., (M91) 1000 Escalon Avenue, Apt. F-2048, Sunnyvale, CA 94086. Dy: (415) 604-3010. Res: (408) 738-3769. Job: Contract Specialist, ATCOM, Aeroflightdynamics Div., Moffett Field. GS: 11.

Kirsch, Franklin K., (M88) (Frank) P.O. Box 361, O'Fallon, MO 63366-0361. Dy: (314) 263-1349. Res: (314) 272-7697. Job: Aerospace Engr, RAH-66 PMO. GS: 14. Life Member.

Klein, Manfred W., (M85) (Fred) 2205 Scarlet O'Hair Cir., Huntsville, AL 35803. Dy: (205) 878-5248. Res: (205) 883-0673. S: Diane. Job: Sys Engr & Prod Dir, USAAMCOM. GS: 14.

Kravchuk, Debbie A., (M89) 7272 Abbey Lane, Winter Park, FL 32792. Dy: (407) 380-8541. Res: (407) 671-0824. Job: Systems Engineer, STRICOM. GS: 12.

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Krueger, Charles W., (M84) 2002 Airline, No. 1407, Corpus Christi, TX 78412. Dy: (512) 939-4532. Job: Trouble Shooter A/C Common Hardware-Material Equipment, CADC.

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Lange, James P., (M86) (Jim) 356 Suburban Drive, Toms River, NJ 08753. Dy: (908) 544-4028. Res: (908) 349-0284. S: Carol. Job: Electronics Tech, C2SID. GS: 12.

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Kiowa Warrior PM. GS: 14.

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Mattingly, Don G., (M92) 6 Cedar Glade, F. Eureka, MO 63025. Dy: (314) 263-2226. Res: (314) 677-4957. S. Patti. Job: AVSCOM/GTCS. GS: 9.

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Reynolds, Virginia L., (M84) (Ginny) 42097 Via Cuesta Al Sol, Temecula, CA 92591. Dy: (619) 537-4770. Res: (909) 676-8633. S: Daniel. Job: Secy, Navy Alcohol Rehabilitation Center, NAS Miramar, CA. GS: 6. Past Chapter Officer.

Rhen, Claudia Lee, (M85) 241 Failing Leaf Drive, St. Peters, MO 63378. Dy: (314) 263-7633. Res: (314) 441-5727. S: Darryl. Job: Opns Research Analyst, ATCOM. GS: 13.

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APACHE

(continued from page 48)

Apache Integrated Training Program family of training devices. These devices are concurrent engineered products developed in compliance with the TRADOC Systems Approach to Training and MIL-STD-1379D. These media utilize a hardware and software architecture that flows down from the aircraft and through the individual devices within a modular design framework. This results in significant cost savings in both up front acquisition and O&S costs. It also provides a "leader-follower" relationship with the Longbow Apache program and generates additional savings (i.e., up to 65%) for its family of media in the form of transportable, reusable software and hardware.

The Apache Crew Trainer is a high fidelity, mobile (land, sea, air transportable), distributed interactive networkable device intended to satisfy requirements for individual initial/sustainment training, crew/collective team training, combined arms tactical training, mission rehearsal, and Battle Lab/Louisiana Maneuver interplay.

It is principally comprised of numerous auxiliary cockpits (Apache, Longbow Apache, and Kiowa Warrior) and an aircraft equivalent (front seat and back seat) cockpit. Among its many optional uses, it affords a

powerful tool to support tactics, techniques, and procedures development required under the Aviation Restructure Initiative, and also represents training for the emerging digital battlefield. Above all else, it offers a low cost, low risk medium for Army Aviation to demonstrate its maneuver force capabilities and dominance as the third dimension centerpiece of the land force.

With simulation lighting our path to the vision of the future, you can rest assured that Apache, and, Longbow, will offer the force commander more flexibility and lethality than has ever been available to Army Aviation. The crews will benefit from high fidelity training via simulation, as well as survivability, and reliability in the actual weapon system.

Technology advancements and insertion will continue to change our vision into reality. As General Sullivan said recently at the Longbow rollout ceremony: "Longbow allows us to capture the battlefield, and engage the enemy in all its dimensions ... speed, space and time. We know where we are, we know where you are, we know where you are not, and we are coming after you day and night, until we win. That's what this helicopter is all about."

★★

LTC Gunning is the Product Manager, Longbow Apache Aircraft, PM Longbow, St. Louis, MO.

LTC Young is the Product Manager, Apache Modernization, PM Apache, St. Louis, MO.

Solicitation now underway for CY 93 AAAA National Awards: NOMINATIONS DUE AT THE AAAA NATIONAL OFFICE ON OR BEFORE JAN. 15, 1994.

"Award Presentations"

Up to eight AAAA National Awards for accomplishments made during Calendar Year 1993 will be presented at the 1994 AAAA Annual Convention in St. Louis, MO. Senior members of the U.S. Army will be invited to present the AAAA's top awards to the 1993 winners.



"Outstanding Aviation Unit Award"

Sponsored by the McDonnell Douglas Helicopter Company, this award is presented annually by AAAA "to the Active Army aviation unit that has made an outstanding contribution to or innovation in the employment of Army Aviation over and above the normal mission assigned to the unit during the awards period encompassing the previous calendar year." Any Active Army Aviation unit that has met the foregoing criteria is eligible for consideration.

"ARNG Aviation Unit of the Year Award"

Sponsored by Textron Lycoming, this award is presented annually by the AAAA "to the Army National Guard aviation unit that has made an outstanding contribution to or innovation in the employment of Army Aviation over and above the normal mission assigned to the unit during the awards period encompassing the previous calendar year." Any Army National Guard aviation unit or organization that has met the foregoing criteria is eligible for consideration.

"USAR Aviation Unit of the Year Award"

Sponsored by Textron Lycoming, this award is presented annually by the AAAA "to the U.S. Army Reserve aviation unit that has made an outstanding contribution to or innovation in the employment of Army Aviation over and above the normal mission assigned to the unit during the awards period encompassing the previous calendar year." Any U.S. Army Reserve aviation unit or organization that has met the foregoing criteria is eligible for this award.

"The Robert M. Leich Award"

Sponsored by the Grumman Corporation, this award is named in memory of Brigadier General Robert M. Leich, USAR, the AAAA's first president (1957-1959) and its Awards Committee Chairman for 23 years. It is presented periodically to a unit for sustained contributions to Army Aviation, or to a unit or an individual for a unique, one-time outstanding performance.

"Army Aviator of the Year Award"

Sponsored by the Sikorsky Division of United Technologies Corporation, this award is presented annually through the AAAA "to the Army Aviator who has made an outstanding individual contribution to Army Aviation during the Awards period encompassing the previous calendar year." Membership in AAAA is not a requirement for consideration. A candidate for this award must be a rated Army Aviator in the Active U.S. Army or Reserve Components, and must have made an outstanding individual achievement.

"Aviation Soldier of the Year Award"

Sponsored by Bell Helicopter Textron, this award is presented annually by AAAA "to the enlisted man serving in an Army Aviation assignment who has made an outstanding individual contribution to Army Aviation during the awards period encompassing the previous calendar year." Membership in AAAA is not a requirement. A candidate for this award must be serving in an Army Aviation assignment in the Active U.S. Army or the Reserve Components, and must have made an outstanding individual achievement.

"James H. McClellan Aviation Safety Award"

Sponsored by General Electric Aircraft Engines in memory of James H. McClellan, a former Army Aviator who was killed in a civil aviation accident in 1958, this award is presented annually to an individual who has made an outstanding individual contribution to Army Aviation safety in the previous calendar year." The award is NOT intended to be given for the accumulation of operational hours without accidents by any aviation unit.



"Joseph P. Cribbins DAC of the Year Award"

Sponsored by Boeing Helicopters, this award is named for Mr. Joseph P. Cribbins, the award's first recipient in 1976. It is presented annually by AAAA "to the DAC who has made an outstanding individual contribution to Army Aviation in the awards period encompassing the previous CY." Membership in AAAA is not a requirement. A candidate for this award must be a current Department of the Army Civilian.

Administrative Details

ACCOMPANYING DATA FOR INDIVIDUAL AWARDS: A standardized "Nomination Form for Submission of All AAAA National Awards" is the sole form utilized by the Awards Committee in its selection of annual AAAA National Award Winners. Copies may be obtained from any Chapter Secretary or by writing to AAAA, 49 Richmondville Ave., Westport, CT 06880-2000.

The form should be accompanied by a recent photo and biographical sketch of the nominee. Photos of the commander and the senior NCO must accompany each unit nomination. The "Nomination Form for Submission of All AAAA National Awards" and the accompanying photo(s) must be received at the AAAA National Office on or before January 15. Please use stiffeners to protect the photo(s) being submitted. The receipt of each nomination and seconding nomination will be acknowledged by the AAAA. However, awards nominations materials - to include photographs - cannot be returned.

AIR ASSAULT CHAPTER FORT CAMPBELL, KY

CW2 Archie J. Chapman, Sr.
MAJ William R. Frunzi
CW2 Tony A. Hines
CW2 Jeffrey A. Marler
Ms. Karen S. Speidel

AMERICA'S FIRST COAST CHAPTER JACKSONVILLE, FL

SPC Greg E. Knight

ARIZONA CHAPTER MESA, AZ

Mr. Jack W. Esry

ARMADILLO CHAPTER CONROE, TX

CW3 Michael L. Bassett

AVIATION CENTER CHAPTER FORT RUCKER, AL

2LT Darryl Lee Gerow
W01 Lawrence D. Harrington
1LT Robert D. Irving
SPC Jerome D. Jordan
2LT Danny M. Kelley, II
CW2 Chester R. McGee, III
CPT Gregory S. McMeel
2LT Kevin A. McKenna
2LT Raymond E. Meadows
CPT Jerome C. Meyer
1LT Cameron F. Moose
SSG Robert L. Niebrugge
W01 Monty Nijar
2LT Hilton J. Nunez
SSG Sonia R. Patton
Mr. John P. Rhein
2LT Gordon D. Schmidt
SPC Rodger L. Singletary
2CD Scott C. Small
CW4 Leon L. Sline, III
Ms. Cheri C. Swaim
Mr. David Swaim
Mr. Carl E. Swanson, Jr.
CW3 Geoffrey A. Vandewert
CW3 Allen R. Wells

CENTRAL AMERICAN CHAPTER FT. CLAYTON, PANAMA

CPT Jerold D. Bastian
CW2 Johnnie E. Estlinger
CW4 Jerry D. Manning
MAJ Forrest P. Poulson

CENTRAL FLORIDA CHAPTER ORLANDO, FL

Mr. Everett S. Diaz
Ms. Sharon R. Mitchell

CHECKPOINT CHARLIE CHAPTER BERLIN, GERMANY

SSG Michael E. Rice

COLONIAL VIRGINIA CHAPTER FORT EUSTIS, VA

PVT Douglas C. Adair
PFC Grover M. Alcock
PFC Shawn H. Alexander
SSG Kimball M. Almour
Mr. Gene A. Brocco
PVT Scott D. Callanan
MSG Gary L. Conrill
PFC David L. Engebrecht



PVT Roger E. Evans
PV2 Scott J. Hamelin
CW4 Haltonia A. Holliday
PVT Christopher H. Horen
CPT Johnathan E. Mankel
PVT David E. Miens
CPT Cynthia A. Palinski
Mr. James R. Parker
CW4 Paul J. Petrakis
Ms. Gail L. Souder
SGT James J. Strnad
COL John B. Ties, III
CPT Charles Triblett

CORPUS CHRISTI CHAPTER CORPUS CHRISTI, TX

Mr. Leonides Botello
Mr. John J. Chavez
SGT Matthew T. Darbro
SFC Robert L. Folmer
Mr. Albert Garza, Jr.
Mr. Alonso Jasso
Mr. Shabram Malekpour
Mr. Pedro M. Pedraza
Mr. John R. Rios
LTC Daniel Q. Rodriguez
LTC Danny R. Sylve
Mr. Dave C. Tindall, Jr.
Mr. Larry W. Tipton
Mr. Rolando A. Uribe

FLYING TIGERS CHAPTER FORT KNOX, KY

COL Terry A. McDowell
CW4 Don A. McLaughlin
CW2 Glenn A. Phelps
CW4 John D. Pickard
CW4 Robert A. Poe
CW2 Richard T. Smith
CW2 Ricky D. Snoddy
CW3 Tracy A. Strong
CW2 Sean M. Walker
CW4 James M. Walters
CW2 Thomas R. Webb
CW2 James T. White
1LT Earl G. Williams, Jr.

GREATER ATLANTA CHAPTER ATLANTA, GA

MAJ Kathryn M. Moore

GREATER CHICAGO AREA CHAPTER CHICAGO, IL

Mr. Michael Sobey

HANAU CHAPTER HANAU, GERMANY

1LT Jeffrey C. Allen
CW4 Thomas L. Anderson
CPT Mark A. Benson
CW3 Richard J. Brostrom
1LT Margaret A. Chanez
1LT Katherine A. Fehskens
SPC Michael D. Kurlis
CW4 Henry W. Moore, III
SGT William S. Owens
CPT Barry K. Read
PFC Richard A. Timian
SGT Richard W. Wagner
1LT William M. Wyatt

HIGH DESERT CHAPTER FORT IRWIN, CA

CPT John D. Beck
CPT Gregory E. Vallet

HUDSON-MOHAWK CHAPTER ALBANY, NY

CW4 Guy R. Demers

INDIANTOWN GAP CHAPTER INDIANTOWN GAP, PA

CW4 Richard E. Cropley
SSG Ricky R. DiMara
COL Charles E. Martin

IRON MIKE CHAPTER FORT BRAGG, NC

CPT Adrian R. Farrell
CW2 Steven N. Snyder
CW2 Mark B. Stewart

JACK H. DIBRELL/ALAMO/ FORT SAM HOUSTON, TX

1SG Alvaro V. Serna

LINDBERGH CHAPTER ST. LOUIS, MO

Mr. James D. Barton II
Ms. Mary L. Bunderthal
Mr. Peter P. Caudill
Mr. Larry E. Crane
Mr. John J. Czura
Mr. Charles L. Davis
Mr. Robert A. Garrison
Mr. Carl G. Hayes
LTC Jon S. Koester
Mr. Robert C. Kutsch
Dr. Harold Y. H. Law

CW2 Craig A. Lessor
SGM Charles I. McCarthy
Mr. Jerry P. Mellick
SSG John K. Neeland
Mr. Gregory L. Siemias

MACARTHUR CHAPTER NEW YORK/LONG ISLAND AREA, NY

Mr. Wayne Cornstock
Mr. Peter C. Connolly
Mr. Thomas E. O'Neill
Mr. Richard Ross
Mr. Robert Russo

MID-AMERICA CHAPTER FORT RILEY, KS

1LT Sheila R. Day
CPT Delven R. King
SPC Verdon L. Sims
SPC David A. Smith, Jr.
CPT Chris R. Ulrich

MORNING CALM CHAPTER SEOUL, KOREA

Mr. Ke Tak Lee
BG Sung Mook Paik
MAJ Dennis L. Roach

NIAGARA FALLS NYARNG CHAPTER NIAGARA FALLS, NY

MAJ Michael E. Kistner

NORTH COUNTRY CHAPTER FORT DRUM, NY

1SG Patrick J. Laidlaw

NORTHERN LIGHTS CHAPTER FORT WAINWRIGHT/ AIRBANKS, AK

SPC Michael T. Blaize
MG David A. Bramlett
SPC Patricia D. Duncan
CW2 Gordon A. Hughes
SSG James K. Mathews
SPC Michael R. Metcalf
1SG Dennis W. Mullen
SSG David C. Nall
CPT Brian C. Olson
CPT Christopher D. Perry
CPT Dan R. Shea
SSG Peter J. White
SFC Peter L. Yandall

OLD BILL CHAPTER FORT BLISS, TX

Mr. Michael A. Schuck

OLD TUCSON CHAPTER MARANA, AZ

CW3 Roger H. Anderson

PHANTOM CORPS CHAPTER FORT HOOD, TX

CW2 Roger L. Baird
2LT Christopher L. Brown
CPT Richard E. Crogan, II

NEB MINUTES

AAAA's National Executive Board (NEB) conducted its Fall meeting in Washington, D.C., 18 Oct 1993. Major actions included:

AWARDS: ESTABLISHMENT OF AAAA AVIONICS AWARD. MG Harrison referred the NEB to the Agenda and advised the NEB that the NEB approved the establishment of an AAAA Avionics Award at the last NEB meeting. A motion was approved to accept Cubic Defense Systems, Inc. as the award sponsor and to accept the proposed design as presented in the Agenda.

AWARDS: APPROVAL OF DISTINGUISHED GRADUATE COURSES FOR AAAA AWARDS. A motion was approved to accept the list of courses developed by the Aviation Center Chapter as presented in the Agenda to be recognized for AAAA Distinguished Graduate Awards.

AWARDS: APPROVAL OF AAPI AS AAAA ESSAY CONTEST SPONSOR. MG Harrison advised the NEB that the publisher of Army Aviation Magazine, AAPI, proposed to sponsor the AAAA Annual Essay Contest and underwrite the \$1,000 annual prizes. A motion was approved to accept AAPI as the sponsor and underwriter of the \$1,000 cash prizes.

AWO AFFAIRS: REQUEST TO DISTRIBUTE AWO SURVEY TO MEMBERS AND NON-MEMBERS. MG Harrison referred the NEB to the Agenda and asked CW4 Pisano to brief the NEB. CW4 Pisano requested approval to conduct a survey of the Aviation Warrant Officers at the Aviation Warrant Officer Academy in Fort Rucker, AL. A motion was approved to undertake the survey as presented in the Agenda.

BY-LAWS & LEGAL: PETITION TO AMEND BY-LAWS SECTION 5.2, ORGANIZATIONAL STRUCTURE. MG Harrison referred the NEB to the signed Petition in the Agenda to amend Section 5.2, Organizational Structure. A motion was approved to amend the By-Laws, Section 5.2, Organizational Structure, so that the Regions listed in the AAAA By-Laws conform to the Regions of the U.S. Army.

BY-LAWS & LEGAL: PETITION TO AMEND BY-LAWS SECTION 2, MEMBERSHIP. A motion was approved to amend the By-Laws, Section 2, Membership, to incorporate AAAA's policy on Standards of Conduct into the AAAA By-Laws.

2.71—Members are encouraged to read and be familiar with these By-Laws. Copies are on file with Chapter Secretaries and are obtainable from the National Office on request. At Chapter-, Region-, and National-Sponsored activities, members of the Association will refrain from acts of personal conduct that are morally offensive to the Association membership and to the communities in which the activities are sponsored.

POLICY & PLANS: ESTABLISHMENT OF TRAVEL BUDGET. MG Harrison referred the NEB to 1994 travel budget outlined in the Agenda and requested approval. A motion was made to approve the 1994 travel budget as outlined in the Agenda.

REVIEW OF AAAA SCHOLARSHIP SELECTION PROCESS. A motion was approved that overall merit ranking would apply in the general selection process; for designated set-aside categories, separate merit ranking lists would be established for applicants in those categories; and in the absence of applicants in designated set-aside scholarship categories, those scholarships would be awarded to applicants based on the overall merit ranking process.

New Members (continued)

LTC Michael L. Dixon
CW2 Richard A. Feagin
LTC Don V. Fenier
CW2 Gary C. Galbraith
CPT William D. McGarrity
CPT Gary W. McGrath
CPT Michael C. Moloney
1LT William T. Winkbauer
CW2 David Wortner

PIKES PEAK CHAPTER FORT CARSON, CO

CW3 Larry L. Gonzalez
CW4 Steven C. Scherb

RAZORBACK CHAPTER NORTH LITTLE ROCK, AR

CW4 Robert W. Fureigh

SAN JACINTO CHAPTER ELLINGTON FIELD, HOUSTON, TX

Mr. Ronald Salwen

SAVANNAH CHAPTER FT STEWART/ HUNTER AAF, GA

CPT James E. Bird
CPT Robert B. Foutz
CPT John S. Hodges
CW3 Patrick J. Mazzone
CPT Barrett K. Peavie
MAJ James R. Ritchie

SOUTHERN CALIFORNIA CHAPTER LOS ANGELES, CA

CPT Gerald D. Syas

WASHINGTON D.C. CHAPTER WASHINGTON, DC

MSG Daniel W. Boone
SSG Fitzroy W. Delacourday
COL Dickey R. McKinney, Ret.
Mr. Lawrence P. Peduzzi

WINGS OF THE DEVIL CHAPTER FORT POLK, LA

CPT Robert S. Frazier

MEMBERS WITHOUT CHAPTER AFFILIATION

CDT Brian A. Cope
LTC James A. Cozine
CDT Paul J. Hess, III
Mr. Jason D. Johnston
SSG Bond Kinney
Mr. Joerg Lunow
SGT Darin Myers
Mr. Alan B. Nussbaum
Mr. Oliver C. Pade
Mr. Rick Reinmuth
Ms. Jan Stiffey
Mr. Raymond E. Smolenski
CPT Larry W. Thomas
MAJ Richard L. Thomas
SPC Davis K. Ulfirson
SGT Michael S. Wagner
PFC Catherine S. Webb

AAAA offers \$125,000 in 1994**Two scholarships now "set aside" for spouses of AAAA members
Scholarships also "set aside" for AAAA Company Grade Officer,
Warrant Officer, Enlisted and Civilian members****■■■BACKGROUND:**

The AAAA Scholarship Foundation, a separate non-profit, tax-exempt corporation created to render financial assistance to members of the Army Aviation Association of America, Inc. (AAAA) and spouses, unmarried siblings, and unmarried children of current and deceased AAAA members, expects to make available \$125,000 in assistance funds for the 1994 college-entry year.

■■■SCHOLARSHIP GRANTS AND LOANS:

A minimum of forty scholarships will be presented to entering freshmen — ranging from \$1,000 to \$12,000 grants given out as one, two or four year scholarships; five interest-free loans of up to \$4,000 (\$1,000 a year); a \$10,000 scholarship to an applicant pursuing a four-year degree in engineering; a \$4,000 scholarship (\$1,000 a year) to an eligible applicant pursuing a four-year B.S. degree in an aeronautical-related science.

In addition, six scholarships will be presented to undergraduate sophomores, juniors or seniors (\$1,000 a year) and three \$1,000 scholarships will be presented to graduate students.

Also, two \$1,000 scholarships will be "set aside" for spouses of AAAA members in pursuit of college studies at the undergraduate or graduate level; two \$1,000 scholarships will be "set aside" for AAAA Company Grade Officer members; two \$1,000 scholarships will be "set aside" for AAAA Warrant Officer members; two \$1,000 scholarships will be "set aside" for AAAA Enlisted members; and two \$1,000 scholarships will be "set aside" for Civilian members for full-time or part-time study in pursuit of off-duty educational goals. Set aside scholarships are designed to encourage broader participation within these categories. In the event there are fewer applicants than awards for a specific set aside scholarship, the remaining set aside award(s) will be issued to the next most competitive candidate without regard to the category.

■■■AWARD PHILOSOPHY:

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

■■■APPLICATION PROCEDURE:

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

■■■ELIGIBILITY CRITERIA:

The applicant must be attending an accredited college or university or selected for Fall entry as an undergraduate or graduate student. No recipient can hold concurrent AAAA Scholarships. Applicants who will attend a Service Academy or who receive a four year ROTC Scholarship are ineligible for a grant or loan. The AAAA member to which the applicant is related must have an effective date of membership on or before **October 15** of the year preceding the year in which the applicant is seeking aid unless the member is deceased.

■■■SELECTION AND NOTIFICATION:

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

New AAAA Chapter Officers

Aloha:

COL Benton H. Borum (Pres).

Colonial Virginia

CPT Neal Freeman (VP Prog);
MAJ William M. Gavora (VP
Publicity); LTC James E.
Sutton (VP USAR).

Iron Mike:

LTC Joseph G. Kaufmann,
Jr. (Sr. VP); CPT Richard G.
White (Secy); 1LT David A.
Kirklan (Treas.); MAJ Lisa
A. Black (VP Memb); CPT
Craig H. Bird (VP Off. Affrs.);
CSM John J. Mercer (VP
Enlisted Affairs); CPT David
E. Wood (VP Public Affairs);
MAJ Thomas W. Johnson
(Unit Rep. 82d AVN BDE).

Mid-America:

MAJ Daniel S. Brown (Senior
VP); MAJ Marcus Blair (VP
Prog); CW3(P) Casper
LeBlanc (VP Member-at-
Large); CW4 Ronald V.
Byron (VP Member-at-
Large); CSM Gene Scott (VP
Enlisted Affairs)

North Country:

LTC James A. Kelley (Pres).

Talon:

MAJ Roy J. Panzarella
(Pres); CPT Derek R.
Rountree (Secy); 1LT Jerry
L. Baird (VP Memb); CPT
Michael A. Casper (VP Prog).

Thunderhorse:

CPT Todd A. Messitt (Pres).

AAAA Life Members

1LT Gregory W. Glover
COL Seth Hudgins, Jr., Ret.
CPT Robert Marcinkowski
CW2 Jason F. Mohawk
CPT Bruce A. Wilhelm



LTG Teddy G. Allen (right) received the Honorable Order of St. Michael Silver Award from MG John D. Robinson, Aviation Branch Chief and Commanding General, Fort Rucker, AL, on 3 August 1993. LTG Allen retired on 27 August 1993, and his Silver Award was only the seventh presented in the history of the program.

LTC Rich Clifford, NASA Astronaut, proved to be a crowd pleaser as he signed autographs for members of the Corpus Christi Chapter on Tuesday, 9 March 1993. LTC Clifford shared a slide presentation on his experiences while aboard the Space Shuttle *Discovery's* flight STS-53 in December 1992.



Aces

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

1LT Margaret A. Chanez
Ms. Allie N. Eschenbach
LTC Stanley E. Meyer
GW2 William R. Morse
CPT Brian C. Olson
MAJ Christopher C. Romig

New AAAA Sustaining Members

Dothan Area
Chamber of Commerce
 Dothan, AL

New AAAA Industry Members

**Decisions & Advanced
Technology Associates,
Inc. (DATA)**
 Maryland Heights, MO

Honorary Members

The following persons have been selected by their Chapters as Honorary Members. Each will receive a complimentary one year membership, citation in these pages, and "Certificate of Honorary Membership."

MG George A. Crocker
Central American Chapter

Mr. Richard Stafford
MacArthur Chapter

BG James L. Wilson
Central American Chapter



On 23 July 1993, LTC Bruce E. Simpson (right), then Deputy Commander, 18th Aviation Brigade, was presented the Order of Saint Michael Bronze Award by MG Edison E. Scholes (left), XVIII Airborne Corps Deputy Commanding General, at Fort Bragg, NC. Looking on are LTC Simpson's wife, Patti, and his two daughters.

LTC Julius G. Scott, Jr. (left), then Commander, 1st Battalion, 223rd Aviation Regiment, accepts the Order of Saint Michael Bronze Award from former Aviation Training Brigade Commander, COL Thomas M. Roy (center), on 26 July 1993 at Ft. Rucker, AL. The occasion was LTC Scott's battalion change of command ceremony.



Top Chapters

The 1 November 1993 Membership Enrollment Competition standings have the following chapters ahead with one month left in the CY93 contest ending 31 December. The rankings are based on CY93 net membership gain.

Master Chapters

(175 or more members)

1. Phantom Corps.....93
2. Colonial Virginia.....21

Senior Chapters

(85-174 members)

1. Mid-America.....91
2. Central American.....39
3. Leavenworth.....18
4. Talon.....12
5. Jack H. Dibrell.....5
6. Edwin A. Link.....2

AAAA Chapters

(25-84 members)

1. Old Bill.....17
2. Rochester.....13
3. High Desert.....11
4. Citadel.....9
5. Cedar Rapids.....8
6. Checkpoint Charlie.....6

AAAA CALENDAR

A list of upcoming AAAA Chapter and National dates.

December, 1993

- ✓ Dec. 1. AAAA National Executive Board Meeting, Ft. Rucker, AL.
- ✓ Dec. 2. AAAA Aviation Trainer of the Year Award Presentation, AAAA Air/Sea Rescue Award Presentation, & AAAA ROTC Award Presentation, Ft. Rucker, AL.
- ✓ Dec. 18. Morning Calm Chapter Christmas Ball, ROK.

January, 1994

- ✓ Jan. 28. AAAA Scholarship Board of Governors Meeting, Arlington, VA.
- ✓ Jan. 29. AAAA National Awards Committee Meeting to select CY93 National Award Winners.

February, 1994

- ✓ Feb. 2-4. 20th Annual Joseph P. Cribbins Product Support Symposium sponsored by the AAAA Lindbergh Chapter, Stouffer Concourse Hotel, St. Louis, MO.
- ✓ Feb. 3. AAAA Outstanding Aviation Logistics Support Unit of the Year Award Presentation & Industry Award Presentations, Stouffer Concourse Hotel, St. Louis, MO.

March, 1994

- ✓ Mar. 24-25. AAAA USAREUR Region Professional Sessions and USAREUR Region Ball.

April, 1994

- ✓ Apr. 20-24. 1994 AAAA Annual Convention Cervantes Con. Center, St. Louis, MO.

Top Guns as of 21 October 1993

The member who sponsors the greatest number of new members during the contest year ending 31 December 1993 wins an all expense-paid trip to the AAAA Annual Convention as well as a \$300 cash award, and receives a plaque at the AAAA Membership luncheon.

- | | |
|------------------------------|----|
| CW3(P) L. C. LeBlanc..... | 60 |
| Ms. Susan E. Barnes..... | 43 |
| Mr. John H. Bae..... | 25 |
| MAJ Mark A. Reisweber..... | 24 |
| 1SG Willie C. Lucas..... | 23 |
| Ms. Becky A. Snyder..... | 16 |
| MAJ Jim D. Bodenheimer..... | 16 |
| LTC Vern Watts..... | 12 |
| MW 4 Harry R. Ward..... | 12 |
| Mr. Frederick Khemchand..... | 12 |
| LTC James A. Herberg..... | 11 |
| CPT Robert S. Ballew..... | 11 |
| 1LT D. Lee Winningham..... | 10 |
| CPT Brian C. Olson..... | 10 |
| CW2 Robert Holloway, Jr..... | 10 |
| CW4 Ronald J. Ferrell..... | 10 |
| LTC Merle W. Converse..... | 9 |
| LTC James B. Blunk, Jr..... | 9 |
| CPT William K. Miller..... | 8 |
| CW4 John R. Kemp..... | 8 |
| Mr. Jesse W. Glance..... | 8 |
| SGM Gary L. Freeman..... | 8 |
| CW3 Anthony Castiglione..... | 8 |
| CW2 Thomas J. Bauer..... | 8 |
| CW2 William R. Morse..... | 7 |
| CPT John W. Amick..... | 7 |
| CW2 Andrew V. Smith..... | 6 |
| MAJ Christopher Romig..... | 6 |
| CW2 James P. Kennedy..... | 6 |
| CW2 Brenda Hellerman..... | 6 |
| CPT Christopher Gehler..... | 6 |
| MW4 Kenneth Donahue..... | 6 |
| Mr. Joseph A. Caines..... | 6 |
| LTC Stanley E. Meyer..... | 5 |
| Mr. John S. Hussar..... | 5 |
| Ms. Allie N. Eschenbach..... | 5 |
| CSM Raywood P. Dartz..... | 5 |
| Ms. Donna M. Ciolkos..... | 5 |
| 1LT Margaret A. Chanez..... | 5 |

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

The AAAA Lindbergh Chapter Annual Joseph P. Cribbins Product Support Symposium and ATCOM Advanced Briefing to Industry will be held in St. Louis, MO on February 2-4, 1994 at the airport Stouffer Concourse Hotel. The program will emphasize modernization of the Army aircraft fleet and support of the fleet.

The symposium will begin with opening remarks by MG Dewitt T. Irby, Jr., President of the Lindbergh Chapter. Government Keynote speaker will be LTG Leo Pigaty, Deputy Commanding General of the Army Materiel Command and Industry Keynote speaker will be Mr. Anthony Farrington, Director of Customer Support, Allied Signal.

A series of presentations by the PEO Aviation and Aviation PMs are planned for Thursday morning. The luncheon speaker will be MG John D. Robinson, Commanding General, U.S. Army Aviation Center, Fort Rucker, AL. The presentations by the PMs will continue throughout the afternoon. Thursday's dinner will honor industries, individuals and the military through the presentation of AAAA Army

Aviation Materiel Readiness Awards and the AAAA Outstanding Aviation Logistics Support Unit of the Year Award.

A series of presentations by ATCOM are planned for Friday morning. The symposium will end around noon after a general question and answer session.

The 1994 ATCOM Competition Advocates Shopping List (CASL) and Spare Parts Symposium will precede the AAAA Product Support Symposium at Stouffer Concourse Hotel on January 31—February 2, 1994. There will be an opportunity to obtain information about ATCOM CASL Program, Technical Data Packages, Overhaul, Source Approval Requests and other related subjects.

The CASL Workshop and Parts Symposium will commence at 0830 on Tuesday, February 1, 1994 and conclude at 1600 on Wednesday, February 2, 1994. AAAA Product Support Symposium attendees are encouraged to attend. For information about the CASL Workshop contact Mary Ann Green at (314) 263-2503.

WEDNESDAY, 2 FEBRUARY 1994

- 1600-2000 Registration and Ticket Sales
1830-2030 Early Bird Reception

THURSDAY, 3 FEBRUARY 1994

- 0730-1600 Registration and Ticket Sales

MORNING SESSION

- 0730-0835 Continental Breakfast
0830-0845 Opening Remarks
0845-0915 Government Keynote Speaker
LTG Leo Pigaty
0915-0945 Industry Keynote Speaker
Mr. Anthony Farrington
0945-1015 Break
1015-1045 Aviation PEO
1045-1115 Comanche PM
1115-1330 Luncheon with Speaker
MG John D. Robinson

AFTERNOON SESSION

- 1330-1445 Advanced Attack Helicopter PM
Longbow PM
Kiowa Warrior PM
Utility Helicopter PM
CH-47PM

- 1445-1515 Special Operations Aircraft PM
Break
1515-1600 Aviation Electronic Combat PM
Aviation Life Support Eqpt. PM
Q&A
1600-1630

EVENING SESSION

- 1800-1930 Reception
1930-2200 Dinner

FRIDAY, 4 FEBRUARY 1994

- 0700-0730 Continental Breakfast
0730-0800 ATCOM Overview
0800-0830 Acquisition Center
0830-0915 Aviation Research Development
and Engineering Center
0915-0945 Break
0945-1130 Integrated Materiel
Management Center
-Product Managers
-Weapon Systems Managers
-International Logistics
-Maintenance & Overhaul
-Spares
1130-1200 Q&A
1200-1215 Closing Remarks



**1994 AAAA Joseph P. Cribbins
Annual Product Support Symposium/
ATCOM Advanced Briefing to Industry
Advance Registration Form**

STOUFFER CONCOURSE HOTEL — ST. LOUIS, MO — 2-4 FEBRUARY 1994



SPONSORED BY THE LINDBERGH CHAPTER OF THE ARMY AVIATION ASSOCIATION

ADVANCE REGISTRATION DEADLINE: 19 JANUARY 1994

FULL NAME: _____

RANK/TITLE: _____

COMPANY: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

OFFICE PHONE: _____ BADGE NAME: _____

IF YOU WORK FOR A DEFENSE CONTRACTOR ON A FULL-TIME, PARTTIME OR CONSULTING BASIS, YOU ARE NOT ELIGIBLE FOR GOV'T/MIL REGISTRATION FEE, EVEN IF YOU ARE RETIRED MILITARY. AAAA MEMBERSHIP IS REQUIRED TO ATTEND THE AAAA PRODUCT SUPPORT SYMPOSIUM. NON-MEMBERS WILL BE CHARGED A \$21 MEMBERSHIP FEE APPLIED TOWARDS A ONE-YEAR MEMBERSHIP IN THE AAAA. THIS REGISTRATION FORM & FEES LISTED DO NOT COVER THE COMPETITIVE ADVOCATES SHOPPING LIST (CASL) WORKSHOP 31 JAN—2 FEB 1994.

ARE YOU PLANNING TO ATTEND CASL WORKSHOP 31 JAN—2 FEB 1994? _____ YES _____ NO
POINT OF CONTACT: MARY ANN GREEN (314) 263-2503, FAX (314) 263-2557

	2-4 FEB 94 REGISTRATION	3 FEB 94 LUNCHEON	3 FEB 94 BANQUET	3-4 FEB 94 PROCEEDINGS	1 YEAR MEMBERSHIP	TOTAL PAID
INDUSTRY FEES	_____ \$190	(Included)	(Included)	(Included)	_____ \$21	\$ _____
GOV'T/MIL FEES	_____ \$15	_____ \$15	_____ \$25	_____ \$25	_____ \$21	\$ _____
SPOUSE FEES	N/A	_____ \$15	_____ \$25	N/A	N/A	\$ _____

LATE REGISTRATION FEE: _____ \$25 (Postmarked after 19 Jan 94)

CIRCLE FORM OF PAYMENT: Cash Personal Check Business Check Grand Total \$ _____

MAKE CHECK PAYABLE TO: AAAA PRODUCT SUPPORT SYMPOSIUM

IF CANCELLATION IS NECESSARY, REFUNDS OF REGISTRATION FEES WILL BE PROVIDED ONLY UPON RECEIPT OF:
WRITTEN NOTICE OF CANCELLATION — POSTMARKED NO LATER THAN 19 JANUARY 1994

* MAILING INSTRUCTIONS *

PLEASE RETURN COMPLETED REGISTRATION FORM AND FORWARD WITH APPROPRIATE FEES MADE PAYABLE TO: AAAA PRODUCT SUPPORT SYMPOSIUM, ATTN: NANCY VERMILLION, AEPCC, INC., 4433 WOODSON, SUITE 200, ST. LOUIS, MO 63134

Inquiries should be directed to Nancy Vermillion at (314) 427-8707, FAX (314) 427-2501 (Industry)
or Susan Barnes at (314) 263-5311, FAX (314) 263-5315 (Government)

* HOTEL RESERVATIONS *

TO MAKE YOUR HOTEL RESERVATION, CONTACT THE HOTEL DIRECTLY NO LATER THAN 19 JANUARY 1994 at: (314) 429-1100
STOUFFER CONCOURSE HOTEL, 9801 NATURAL BRIDGE RD., ST. LOUIS, MISSOURI 63134. In order to receive reduced rates, please refer to "AAAA Product Support Symposium" when making reservations. Reservations received after 1/19/94 will be on a space available basis only.

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Interoperable air and ground high-frequency communications are assured by Rockwell/Harris team experience. The two leading HF suppliers in the world have joined forces and technical expertise to meet the Army's most important NOE COMM requirements through the ARC-220 pursuit. Separately, it has taken Rockwell (airborne HF) and Harris (ground HF) more than 10 years and significant individual investments to develop the key technologies to implement U.S. MIL-STD Automatic Link Establishment, Electronic Counter Countermeasure and data modem waveforms.* Not an easy task, yet accomplished through diligent engineering and innovation. Together, these two industry-leading companies offer complementary low-risk solutions for the full range of NOE COMM requirements, for air and ground. They have conquered the complexities of some of the toughest waveforms ever developed and made it all very easy to use. Rockwell and Harris have off-the-shelf production equipment available today to demonstrate that they can meet the stringent requirements of the U.S. Army's NOE COMM program. Communications are assured with the high-frequency systems from the Rockwell/Harris team -- the source for advanced HF products to meet tough requirements. The ARC-220 will be a quality solution from the experienced leaders in HF communications. For more information, contact the Rockwell/Harris NOE COMM Program Office at (319) 395-1600, fax to: (319) 395-5111, or write to: Rockwell/Harris, NOE COMM Team, Dept. 120-131, 350 Collins Road NE, Cedar Rapids, Iowa 52498.



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