AAAA Annual Convention Details page 33

Special Report on Avionics Research and Development Activity (AVRADA)

ARMY AVIATION

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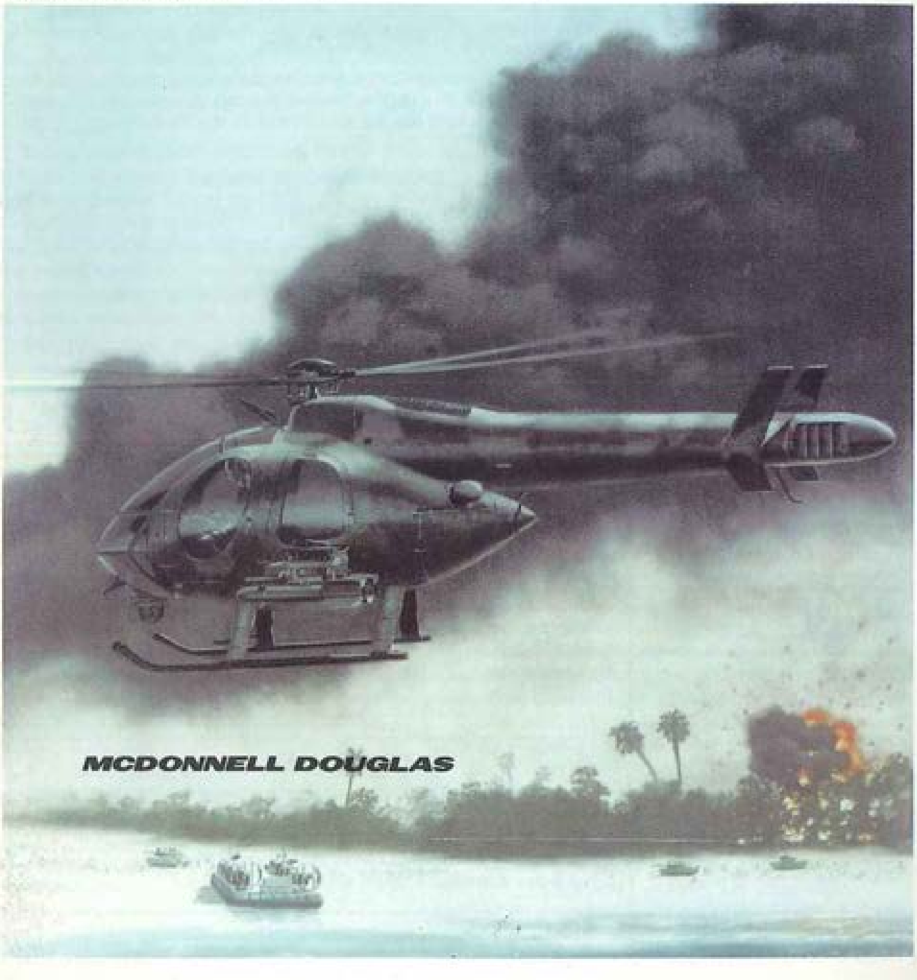

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ARMY AVIATION

VOLUME 38 NUMBER 1

GUEST EDITORIAL

AVIATION BRANCH UPDATE

AAAA NEWS

SPECIAL REPORT: AVRADA

FIELD REPORTS

OTHER DEPARTMENTS

EDITORIAL MATERIAL

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U.S. Army Aviation: Dedicated, Courageous Soldiers

by Sergeant Major of the Army Julius W. Gates

Happy New Year (1989) to you, the great soldiers and Department of the Army civilians, that make up the team responsible for the most advanced, most lethal, and safest aviation in the world — the United States Army Aviation.

Today, your modern machines fly the skies around the world. They patrol the east-west borders in Europe, they fly the DMZ in Korea, they fly the jungle trails of Central and South America, and they patrol the Persian Gulf waters. Wherever our soldiers train to fight, wherever a critical life saving evacuation or rescue mission is needed, you have been, you are, and you will be there. Today you, and the great Americans who served before you, should stand tall and be proud of your critical contributions to our soldiers and to our Army.

Many Things to Many Soldiers

Army Aviation means many things to many soldiers:

- To the front line ground combat soldiers it means rapid transportation over difficult terrain to the battle.
- To the soldiers in a fire fight it means the delivery of pinpoint accurate, devastating fire support.
- To soldiers in a tank battle it means the delivery of deadly antitank fire.
- To soldiers serving at isolated outposts it means a life line and communications.
- To war fighting units it means resupply and replacement of critical food, water, fuel, ammunition and soldiers.
- To the wounded soldier it could mean the difference between life and death.

U.S. Army Aviation means all of these things and more. However, to me, the one thing that has always stood out are the great soldiers who choose to serve their Army and their country as members of our Army Aviation.

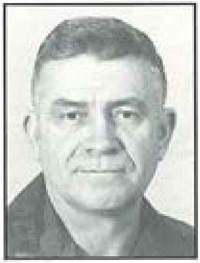
Five Examples

During my soldier tenure I have had the honored opportunity to serve with some of the most dedicated, courageous, technically and tactically competent aviation soldiers that have ever worn the Army uniform. These five examples best illustrate the soldiers that I have served with during war and peace.

- During my first two weeks in Vietnam as an infantry squad leader, the point man of my squad was seriously wounded. During the fire fight a helicopter appeared and started to descend into a small opening in the jungle which, in my opinion, was too small to accomodate the helicopter. The door gunners were hanging out of the doors exposed to the incoming small arms fire while guiding the descending helicopter. After several attempts and after receiving numerous hits the helicopter finally got low enough for us to place our squad member aboard. Today, the then wounded soldier is married, has two sons and he is a successful businessman. I have often wondered who the helicopter pilots and door gunners were who saved that soldier's life.
- I did not learn enough during my first tour in Vietnam so I was given a second opportunity as a Platoon Sergeant, in K Company, 75th Infantry. We received a base camp message one day that one of our four-man, long range patrols

(Soldiers — cont. on page 58)

SMA Gates, Department of the Chief of Staff, U.S. Army, Washington, DC.



Enlisted Training: Past, Present and Future

by Major General Ellis D. Parker

During the past two years some very important developments have impacted upon enlisted training at the USAAVNC. Before discussing these changes and some plans for the future, I will briefly describe the historical development of enlisted training at Fort Rucker.

A few weeks after the beginning of the transfer of the Army Aviation School from Fort Sill, Oklahoma, in late 1954, training for some enlisted aviation mechanics began at Rucker. From that time until the present, however, many mechanics and other enlisted aviation personnel have been trained elsewhere. During the first two decades after the transfer, enlisted training at Fort Rucker was almost entirely for aircraft maintenance personnel, although a few aeromedical specialists were trained, and instruction for air traffic controllers began toward the end of the period.

Maintenance Training

During that twenty-year period, enlisted maintenance trainees were assigned to the Department of Maintenance Training (name varied before 1966), which also trained aviators in the operation of aircraft systems. As a result of the war in Vietnam, there occurred a tremendous surge in requirements for enlisted mechanics in 1965. This led to the expansion of facilities, double-shift training, and the development of new specialized courses for the new types of Army aircraft. The department occupied 36 temporary World War II buildings until 1972, when it moved into a new maintenance instruction facility with 28 classrooms and two maintenance hangers; the facility was later named Yano Hall in memory of SFC Rodney J.T. Yano, a Medal of Honor recipient killed in action in Vietnam.

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

Significant developments during this period included the implementation of self-paced instruction for enlisted personnel (begun in 1972; completed in 1977) and the successful completion of the UH-1 enlisted maintenance course in 1973 by PVT Linda Plock, the first female aircraft mechanic trained at Fort Rucker.

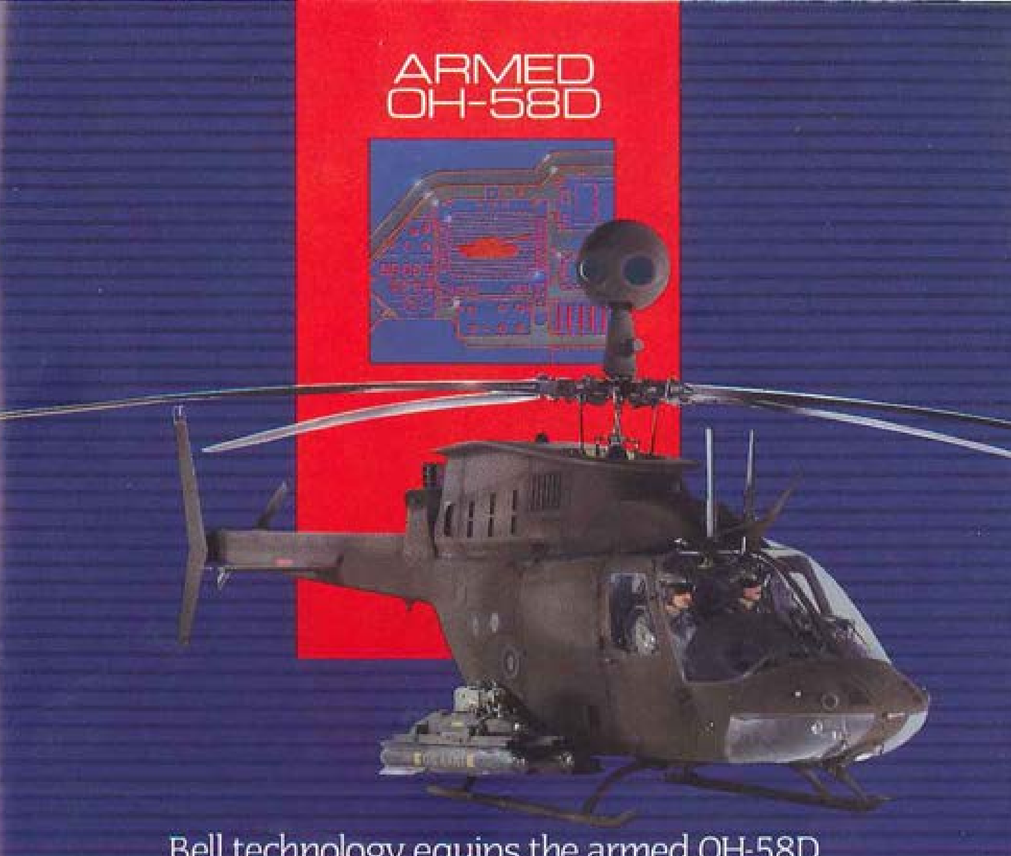
As early as 1967 on-the-job training was given to a few air traffic controllers who had completed the air traffic control (ATC) course at Keesler Technical Training Center. Then in 1972 both basic and advanced ATC courses were implemented at Fort Rucker and placed under the newly created Department of General Subjects.

Third Decade

The third decade of aviation training at Rucker began with the creation in 1974 of the Department of Academic Training, which consisted of five divisions. Two of these, Maintenance Training and Air Traffic Control, had major responsibility for enlisted training, but some enlisted personnel also received training in the Career Training and the Flight Simulator divisions. The Noncommissioned Officer Education System (NCOES), providing for five levels of enlisted training, was developed and implemented at about that time also. The first of these five levels, Advanced Individual Training (AIT), was provided at Fort Rucker for military occupational specialties (MOSs) 67N, 67V, 71P, 93H, and 93J during the late 1970s and early 1980s. Also, level four training, the Advanced Noncommissioned Officer Course (ANCOC), was provided for MOSs 71P, 93H, and 93J.

During this post-Vietnam War period, increasing numbers of the enlisted trainees were guardsmen or reservists, and the proportion of both females and allied students gradually increased.

(Enlisted — continued on page 56)



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Director's Overview

by David V. Gaggin

The reduced financial and manpower resources imposed on all DOD organizations during this last year have also impacted AVRADA.

Our shift in focus from mission research and development to customer support, described in the November 1987 issue of ARMY AVIATION, minimized the effect of this reduction on the day-to-day activities of our workforce.

AVRADA has successfully responded by "doing more with less" through the creative management techniques of our Division, Office and Branch Chiefs. Several of these initiatives are described in this issue.

"Early Out"

The "early out" offered by DA last spring changed the faces of many of our senior managers. Although the lost talent will be missed, we were able to fill all the positions with highly qualified managers. We also used this opportunity to fine-tune the organization; eliminating the concept of an Advanced Technology Directorate (ATD) and giving the Flight Information Systems Division and the Tactical Information Systems Division 6.2 thru 6.4 responsibility. This is consistent with the Communication and Navigation Divisions, and now allows a smoother flow of technology from all the tech base programs into the field. The end result has been the creation of a strong, aggressive team; focused on supporting the soldier.

Mr. Gaggin is Director of Avionics Research and Development Activity (AVRADA), Ft. Monmouth, NJ.

Field Trips

In keeping with AVRADA's foremost concern of servicing our ultimate customer, the soldier, key AVRADA technical and management personnel made numerous trips to the field during the last 12 months, including Panama, Korea and Germany.

One theme kept recurring: "Nap-of-the-Earth Command, Control and Communication is the primary avionic operational concern." Although this helped validate our previous decisions which established major R&D thrusts in this area; more importantly, it caused us to refocus and expedite key elements of our near-term programs to better address these issues. Flight following, anti-jam HF and FM retransmission techniques are examples.

AVRADA has been heavily involved in many key AVSCOM programs this year. We performed the Source Selection Evaluation Board (SSEB) for the Special Operations Aircraft (SOA) Integrated Avionics System which IBM won and then became a directed subcontractor to Boeing and Sikorsky. We provided the technical expertise to the APACHE PM which allowed for the competitive selection of Rockwell Collins for the ATHS/AI program.

MSIP Programs

We are now heavily involved in developing the APACHE and BLACK HAWK MSIP programs. Both programs are in the early engineering development phase and FY89 will be a crucial year in defining the configuration and establishing a sound design.

The OV-1D Block Improvement prototype aircraft is in flight test and is performing well. The LHX program has resolved its political programs and AVRADA will be playing a large role in the Risk Reduction Program and the follow-up MEP FSD development.

Although the customer support programs seem to be taking a great deal of our resources, the tech base programs are by no means dormant. In the second quarter of

(Overview — cont. on p. 52)

AVRADA Actively Pursues AAAA and Other Activities

by Bobbi C. Campbell

What a year! '88 really kept us hopping. From exhibiting at conventions to giving "in-house" demonstrations, AVRADA was constantly on the go.

AAAA Annual Convention

At the AAAA Annual Convention held in the Cervantes Convention Center, St. Louis, MO, we displayed the NUH-60 ADAS/STAR Aircraft; the Command and Control Ground Station; the GPS; and the AN/ARN-148 and AN/ASN-132, which were both housed in the "NAV" Mobile Van. The AVRADA Overview videotape was played continously throughout the convention.

We were all delighted when GEN Louis C. Wagner, CG, AMC; LTG Edward Honor, Director for Logistics, J4, JCS; MG Ellis D. Parker, Chief, Aviation Branch, and CG, USAAVNC and Fort Rucker; and MG Richard E. Stephenson, CG, AVSCOM, visited our booth. Another highlight was a visit by GEN Carl E. Vuono, Chief of Staff, who was given a special demonstration prior to the Banquet. We also welcomed visits from MG Orlando E. Gonzales, Ret., (former CG, AVSCOM), LTC Charles W. Millican (former Deputy, AVRADA), and Sam Merrifield (former Chief, SAVAA-I, West).

At our Chapter Reception (shared with five other chapters), we displayed the Chapter Banner, the New Jersey State Flag, and scenic posters of New Jersey.

Not to be outdone by our Texan co-hosts, we decorated the walls and tables with colorful Monmouth Chapter AAAA Balloons and gave gold stickers in the shape of New Jersey to all the attendees to display on their badges. Some had so many stickers, pins, etc., on their badges that you could hardly read their names.

At the Membership Luncheon, Walt Sabey, a member of our exhibits team, was honored by receiving his 30 year AAAA membership pin. Walt has been a member of the Army Aviation Association of America since 1958.

In a congratulatory letter to AVRADA, MG Stephenson, the 1988 Convention Host, stated that he had received many compliments from Government

(Activities — cont. on p. 46)

Mrs. Campbell is in the Technical Plans and Financial Management Division of AVRADA.

CPT Jim Jesson, AVRADA pilot, gave children a helicopter tour during Armed Forces Day.

"The voice recognition system used in the flight test is a connected phrase recognizer, so that the pilot is not forced to separate his command into discrete words, but may "run the words together."

Human Interface For AVRADA's Flight Test of ICNIA ADM (Army)

by Captain Ron Nelson

The Integrated Communication, Navigation, Identification Avionics (ICNIA) Advanced Development Model (ADM) program addresses a revolutionary approach to aircraft avionic package design. The principle goals of the ICNIA program are to meet weight, size, and cost constraints for CNI functions that have been validated for integration into future tactical aircraft. The ADM program seeks to demonstrate the new technologies needed for the final product in a realistic environment, and includes previously developed functions such as SINCGARS, HAVEQUICK, EPLRS, GPS and IFF (MK-XII).

The approach used in the ICNIA program incorporates state-of-the-art VHSIC and RFLSI technologies and makes maximum use of the sharing of common module resources such as data, signal, and RF processing hardware. Common module sharing is a necessary spin off of the increased processing load of future tactical aircraft.

CPT Nelson is an Electronic Systems Engineer in the Flight Information Systems Division, AVRADA.

Additional benefits inherent to a common module approach include the capability to reconfigure the allocation of common resource assets in the event of component failures. The failure of a common resource such as a receiver would not cause a critical CNI function to fail. Instead, the failed component obtained is automatically replaced with a functional component obtained from a pool of currently spare components, or appropriated from a CNI function of lesser priority.

AVRADA is scheduled to perform a flight test of the ICNIA ADM in FY89. The flight test will provide realistic mission scenarios designed with two objectives in mind. The first objective is to evaluate the ICNIA ADM as far as its ability to perform the basic functions provided with the Army ADM version of ICNIA and its ability to sustain faults injected into the ICNIA hardware. A secondary goal of the flight test is to evaluate the use of ICNIA in an integrated avionic environment where MANPRINT issues have been considered and specifically factored into the integrated systems design. This paper deals with the second of these two goals and will describe the basic pilot/machine environment in which the ICNIA ADM will function.

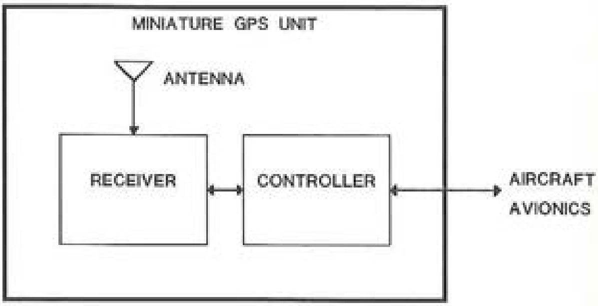
The Pilot/Machine Interface

The interface between pilot and machine must be effective. The requirements that flying a helicopter in combat places on the pilot are quite extreme. Avionics provide the pilot with a set of tools for generating information and aircraft control that are required in an increasingly complex mission scenario. Yet the information obtained via

(Interface — cont. on p. 42)

Miniature GPS Unit (MGU)

by Paul M. Olson



The advent of a new era in navigation began with the development of a satellite based radio navigation system called the NAVSTAR Global Positioning System (GPS) which provides accurate navigation information continuously, day or night and in all weather, to an unlimited number of users.

AVRADA, with the responsibility for development of navigation equipment in both Army aircraft and ground based applications, has initiated a program to develop a small lightweight GPS sensor, known as the MGU.

What is GPS?

GPS is a satellite based radio system which provides a user with highly accurate position, velocity and time information. The GPS system consists of three segments; space, ground, and user. The space segment will be comprised of 21 satellites all constantly transmitting their own unique signals on two separate frequencies toward the earth. The ground segment consists of control stations which update the satellites with information pertinent to the satellite signal. The user segment, as its name suggests, is what determines the user's position, velocity and time, and provides this information to the pilot and mission equipment. The user segment is resident in aircraft, ships, ground vehicles, man-packs and hand held units.

These systems receive the satellite signals and estimate the systems range to the satellite, by computing the time difference between sending and receiving the signal. A minimum of four satellites is required to determine a three-dimensional position. In ARMY aircraft, other available navigation systems such as the AN/ASN-137 Doppler or the AN/ASN-141 Standard Inertial Navigation System enhance the GPS operation.

Between 1979 and 1985 the GPS Joint Program Office (JPO) held competitive contracts to develop the GPS User Equipment. Rockwell Collins was selected to be the supplier of GPS units to the Tri-Services.

Mr. Olson is an Electronic Engineer in the Navigation Division, AVRADA.

Six Satellites

Currently there are only six satellites operational which limits access time to only a few hours a day. Full 24 hour GPS Satellite coverage is expected in the early 1990's. Several Army aircraft Program Managers (PMs) are now planning to add GPS capability to their aircraft.

The available GPS units, consisting of three separate Line Replaceable Units (LRU); an antenna, preamp, and receiver, weigh over thirty pounds without cabling and connectors. As the future mission and mission gear of tactical Army aircraft expand, the size and weight requirements of this unit will be a problem.

Recent advances in microelectronic technology provide the

(MGU — cont. on p. 49)

PLS: Rescue of Tri-Service Program

by Tim Ryder

During the Vietnam War, American pilots who had been downed by enemy fire knew they would be found. The question was whether they would be "rescued" by friends or by foes.

Flares, smoke and the signals from survival radios were equally discernible by both sides.

As a result, the sight of parachutes in the sky or the sound beacon on the ground often triggered a race toward the flight-crews, a race that could mean life or death — not just for the airmen, but the rescuers, as well.

Phase I Complete

Now, thanks to the successful completion of Phase I of the Personnel Locator System (PLS) program, Army rescue aircrews can look forward to the FY90 fielding of a Combat Search and Rescue (CSAR) System that will provide a means of performing the rescue mission.

The system, which was reported in the February 28, 1987 issue of ARMY AVIATION consists of the AN/ARS-6(V) manufactured by Cubic Corp, and Motorola's AN/PRC-112 Survival radio reported in the November 30, 1987 issue. The two units, operating together, offer steering and range information to the Army CSAR aircrew, which may then locate the "Survivor" holding the radio, on a single pass, within a nominal 60 feet.

Radio set AN/ARS-6(V) consists of a remotely mounted receiver transmitter, an antenna group tailored to the UH-1 or UH-60 aircraft, a console mounted Control Display Unit (CDU) and an instrument panel-mounted Remote Display Unit (RDU). An alternate configuration will be integrated on the MIL-STD-1553B data bus of MH-60K and MH-60K and MH-47E aircraft.

Mr. Ryder is an electronics engineer, Communications Div., Communication Systems Branch, AVRADA.

The transmitter can be programmed for continuous or single transmission, and is capable of interrogating as many as nine preselected transponder codes. PLS has demonstrated accurate measurement of both distance and direction at ranges of up to 150 nautical miles.

The PLS guidance system is also capable of homing in on any transmitter operating on any frequency from 225 to 300 mHz.

Steering commands and ranging information are displayed on the RDU that is easily mounted on the aircraft instrument panel. Range to target is displayed in nautical miles (feet within 10,000 feet of the AN/PRC-112). The three-inch high CDU mounts in any U.S. military FM radio slot and uses the radio's power, dimming bus and communications connections. The RDU and CDU have excellent sunlight readability and full night vision goggle compatibility.

Operational Testing

Since publication of the previous articles, the system has completed operational testing by Army and Air Force test components. The Navy has also performed a fleet assessment and will be adapting AN ARS-6 (V) to meet the similar "downed airman locator system" require-

(PLS — cont. on p. 55)

"The Data Transfer System (DTS) will be integrated to alleviate most pilot/CPG keypad interaction by automating the mission data loading process."

APACHE Airborne Target Handover System/Avionics Integration (ATHS/AI)

by Martin Post

The ATHS/AI program was competitively awarded on March 18, 1988 to integrate the Airborne Target Handover System (ATHS) into the AH-64 APACHE fleet. ATHS provides the APACHE with a new capability to automatically handover targets between AHIP, other APACHEs, and TACFIRE compatible ground forces.

ATHS is being fully integrated into the APACHE to provide the aircrew with an efficient means to automatically handover or receive enemy targets and rapidly launch HELLFIRE missiles against them. This total system integration is accomplished by adding a new MIL-STD-1553B Communications, Navigation, Identification (CNI) Avionics BUS to the APACHE in a manner that will allow complete sharing of workload by either crew member through a pair of Control Display Units (CDU), one located in each cockpit. The system will monitor and communicate with the existing APACHE Fire Control Computer (FCC) BUS to form an integrated APACHE system.

Mr. Post is an Electronic Engineer in the Aviation Electronics Integration and Installation Division, AVRADA.

ATHS/AI Cockpit automation will include the following capabilities:

- Prepointing of Target Acquisition Designation System (TADS) to ATHS received targets.

- Automated HELLFIRE missile engagement to ATHS targets.

- Automated performance planning including decremented fuel and weapons.

- Data Transfer System to automatically load communications, navigation, targets, mission and Communications Electronic Operating Instructions (CEOI) information into the aircraft.

- Display pilot and copilot/gunner (CPG) selected frequencies/nets to both crew members on panel mounted Remote Frequency Displays (RFDs).

- Selection of preset radio communications frequencies/nets and navigation waypoints from the pilot's flight control.

- Automatic pairing of COMSEC nets to selected radio presets/nets.

- Automated offset navigation present position updates with TADS.

- Worldwide magnetic variation stored in the system and automatically included with Lat/Long navigation waypoints.

- Cross spheroid UTM navigation simplified by allowing storage of multiple spheroid informa-

(ATHS/AI — cont. on p. 32)

F3 Doppler — The Next Generation

by Paolo D. Paone and Earl I. Feder

The Lightweight Doppler Navigation System (LDNS), AN/ASN-128 became the primary navigation system for the UH-60A Black Hawk, the AH-1S Modernized Cobra, the AH-64A Apache Advanced Attack Helicopter, the CH-47D Chinook, and many foreign helicopters in 1978 when the first production system was delivered. This equipment fulfilled the need for a self-contained, automatic "set and forget" navigation system which computes the aircraft's current position continuously and accurately and gives the pilot bearing the range to selected destinations or targets. Since that time the U.S. Army has accepted delivery of over 2500 AN/ASN-128 systems.

To meet advanced Army helicopter requirments for an integrated avionic suite, a Multiplexed Lightweight Doppler Navigation System (MLDNS) (AN/ASN-137) program was initiated. This system incorporated all of the features of the AN/ASN-128 and added others with the most prominent being a MIL-STD-1553A/B Mux Bus compatibility. This Doppler consists of two Line Replaceable Units (LRU's) with Control and display provided by new integrated avionic architecture.

	F3 DNU		AN/ASN-137	Improvement
Weight (lbs)	12	vs	28	16
Volume (in³)	400	vs	1160	760
Power (watts)	60	vs	150	90
Reliability (hrs)	2000	vs	1000	1000

The first AN/ASN-137 was delivered for installation on the OH-58D (AHIP) Helicopter in March of 1985. AN/ASN-137's are now being installed on all production AH-64A and OH-58D helicopters.

Recognizing further advancements in electronic and mechanical technology the AVRADA program office proceeded with procurement of a new generation Doppler, employing micro-strip antenna technology. A Non-Development Item (NDI), single LRU approach was selected for the acquisition of a Form, Fit and Function (F3) replacement for the AN/ASN-137 and to satisfy new installation requirements for the Army Aviation Modernization Program.

In 1986 a Market Survey was initiated with an announcement in the Commerce Business Daily (CBD) asking all interested Doppler manufacturers to participate in an F3, NDI, competitive program to provide the Army with a "ONE BOX" Doppler that would offer significant improvements in space, weight, power, reliability and cost.

As a result of the announcement, two manufacturers offered prototype models for testing. The purpose of the test was to deter-

(Doppler — cont. on p. 45)

Mr. Paone is a Program Leader in the Navigation Division, AVRADA; Mr. Feder is an Electronic Engineer in the Navigation Division, AVRADA.

"We are projecting acquisition of an easy to use airborne STAJ (Short Term Anti-Jam) radio in 1992."

Anti-Jam Aircraft HF Radio Program

by Robert Riehlman

The Nap-of-the-Earth Communications (NOE COMM) Required Operational Capability (ROC) established the need for a light weight High Frequency (HF) Single Sideband (HF-SSB) Radio. The purpose of this HF radio was to provide Army Aviation an internal Command and Control net enabling communications to a range of fifty kilometers while operating non-line-of-sight at NOE altitudes.

The AN/ARC-199 and AN/VRC-86 HF Radios were procured to meet this need through an Non-Development Item (NDI) program beginning in July 1982 with the competitive contract award to King Radio. The radios were undergoing operational tests when a new requirement emerged citing the need for the aircraft HF radio to interoperate with the ground HF nets. These ground HF nets utilize the family of Improved HF Radios (IHFR) including the AN/PRC-104 manpack, the AN/GRC-213 twenty watt vehicular radio and the AN/GRC-193 four hundred watt vehicular radio. This family of radios is being product improved to provide an Electronic Counter Counter Measure (ECCM) capability called Short Term Anti-Jam (STAJ). This STAJ capability for the ground HF nets is scheduled for fielding in the 1990's.

Mr. Riehlman is a General Engineer in the Communications Division, AVRADA.

The new requirement for interoperability with ground IHFR STAJ nets imposed new technical requirements on the HF radio system in the areas of anti-jam, automatic link establishment, COMSEC, and data handling capabilities. In addition, experience with the ARC-199, and technology advances over the past several years, have improved new "unstated" requirements regarding ease of operation and improved system performance. The following addresses each of these features.

ECCM Capability

The current Tri-Service approved standard for HF frequency hopping is stated in MIL-STD-188-148. This standard is being used by Communications Electronics Command (CECOM) to product improve the PRC-104 family of ground radios.

In addition, the PRC-104 also incorporates two additional anti-jam modes, Army Normal and Army Enhanced. These modes provide for improved operation and added anti-jam protection. These modes allow the IHFR STAJ family to remain a viable means of defeating emerging threats. For these reasons, the anti-jam requirement for the next generation airborne HF radio will incorporate all hopping modes used in the IHFR family. That is, Tri-Service standard, Army normal, and Army enhanced.

(ALE)

Automatic Link Establishment is one of the adaptive features currently being defined for HF. The ALE feature can greatly simplify HF radio operation because the pilot or crew member does not have to think about HF radio propagation, channel selection and range to the other station. The

(Radio - cont. on p. 17)

Radio – cont. from p. 15

operator only needs to input the net code or called station code and press the key. The radio does the rest.

A moratorium on the procurement of ALE systems (and data modems) was imposed by the Secretary of Defense in August 1987 based on concerns regarding interoperability between several systems being developed and/or procured. A standard, MIL-STD-188-141A, has been developed, and is scheduled to be released.

At this writing, it is not clear when the standard will be implemented. However, the Secretary of Defense letter does authorize the Army to "proceed with the development and procurement of STAJ, with the condition that maximum interoperability between STAJ and ACP (Automatic Communications Processor, the Air Force version of ALE.) is achieved in both ALE address protection and ECCM modes".

This leads to the recommendation that the next generation aircraft HF radio be developed with the ACP version of ALE since this is the current Air Force implementation. Since ALE is software intensive, it will be possible to modify the ALE should it be necessary in the future.

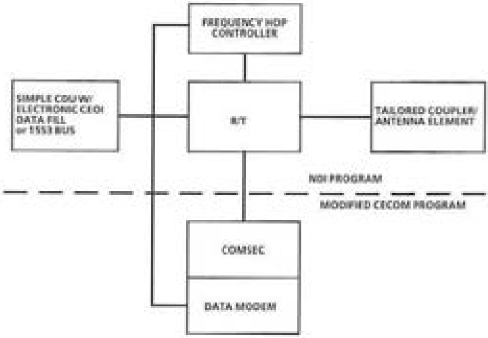


FIGURE 1 - PROPOSED AIRCRAFT HF RADIO SYSTEM ARCHITECTURE

COMSEC Device

The PARKHILL COMSEC security device (KY-75) is the currently fielded COMSEC device and will remain the standard device until the 1991 timeframe. The draft Organizational & Operational (O&O) Plan for the STAJ compatible airborne radio states the PARKHILL will be used as the secure device until replaced by a follow-on system or device.

The National Security Agency (NSA) is currently on contract with ITT to develop a new HF security device and data modem known as ANDVT/MINTERM. These devices are not currently compatible with the STAJ frequency hopping system; however, plans call for the production MINTERM to have growth provisions for STAJ.

Besides providing voice security, the basic MINTERM provides a 300-2400 BPS data capability. While there is no aircraft version of MINTERM in development, the Air Force has expressed interest in an airborne version. In addition, CECOM has expressed an interest in using the Enhanced MINTERM for the IHFR manpack radios. CECOM is also developing a COMSEC/data modem known as the MD-1230. This device was developed by Harris and provides a 75-2400BPS capability. They will also consider incorporating features to make it suitable for aircraft use such as, MIL-STD-1553 compatibility and improved signal processing.

Operator Interface

During the initial operational testing of the ARC-199 and in feedback from various user units, one of the most prevalent reported shortcomings is that of the user interface. We have received many complaints that the ARC-199 is too complicated to operate.

In addition, Army aviators are not familiar with HF propagation and do not want to worry about frequency selection. Army aviators want an HF radio system that will give them operation comparable to a Line-of-Sight (LOS) radio.

Therefore, the next generation HF radio should consist of a simple Control Display Unit (CDU) with as few as possible controls and displays and a "smart" Receiver/Transmitter (R/T) capable of placing the radio in the proper operating mode based on inputs from the CDU.

HF communications have historically been unreliable in

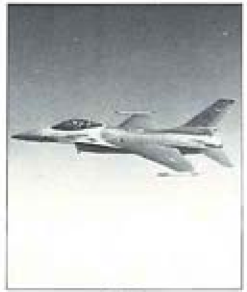
(Radio - cont. on p. 44)


UH-60


B-1B


SH-60


CH-47D


F-16

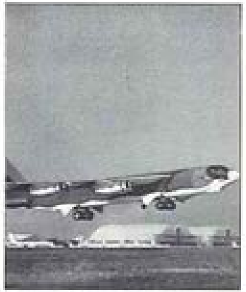

ACAP


Model 360


ATF


AH-64


H-76


B-52H


CH-53E


AH-1


MH-47E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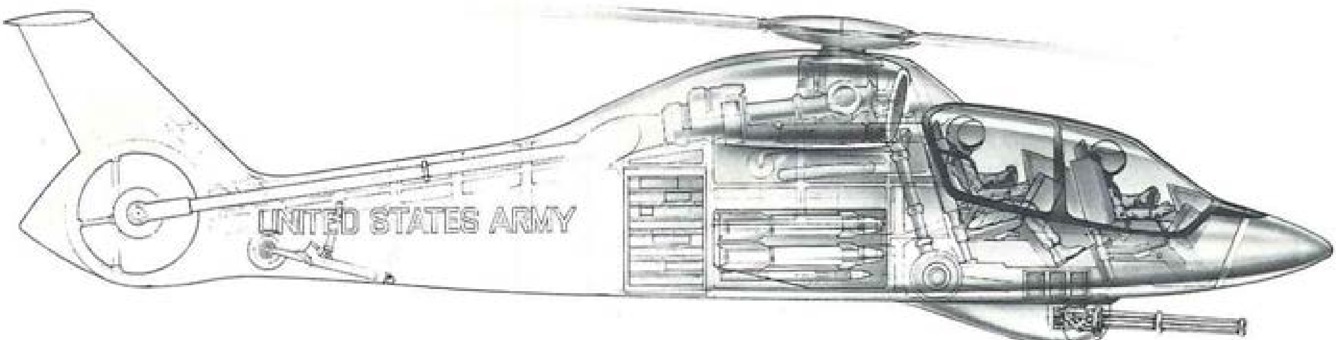

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"Common avionic modules can be used like building blocks to develop an avionic suite tailored to the needs of an individual aircraft."

Joint Integrated Avionics Working Group Support

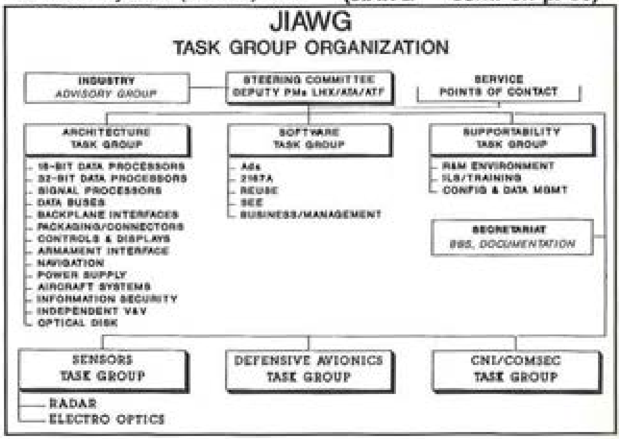
by Douglas C. Johnson

AVRADA has the responsibility within its parent command, U.S. Army Aviation Systems Command (AVSCOM), to develop and integrate aviation electronics for the Army. AVRADA has been supporting the Army's Light Helicopter Family (LHX) program since its inception, including help in preparing the LHX Trade Off Determination (TOD), Trade Off Analysis (TOA), Best Technical Approach (BTA), System Specification, and Request for Proposal (RFP). AVRADA has also participated in the Advanced Rotorcraft Technology Integration (ARTI) program from 1983 to 1986 and the Risk Reduction program from 1986 to the present under contracts led by AVSCOM's Aviation Applied Technology Directorate at Fort Eustis, VA.

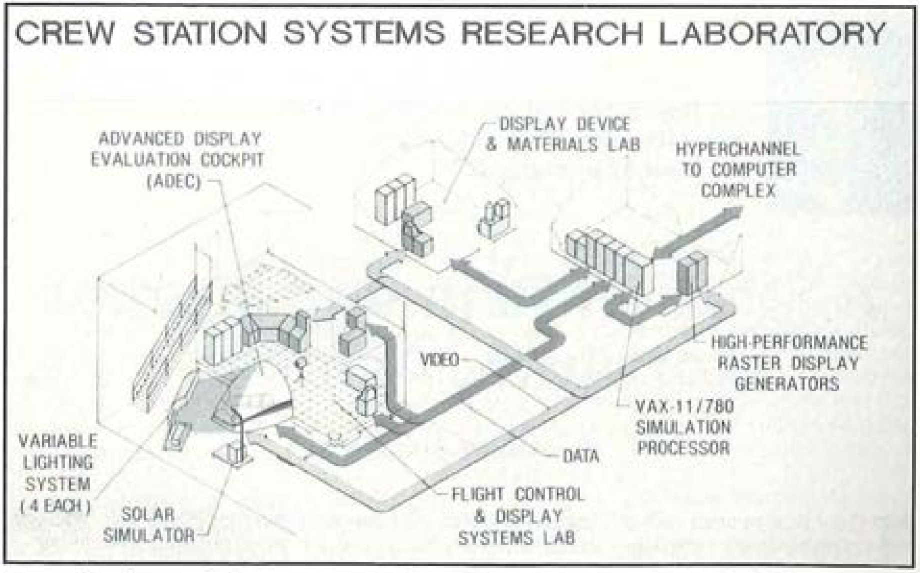
Birth of JIAWG

AVRADA personnel became involved in a tri-service effort to standardize common avionics for the LHX, the Air Force Advanced Tactical Fighter (ATF), and the Navy Advanced Tactical Aircraft (ATA or A-12) in response to Congressional direction in the FY87 DoD Appropriations Act Conference Report, dated 15 October 1986. This standardization is based on programs including Integrated Communications, Navigation, Identification Avionics (ICNIA), Integrated Electronic Warfare System (INEWS) and PAVE PILLAR. The Air Force, as lead service for these programs, and other programs contributing to integrated avionics technology, in coordination with the Army and Navy, prepared the "Joint Integrated Avionics Plan for New Aircraft" in 1987. This plan established the JIAWG comprised of government personnel supporting the three aircraft programs and headed by a Steering Committee with deputy pro-

(JIAWG — cont. on p. 50)



Mr. Johnson is an Electronic Engineer in the Aviation Electronics Integration and Installation Division, AVRADA.



Joint Research Programs Office

by George Stech

AVSCOM has developed an effective aeronautical technology program through the collocation of Army R&D activities at NASA research centers: Aeroflightdynamics Directorate at the NASA Ames Research Center, Aerostructures Directorate at the NASA Langley Research Center, Propulsion Directorate at the NASA Lewis Research Center.

This arrangement has conserved both Army and NASA program resources in the conduct of research and technology efforts in areas of common interest. Further, the Army has been provided access to the substantive NASA research facilities and technical expertise for application to Army aviation technology development.

Mr. Stech is the Senior Electronic Engineer in the Joint Research Program Office, AVRADA, located at NASA Langley in Hampton, VA

The newest AVSCOM R&D activity to be collocated at a NASA research center is AVRADA's Joint Research Programs Office (JRPO) at NASA's Langley Research Center.

Strongly identified with the spectacular technical achievements and success of the early United States Space Program, NASA Langley has also made significant contributions to the United States leadership in civilian and military aviation technology and systems. Langley Research Center, established as the Nation's first aeronautical laboratory in 1917, is one of the world's foremost aeronautical research facilities.

Currently, approximately two-thirds of NASA Langley's program resources are invested in aeronautical research. In 1985, AVSCOM, recognizing the strength and relevance of the

(JRPO — cont. on p. 47)

"...one must be especially cognizant of the in-cockpit capabilities of the specific aircraft which the mission-planning system is to support."

A Mission-Planning System for Army Aviation

by Norman K. Shupe, PhD

The incorporation of a digitally-based map-display-system in the MH-60K and MH-47E Special Operations Aircraft has exacerbated the need for a Army aviation mission-planning capability. It is not coincidental that the mission-planning system most closely approximating the stated needs of Army Aviation (i.e., in a draft Organization and Operation plan entitled "Automated Mission Planning System"), and currently available within the industrial community, was also developed to support a digitally-based map-display-system (i.e., for the Marine Corps AV-8B and V-22 aircraft).

Recent Developments

From the perspective of affordable hardware technology, digitally-based map-display-systems have been ready for production for perhaps five years. The deployment barrier has been the logistics burden associated with supporting the airborne hardware with appropriate data bases in the tactical environment.

Two recent technological developments, optical-disc storage media and the computational power available in the form of coprocessors for the IBM-compatible personal computer, have breached this logistic barrier and, as a technological by-product, have also placed computer-based mission-planning within the reach of the general tactical aviation community.

It is important to understand that the mission-planning system supporting an aircraft containing a digitally-based map-system is logistically very similar to that required (i.e., by the draft O&O plan) for support of aircraft without such equipments.

To understand the logistical requirements associated with various classes of ground-based mission-planning systems, one must be especially cognizant of the in-cockpit capabilities of the specific aircraft which the mission-planning system is to support.

Dr. Shupe is Chief, Tactical Information Systems Division, AVRADA.

Three Classes

Consider three Classes of mission-planning systems, each of which is matched to an appropriate in-cockpit capability, and each of which is to address, a simplified preflight-planning problem involving the computerized calculation of the shortest route between a point A and a distant point B, the route being comprised of an unspecified number of legs (N), each of which is a specified and equal length as determined by navigational accuracy considerations.

Furthermore, all N of the legs must be flown at a specified constant altitude above the terrain surface without violating either the observed airspace of a known array of threats or the performance limits of the aircraft.

Class One

The Class 1 planner might

obtain the required N checkpoints by use of a digitized matrix of terrain-elevation data, a threat-location/threat-type array, a computerized model of relevant parameters for each threat-type, and a computerized route-optimization algorithm, one output of which would be the geographic location of each of the N checkpoints. A standard PC-type 3 1/2 inch floppy-disc might act as a tactical-data input-medium for the following information, some of which might be obtained from higher-echelon sources, and some of which might be created by, or fielded with, the Class 1 planner: (1) the digitized terrain-elevation data, (2) the threat-location/threat-type array, and (3) the aircraft-specific parameters for performance-planning and weight/balance calculations, to be used in conjunction with the route-optimization algorithm.

An appropriate output medium for this type of system would be a small-capacity Tactical Data Loader (TDL) to transport the geographic locations of the N-checkpoints/flight-plan-information to the aircraft, where the information might be used to initialize an onboard navigation system.

Incidently, one might also use this hardware configuration, given an appropriate Communication Electronics Operating Instructions (CEOI) input, perhaps from higher-echelon sources, to initialize and control an appropriate aircraft communications suite via the TDL. The Personal Computer program, containing the computerized threat-type models and the route-optimization algorithm, would provide a user-friendly interface to the system, including the ability to enter or update the threat-location/threat-type array, the aircraft-type of interest, and the CEOI information.

Some Deficiencies

The primary deficiencies of this system, from the mission-planning perspective, are likely to be (1) the lack of a map-like geographic context for display of the resulting N-checkpoints and the threat data, and (2) the execution time of the route-optimization algorithm, by even a 80386-based central processor.

An important application of the missing geographic context would allow the user to interactively perturb each of the computed checkpoints to coincide with a prominant navigational feature portrayed on a digitized topographic or photographic map. The prime contributor to an excessive route-optimization time-line is likely to be the time required to compute the interactive effects of the terrain-elevation matrix and the updated threat-location/threat-type array.

Class 2

The requirement for a Class 2 planner might develop as the result of the desire to correct the contextual deficiency of the Class 1 planning system or, perhaps, to augment the in-cockpit capability via a hard-copy, kneeboard-format presentation of the checkpoints and threats in a geographic context (e.g., overlayed against a 1:250,000 scale map). In either case, the major contributors to increased mission-planning system complexity are the need for (1) a high-density/capacity storage medium, and its associated logistics burden, to promulgate and process the digitized images of the topographic map and (2) a state-of-the-art form of videographics adapter to process and display the digitized map images as a background for the checkpoint and threat data. It is here that the noted technological improvements in mass storage media and PC-based processing power have made their greatest impact.

Defense Mapping Agency

The primary source for digitized cartographic products to support a Class 2 mission-planning system is the Defense Mapping Agency (DMA). The standard DMA products of obvious interest are the digitized terrain-elevation data base (i.e., in a 3 arcsecond matrix) associated with the Digital Land Mass System-Level 1 (DLMS) specification, and the digitized paper map images (i.e., in a 100 micron/inch matrix) associated with the ARC Digitized Raster Graphics (ADRG) specification.

Both of these digitized products will be disseminated by DMA in the very-portable and high-density form of compact-optical-discs (CD-ROMS). The ARC acronym refers to a non-conformal, near-rectangular, coordinate and map projection system, created by DMA to facilitate continuous digitized map imagery in the East/West direction (i.e., the Transverse

(System — cont. on p. 53)

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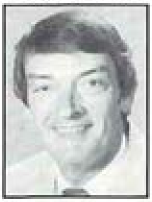

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Personnel

Warrant Officer Update: TWOS Transition

by Colonel Billy J. Miller

ALEXANDRIA, VA — The year that I have been the Chief of Warrant Officer Division can be characterized as one of change and transition as we move toward the full implementation of the Total Warrant Officer System (TWOS). The Army is committed to improving the career management of our warrant officer force and to provide better career incentives along with improved retention. TWOS is designed to do that.

One of the major career incentives of TWOS is the Master Warrant Officer Four (MW4) program, an interim designation implemented while awaiting congressional approval of CW5. Career management initiatives already being implemented include position coding of warrant officer requirements by skill and experience level; training, assignment, and promotion based on those requirements; integration into the Regular Army upon promotion to CW3; and a single Voluntary Indefinite (VI) system.

Five-year Obligation

All Army warrant officers have a five year service obligation upon appointment with consideration for VI at the four year point. Warrant officers are being managed by years of warrant officer service (WOS) instead of years of active federal service. This allows increased retention opportunities; however, retirement opportunities are still based on years of active federal service.

A major change with immediate impact is our SELECT-TRAIN-UTILIZE philosophy. With constrained budgets, PCS limitations and insufficient personnel to meet requirements, it is a mandated philosophy. Selection for any type of training is to meet a valid Army requirement and follow-on utilization is mandatory. Training quotas, especially for advanced aviation skills, are limited and require that we select the right person available to utilize that training.

Master Warrant

Selection for CW3 at around the eighth year of WOS qualifies you for Senior Warrant Officer Training and follow-on utilization in a Senior Warrant (SW) position requiring your skill and career field. This utilization continues upon promotion to CW4.

Eligibility for Master Warrant (MW) occurs at around the 20th year of WOS. Those selected will attend Master Warrant Officer Training and be assigned to a MW position in their career field.

Under TWOS, warrant officers may remain on active duty for 24 years of WOS as a CW4. Selection for MW provides the opportunity to continue to 30 years of WOS or mandatory age retirement, if that occurs first.

All the approved TWOS changes that were within the authority of Department of the Army for change are being implemented now. The transition from old to new will take several years to complete. Our ability to distribute and assign officers to meet the new position coding in MTOEs and TDAs is restricted by both budget and PCS rules. WO1s and CW2s will be assigned to WO positions and CW3s and CW4s will be assigned to SW positions; however, we may find it necessary to substitute up or down a grade during this transition period, in order to meet Army requirements.

Obstacle

A major obstacle in properly managing our warrant officer force is the dual promotion system. One reason why AUS promotion rates for CW3 are low is the minimum Regular Army (RA) promotion rate of 80% established by law. This has resulted in the retention of officers not selected for AUS CW4. Since the budget will only allow for a given number of officers in the various pay grades, we end up with excess in one year group and shortages in another, and no good way to control it.

A single promotion system that will provide a steady state promotion rate and predictable promotion opportunities is a key initiative of the TWOS legislative packages currently being staffed for presentation to Congress in early 1989. Also included in this legislative package is CW5 and several minor technical changes to accomodate the entire TWOS recommendations.

TWOS will greatly improve the

(TWOs — cont. on p. 44)

Colonel Miller is Chief, Warrant Officer Division, Total Army Personnel Agency, Alexandria, VA.

Operations:

1st Battalion, 228th Aviation Regiment

by Lieutenant Colonel William S. Justus

APO MIAMI — The 1st Battalion, 228th Aviation Regiment is the only fixed base Army aviation unit in Central and South America and is charged with a theater-wide, all encompassing combat and combat service support mission. Principally, the battalion conducts disaster relief, humanitarian assistance, medical evacuation, combat assault (for defense of the Panama Canal) and special assistance missions to allied nations throughout Latin America.

Out-of-Country Deployments

The battalion is comprised of a combat assault company (15 UH-60s), a general support company (eight CH-47Cs, 14 UH-1Hs, eight OH-58s), a medical evacuation detachment (six UH-60s), an aviation intermediate maintenance company (one UH-60) and a headquarters company including a VIP section (two UH-60s) and a fixed-wing section (three C-12s).

The UH-60 combat assault company is oriented toward out-of-country deployments. The necessity for the unit to react on short notice to support disaster relief and humanitarian assistance missions over an immense and remote geographical area has prompted the formation of six aircraft deployment packages composed of five tactical and one MEDEVAC UH-60 along with maintenance and support equipment tailored to the mission, location and duration of the support. "Fatcow" CH-47C models can also be employed to facilitate organic refueling enroute and at locations where other refueling methods are not possible. The UH-60 company is also charged with maintaining tactical proficiency in all flight modes to bolster the combat readiness of the United States Army South in the defense of the Panama Canal.

LTC Justus is Commander, 1st Battalion, 228th Aviation Regiment, APO Miami.

General Support Company

The general support company goes well beyond the implied mission of providing helicopter support to the United States military in Panama. The unit is often called upon to conduct simultaneous out of country operations to supplement the UH-60 company and they play a major role in providing medium lift support to the entire theater with the CH-47 fleet. The general support company is also the principal Army aviation element available to provide support to the Canal defense mission.

In addition to the local MEDEVAC mission, the medical evacuation detachment plays an integral role in humanitarian assistance operations, Medical Readiness Training Exercise (MEDRETE) operations, search and rescue, and supplements the deployment packages utilized throughout the theater. A 12 ship company structure is envisioned and is needed to meet the increased demands anticipated in the future.

The headquarters company's VIP BLACK HAWK section supports the Commander-in-Chief SOUTHCOM in addition to the steady influx of dignitaries and government officials who continually tour this politically turbulent region. The fixed wing section provides a similar mission on a wider geographic scale.

Disaster Relief

In recent years the 1st Battalion, 228th Aviation Regiment has supported disaster relief operations in Colombia (volcano and mudslide), Ecuador (earthquake), Costa Rica (flood); drug interdiction operations in Bolivia; humanitarian assistance operations in Ecuador, Peru, Colombia, Honduras and Costa Rica; and has provided direct technical and maintenance assistance to our allies in El Salvador, Brazil, Colombia, Guatemala, and Honduras.

Proposed improvements and Table of Organization and Equipment changes will enhance our ability to conduct more of these key missions. External Stores Support System for UH-60s, D Model CH-47s, ANVIS 6 NVGs, an ATC element, an increase of 160 personnel to bolster low density maintenance MOS's and the potential to increase the battalion to a Brigade structure, are all improvements that are either approved or being examined for future implementation.

Perhaps no other battalion sized element in the Army plays a greater role in the projection of our national image in a troubled

(1/228 — cont. on p. 44)

Reserve Components:

ARNG Aviation Safety

by Major Richard A. Sherman

ABERDEEN PG, MD — Prior to 1971 when the Secretary of Defense, Melvin Laird, announced the Total Force Concept, the National Guard was an ill-equipped and undertrained military organization with an unclear mission. During the last seventeen years the Army National Guard (ARNG) has made giant strides and is a full partner in the defense of the nation. This is evidenced by the issuance of the most modern combat aviation systems to the ARNG under the current force modernization program.

The ARNG is being equipped and trained at all echelons to fight on a highly complex and lethal battlefield. The role of the ARNG Aviation Safety Program is to effectively and efficiently support the goal of well trained soldiers prepared for war. The cost of training soldiers is too high to allow accidents to compromise the mission through unnecessary waste of crucial personnel and material resources.

The goal of the ARNG Aviation Safety Program is to conduct all operations in a safe and professional manner. Attention must be given to the relationship between safety and risks embodied in realistic training, with an eye on making a combat ready soldier while reducing and minimizing accidental losses.

MAJ Sherman is National Guard Bureau Aviation Safety Officer, Aberdeen Proving Grounds, MD.

The ARNG is composed of 452,000 citizen soldiers of which approximately 5,950 are aviators and 4,220 are aviation enlisted men and women. There are over 280 company-size units which have almost 2,780 aircraft assigned. Forty percent of the ARNG aviators have combat experience. This adds up to millions of dollars worth of equipment, training, and talent and will cost even more to replace if commanders, supervisors and soldiers fail to take action to prevent erosion of these assets.

Philosophy

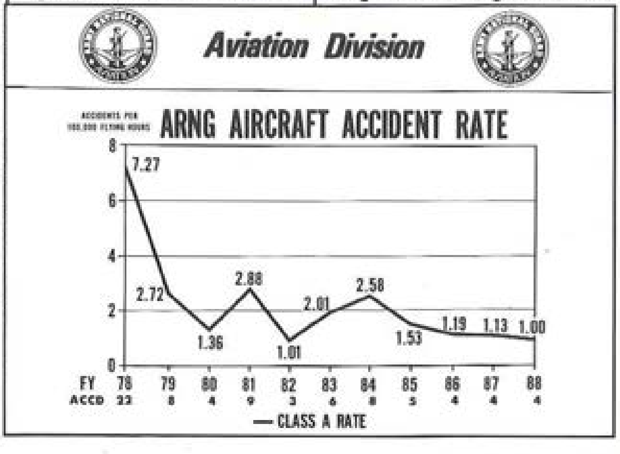
The ARNG Aviation Safety philosophy is predicated on the premise that all accidents are preventable. Favorable results will be realized through bold, incisive leadership at all levels of organization from the first line supervisor to the General Officer.

The objectives of the program are to prevent injury, loss of life, and damage to property resulting from accidents. Accident prevention can be achieved by training to standards; identifying and eliminating hazardous procedures, operations, and conditions; guarding against and controlling hazards that cannot be eliminated; and motivating and training individuals to perform safely.

Daring and Boldness

Soldiers are imbued with daring and boldness which is based on confidence in the reliability of his/her equipment and the soundness of decisions to be carried out. To be daring and bold is not to be confused with taking needless risks. Needless risks frequently result in accidents which undermine a soldier's confidence and the Army's combat potential. The ARNG Aviation Safety Program supports the peacetime priority of training as well as the wartime goal of winning.

The ARNG Aviation Safety Program is managed from the



Aviation Division of the National Guard Bureau by a three member Aviation Safety Team. Communications and coordination is conducted through the State Army Aviation Officer (SAAO) and the Army Aviation Support Facility (AASF) Aviation Safety Officers (ASO) to the units and aviation soldiers. The SAAOs and the ASOs are the individuals on whom the program's success lies.

Training

The foundation of the ARNG Aviation Safety Program is safety training and safety awareness. As time is a critical constraint on all Guard operations and is a commodity which cannot be wasted, training and awareness programs must be well planned and time efficient. The training strategy is to integrate safety into the ongoing training — to make safety a part of the soldier's way of doing business.

The National Guard Bureau conducts formal training courses in addition to those offered by the active Army and intensively manages the limited quotas for the courses taught by the U.S. Army Safety Center (USASC). The SAAOs and the AASF ASOs are provided annual training through the Annual Safety and Occupational Health Conference and Workshop and the Instructor Pilot/Aviation Safety Officer Course. These courses offer refresher training, provide updates to ongoing issues and give a forum for exchange of ideas.

The Aviation Mishap Prevention course is offered four times per year and accommodates fifty students per class. This one week course is designed to give safety training to Guardsmen and women who have not been afforded the opportunity to attend formal safety courses taught by USASC.

Priority of attendance is to those personnel assigned to a unit safety position, commanders and supervisors, maintenance personnel, and other aviation personnel.

In addition to formal classroom education, there are other educational techniques used to inform aviation personnel on safety topics. Most states conduct an annual safety "standdown" weekend or conference to promote safety awareness and education. The Aviation Division's Multi Media Branch (MMB) located at Fort Rucker, AL, develops safety posters, videotapes, slides and other innovative exportable training and education packages for use by ASOs at the AASF and units.

The simplest means of reaching the greatest number of people is through the use of printed material such as a quarterly newsletter and electronic messages.

Main Objective

The main objective of safety awareness is to prevent accidents causing injury and/or property damage by bringing safety concerns into the open through presentations, at meetings, seminars, standdowns, and conferences. By integrating safety into all activities, safety becomes the normal way of doing business. Safety awareness is the product of discipline where disciplined soldiers and operations are inherently safe.

To test whether a program is getting its message across to its target audience, there must be a form of measurement or evaluation. One form of measurement is to compare the aviation Class A accident rate (accidents involving a total loss of aircraft, a fatality, or material loss of $500,000 or more) from one year to another or over a period of time. For FY78 the ARNG recorded twenty-two Class A accidents for a rate of 7.27 accidents per 100,000 hours flown. For FY88 the rate was 1.00 accidents per 100,000 hours flown. This is the best accident Class A rate ever achieved in the ARNG.

Since 1979 the rate has stayed below 2.90. The remarkable aspect of this decline is that more missions have been flown in a higher risk environment such as NOE, Night, and NVG. The program has produced good results but only through the vigilance of all personnel will the accident rate be further reduced.

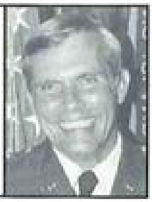
Back to Basics

For FY89 the ARNG safety theme of "Back to the Basics — Plan, Prepare, and Perform to Standards" has been adopted. The concepts and practices commanders use in the areas of combat readiness and operational training are similar to those identified in successful accident programs. Commanders are the key to safe, realistic training. No safety program can succeed without the commander's support. The challenge for the ARNG Aviation Safety Program is to articulate and implement a thoroughly conceived safety plan. IIIII

Reserve Components:

Sixth U.S. Army Aviation at a Glance

by Colonel Randall K. Phelps



PRESIDIO SAN FRANCISCO, CA — Sixth United States Army (USASIX) Aviation is headquartered at Presidio of San Francisco, California and its area of responsibility is the largest of the five Armies in the Continental United States.

USASIX aviation encompasses 12 western states (Arizona, California, Colorado, Idaho, Montana, North Dakota, Nevada, Oregon, South Dakota, Utah, Washington, and Wyoming) and has approximately 600 assigned aircraft.

Aircraft

The assigned USASIX aircraft include 550 rotary wing and 36 fixed wing aircraft which are dispersed within 11 United States Army Reserve (USAR) and 54 Army National Guard (ARNG) aviation units. These aircraft are dispersed over 1.2 million square miles (the land mass of the 12 western states, which comprises 40 percent of the Continental United States).

This large land mass provides many unique and challenging training opportunities (i.e., high altitude/mountainous terrain, cold weather, and desert operations) for USASIX aviation personnel.

USASIX is particularly proud of all its aviation elements for the realistic training they complete in accordance with Army "Train as you will fight" philosophy. USASIX aviators routinely complete night vision goggle, nap-of-the-earth, sling-load, aeromedical evacuation, tactical insertion and extraction, reconnaissance and security, intelligence and electronic warfare training scenarios in maintaining their high state of readiness for any contingency.

Aviation Resource Management Surveys (ARMS) and Director of Evaluation and Standardization (DES) reports have identified USASIX aviation as being extemely well prepared to mobilize with highly trained, effective aviation personnel who can instantly provide combat, combat support, and combat service support as needed to defeat the enemy on today's modern battlefield.

Training

Today's weapons have increased the lethality of combat to the point where the outcome of engagement between forces can be determined in minutes. USASIX aviation training has emphasized the need for realism in training to the greatest extent possible without compromising safety. Our aviation personnel recognize the key role they fulfill in achieving the Army of Excellence (AOE) mandate of increased reliance upon Reserve Component (RC) forces to provide combat power as they and the Active Component (AC) forces deploy in combat.

With the implementation of the Army Aviation Modernization Plan (AAMP), USASIX has initiated unit training which actively addresses the programmed reduction of total airframes and the projected increase in sophistication of the replacement aircraft and associated support equipment that are being phased into the USASIX aviation inventory.

"USASIX Aviation's ... area of responsibility is the largest of the five Armies in the Continental United States."

Our USASIX aviation personnel eagerly meet the training challenges presented by the increased reliance on more technologically advanced systems which are being phased into the USASIX aviation community under AAMP.

During numerous visits with our USASIX aviation units, I continue to be extremely pleased with the high state of readiness and esprit de corps demonstrated by our soldiers. USASIX aviation personnel are well trained and stand ready to meet any contingency. In summary, USASIX aviation is ready to provide swift, intense combat power!

COL Phelps is Aviation Officer, Sixth U.S. Army San Francisco, CA

Logistics:

Foreign Military Sales

by Mr. Donald L. Platt

ST. LOUIS, MO — The past year has seen a dramatic increase in the volume of foreign military sales (FMS) activity at the Army Aviation Systems Command (AVSCOM).

FY88 sales have increased by approximately 400 percent over FY87, and several additional major potential programs are on the horizon.

In order to more effectively manage the growing FMS workload at AVSCOM, the Operations Division within the Directorate for International Logistics was reorganized within the past year. The Operations Division is the heart of the Directorate. All FMS cases are developed, implemented, and managed within the division.

Traditionally, the division has been organized along geographical lines by branch. The reorganization created three systems oriented branches from three geographical ones. The three reorganized branches are:

- Utility Systems Branch (UH-60, UH-1)
- Attack Systems Branch (AH-1, AH-64, Scout/Observation Aircraft)
- General Purpose Systems Branch (CH-47, Fixed-Wing, Trainers, Ground Support Equipment).

This realignment makes the utmost use of expertise within the organization and maximizes the experience gained and lessons learned from past programs for similar aircraft systems. In addition to this reorganization, a new branch has been added, solely for management of the Saudi Arabian Land Forces Aviation Program.

Mr. Platt is Director, Directorate for International Logistics, U.S. Army Aviation Systems Command, St. Louis, MO.

Current Activity

On July 14, 1988, Colombia became the first nation to receive the UH-60 BLACK HAWK through a government to government Foreign Military Sales (FMS) Agreement. The five aircraft were delivered to Colombia via C-5A airlift. Initial spares and support equipment were picked up at New Cumberland Army Depot by Colombian C-130. TRADOC Mobile Training Teams (MTT) are providing assistance to Colombian pilot and maintenance personnel. Limited resources will present constant challenges in maintaining operational readiness.

The government of Egypt has approved an FMS case for the acquisition of two UH-60 BLACK HAWKS in a VIP configuration. The VIP treatment will closely resemble that of Sikorsky S-70 aircraft previously purchased by King Hussein of Jordan. Delivery of the aircraft is tentatively scheduled for late 1990.

The Saudi Arabian Land Forces Aviation Program continues on schedule. In May 1988, AVSCOM awarded the contract to Sikorsky for 12 UH-60 "DESERT HAWK" aircraft with delivery slated in-Kingdom in early 1990. Procurement action for one additional DESERT HAWK in a VIP configuration is in process.

Once again, Corpus Christi Army Depot (CCAD) has provided outstanding support to the Security Assistance Program with completion, in June 1988, of eight Philippine Air Force UH-1Hs previously returned to CCAD for overhaul. The aircraft, inducted in January 1988, were returned to the Philippines via C-5A.

Retired Aircraft

With the US Army Aircraft Retirement Program now in motion, considerable interest in the purchase of retired aircraft, by foreign governments is anticipated. Acquisition of these aircraft may occur via two methods. First, all eligible countries will be queried as to their interest in these aircraft beginning with the UH-1H. Aircraft would be offered for sale in an 'as is' condition. Additional repair, modification, or overhaul would be accomplished by contract services as desired by the customer.

Second Alternative

A second alternative would be for the purchase of aircraft from a 'HUEY Bank'. Preliminary appoval has been received to establish the bank with funding provided through the Special Defense Acquisition Fund (SDAF), a fund established to procure selected items in anticipation of security assistance demands. Under the 'HUEY Bank' concept, a selected

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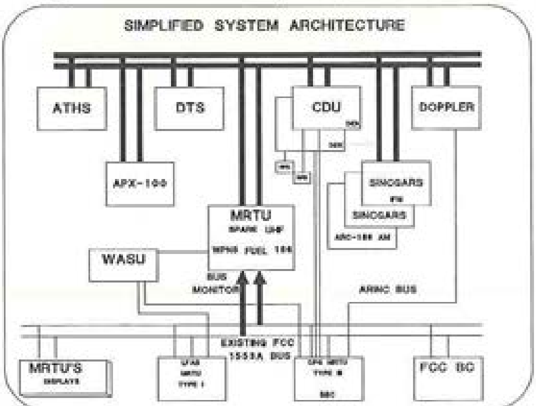
tion with navigation waypoints.

The ATHS/AI program also includes two new SINCGARS, secured Frequency Hopping FM radios and one high power amplifier (IFM) to provide a jam resistant Nap-of-the-Earth (NOE) FM communications capability.

ATHS communications between tactical aircraft is accomplished via jam resistant digital data burst transmissions with reduced on-the-air time. ATHS/AI fully capitalizes on ATHS digital communications through cockpit automation and integration to allow aircraft



computers to communicate directly with each other with minimal operator interaction. The ATHS message, when generated by the scout, contains not only target location but also includes the designator's laser code, location, number of missiles requested, type of acquisition mode (i.e. Lock On After Launch - LOAL), and other parameters, which are all required by the APACHE to initiate a successful HELLFIRE launch. Many of these parameters are today manually set by the crew which is both time consuming and error prone. The systems integration approach to APACHE ATHS/AI automates many of the functions such as: FCC storage of target coordinates and altitude; Fire Control Panel switch set up for TADS prepoint; HELLFIRE missile quantity and laser code selection; Missile channel prioritization; Missile Mode selection (normal or ripple); and Firing Mode selection (LOAL DIR, LO, or HI).

Freeing the aircrew from manually addressing aircraft set-up, and instead allowing them to concentrate on mission objectives is a key goal of the APACHE ATHS/AI program.

System architecture (above) is based upon a pair of integrated Control Display Units which function as bus controllers for the added 1553B CNI avionics bus. The CDUs act as compact mission computers and manage the storage and processing of all targets, waypoints, communications frequencies/nets and CEOI data. HELLFIRE automation and hands on comm/nav preset selection from the pilot's flight controls are also managed by the CDU. In-flight performance planning and calculator functions are provided within the CDU. The Data Transfer System (DTS) will be integrated to alleviate most pilot/CPG keypad interaction by automating the mission data loading process.

The CDUs are each comprised of a display, keyboard and processor. The sunlight readable, ANVIS compatible, eight line display, along with its eight variable action keys will provide the primary operator interface to the ATHS/AI system. All radios, IFF, Doppler, FCC and ATHS functions are accessed through this common display.

The full alphanumeric keyboard, which is similar to the CDU already installed in production APACHEs to control the AN/ASN-137 Doppler, will also replace the Data Entry Keypad (DEK). The keyboard provides a common means to operate all of the integrated avionics systems in one centralized cockpit location with common operating rules and procedures.

The processor section contains a 16 bit 80186 microprocessor, 592K Bytes of memory, a Data Entry Keypad emulator, and both discrete and serial outputs. Since both cockpits contain identical CDUs, each crew member can either monitor the other's actions, control those avionics systems required or take control in the event of an emergency or CDU failure.

In the unlikely event of total **(ATHS/AI — cont. on p. 41)**

AAAA

TRAINING THE ARMY AVIATION FORCE

AAAA Annual Convention, Atlanta, GA, April 5-9, 1989

AAAA ANNUAL CONVENTION GENERAL INFORMATION

REGISTRATION:

An Advance Registration Form must be completed by each individual who wishes to register or attend social functions. This form may be reproduced locally if additional copies are required.

All persons attending the Professional Sessions, except spouses, must register and pay the appropriate Registration Fee; admission to all Professional Sessions will be by Registration Badge. For those attendees who are non-members and wish to attend the Professional Sessions, there is an additional $15.00 fee which includes a full-year AAAA membership. AAAA members, non-members, guests, and their spouses who only wish to attend the exhibits or social functions need not pay the Registration or Membership fees.

Advance Registrations may be submitted to the AAAA National Office at any time prior to **Wednesday, March 1, 1989**, together with full payment for the functions the individual wishes to attend. If time permits, Advance Registrations received after **March 1** will be processed; otherwise, they will be held for On Site Registration. Full refunds of function fees will be made if notification is received at the AAAA National Office by phone or mail on or before **Friday, March 24.**

For those members who advance register and pre-pay their Registration and Function fees, the AAAA will provide an attractive "take-home" convention souvenir.

Individuals may pick up their registration badges and function tickets at the AAAA Registration Center in the **Georgia World Congress Center**. Operational hours of the AAAA Registration Center are listed in the **"SCHEDULE OF EVENTS"**.

HOUSING:

The AAAA National Office has reserved room blocks at four Atlanta hotels at AAAA Convention Rates. Room requests will be processed on a first-come, first-served basis. Room requests received after **Wednesday, March 1**, will be honored on a space-available basis.

Registration for the Professional Sessions or exhibits or attendance at a minimum of one of the convention functions listed on the Advance Registration Form is required to reserve hotel accommodations at AAAA Convention Rates.

The AAAA National Office is serving as the Housing Bureau **ONLY** for Military/DAC rated rooms. Military/DAC fees and room rates apply only to Active Army and DAC personnel and to those Reserve Component and Retired persons who are NOT in the current employ of defense contractors on a full-time, part-time, or consulting basis. DO NOT RETURN THE AAAA OFFICIAL HOUSING REQUEST FORM TO THE AAAA NATIONAL OFFICE UNLESS YOU ARE ELIGIBLE FOR THE MILITARY/DAC ROOM RATE. If you are eligible for the Industry/Civilian rate, send this form directly to the hotel of your choice. The hotels will ONLY accept direct reservations at AAAA Industry/Civilian rates.

PLEASE NOTE: Limited space is available at the hotels listed on the Official Housing Form. Indicate your hotel choices in order of preference: (1)—1st Choice to (4)—Last Choice. **Your Housing Request cannot be processed unless your preferences are clearly indicated on the Housing Form.**

AIR FARE SAVINGS:

Continental/Eastern has been selected as the official carrier for the AAAA Annual Convention and will offer significantly reduced fares for travel to the Convention. Certain restrictions apply. For reservations or more information, call the AAAA's official travel agent, **Westport Travel** at **(800) 243-3335** TOLL FREE (in Connecticut, (800) 433-7183). The savings apply to reservations for Continental/Eastern flights between Sunday , April 2, and Wednesday, April 12. Please consider using **Continental/Eastern** and **Westport Travel** to make your travel arrangements for the AAAA Annual Convention.

RENT-A-CAR SAVINGS:

Through the AAAA contract with Hertz — CDP-1D #83438, AAAA card-holding members attending the AAAA Convention may obtain the Hertz U.S. Government Discount on reservations made personally, or through travel agencies or corporate travel departments. The Hertz toll-free number is **(800) 654-3131**.

BUS SHUTTLE:

Shuttle bus service will be provided between the Georgia World Congress Center and the AAAA Convention hotels located in downtown Atlanta listed on the Official Housing Form. A complete Shuttle Bus Schedule will be provided to Convention attendees approximately two weeks prior to the Convention.

PROFESSIONAL SESSIONS:

The Professional Sessions taking place on Thursday, April 6, through Saturday, April 8, at the Georgia World Congress Center, will be of special interest to all AAAA members, and are being arranged by **Major General Ellis D. Parker,** Aviation Branch Chief and Commanding General of the U.S. Army Aviation Center and School, Ft. Rucker, Alabama, who serves as the Presentations Committee Chairman. The Host and Keynote Speaker of the AAAA Annual Convention is **General Joseph T. Palastra, Jr., Commanding General, U.S. Army Forces Command, Ft. McPherson, GA.** The Professional Sessions — all under the theme of **"Training the Army Aviation Force"** — will officially commence at 8:25 a.m. on **April 6**, with the Keynote Address scheduled for 8:35 a.m. Admission will be by Registration Badge.

EXHIBIT HALL DISPLAYS:

The Exhibit Hall Displays have become one of the most important segments of the AAAA Annual Convention — complementing the Professional Sessions with exhibits of Army Aviation products and services and opportunities to exchange vital information first-hand with the representatives of defense-related manufacturers. The Exhibit Hall Displays will be held in the Georgia World Congress Center. Refreshments will be provided on a cash basis during all open hours. The hours of operation appear in the **"SCHEDULE OF EVENTS"**.

AAAA CHAPTER RECEPTIONS:

The Thursday, Friday, and Saturday evening AAAA Chapter Receptions are a MOST IMPORTANT AND UNIQUE PART of every AAAA Annual Convention. Chapters do their utmost nightly to top one another in providing their own brand of hospitality, entertainment, food, and beverages — for all AAAA Convention attendees. The 1989 Chapter Receptions will be held at the Hyatt Regency Hotel. Bus transportation will be provided from each of the "AAAA" hotels located in downtown Atlanta listed on the Housing Form.

1989 AAAA Annual Convention

ADVANCE REGISTRATION FORM

Georgia World Congress Center, Atlanta, Georgia — April 5-9, 1989

I plan to attend the 1989 AAAA ANNUAL CONVENTION. The Advance Registration Deadline is **WEDNESDAY, MARCH 1, 1989.** If time permits, Advance Registrations received after **March 1** will be processed; otherwise, they will be held for On Site Registration. I understand that I may receive a full refund of my function fees if requested by phone call to the AAAA on or before **FRIDAY, MARCH 24, 1989,** or by written notification to AAAA that is received not later than **FRIDAY, MARCH 24.** Please **print** all information. **NOTE:** Military fees apply only to Active Army and DAC personnel and to those Reserve Component and retired AAAA members who are not in the current employ of defense contractors or suppliers on a full-time, part-time, or consulting basis. **Please make checks payable to AAAA.**

KEY: THIS BOX FOR OFFICE USE ONLY

RANK NAME (FIRST, MI, LAST)

HOME MAILING ADDRESS OR NAME OF COMPANY, FIRM OR UNIT

ADDITIONAL MAILING ADDRESS

CITY STATE ZIP

COUNTRY AREA CODE DAYTIME TELEPHONE NUMBER ARE YOU A U.S. CITIZEN? ☐ YES ☐ NO

NICKNAME FOR BADGE ____________ SPOUSE'S NAME, IF ATTENDING ____________

UNIT/FIRM NAME FOR BADGE ____________

IS YOUR FIRM OR UNIT EXHIBITING? ☐ YES; ☐ NO ARE YOU A CHAPTER DELEGATE? ☐ YES; ☐ NO

REGISTRATION FORM

NOTE—The AAAA Professional Program begins at 8:25 a.m. April 6, 1989.

SPECIFIC FUNCTION HELD AT THE 1989 AAAA ANNUAL CONVENTION	MILITARY/DAC MEMBER OR SPOUSE	INDUSTRY/CIVILIAN MEMBER OR SPOUSE	ITEM LINE TOTAL	OFFICE USE
❶ REGISTRATION FOR PROFESSIONAL SESSIONS & EXHIBITS	☐ $15	☐ $55	$____	____
❷ MEMBERSHIP FEE FOR NON-AAAA MEMBERS	☐ $15	☐ $15	$____	____
❸ EARLY BIRDS CASH-BAR RECEPTION, Wednesday, April 5	☐ at $3 ea	☐ at $3 ea	$____	1
SPOUSE TEA AT PITTYPAT'S PORCH, Thursday, April 6	☐ at $16 ea	☐ at $16 ea	$____	2
HALL OF FAME LUNCHEON, Thursday, April 6	☐ at $12 ea	☐ at $20 ea	$____	3
SPOUSE BREAKFAST AT FOX THEATRE, Friday, April 7	☐ at $19 ea	☐ at $19 ea	$____	4
AWARDS LUNCHEON, Friday, April 7	☐ at $12 ea	☐ at $20 ea	$____	5
PRESIDENT'S RECEPTION, Friday, April 7	☐ at $10 ea	☐ at $18 ea	$____	6
SPOUSE "SHOP TIL YOU DROP" LUNCHEON & TOUR, Saturday, April 8	☐ at $29 ea	☐ at $29 ea	$____	7
MEMBERSHIP LUNCHEON, Saturday, April 8	☐ at $12 ea	☐ at $18 ea	$____	8
❹ AWARDS RECEPTION & BANQUET, Saturday, April 8	☐ at $25 ea	☐ at $55 ea	$____	9
AVIATION BRUNCH & CHAMPAGNE GET-AWAY, Sunday, April 9	☐ at $11 ea	☐ at $16 ea	$____	10

❺ CIRCLE METHOD OF PAYMENT: MasterCard VISA Personal Check Business Check TOTAL $____

CREDIT CARD NUMBER ____________ EXPIRATION DATE ____________

CARDHOLDER NAME AND SIGNATURE ____________

❶ Spouses are not required to register for Professional Sessions. ❷ AAAA Membership is required to attend the Professional Sessions. ❸ Complimentary to Greater Atlanta Chapter members and spouses. ❹ Reserved Seating. Formal/Black Tie; Military Blues/Mess Jacket. ❺ MasterCard & VISA credit cards only; no others accepted.

This form, with the appropriate fees, must be completed and received by: AAAA, 49 Richmondville Avenue, Westport, CT 06880-2000 on or before WEDNESDAY, MARCH 1, 1989. Phone: (203) 226-8184.

Continental/Eastern has been selected as the designated carrier for the AAAA Annual Convention in Atlanta.

The reduced fares to and from Atlanta will be 50% off Coach Class or 5% off the lowest Super Saver. These apply to advance purchase requirements of the applicable fare.

To make your convention reservations ($100,000 free insurance, convention mileage, seat assignments, boarding passes), call Westport Travel, our official agency. The Group Department toll free number is available to all convention attendees.

Call 1-800-243-3335
(In Connecticut, call 1-800-433-7183)

The savings apply to reservations on Continental/Eastern flights between Sunday, April 2 and Wednesday, April 12, 1989.

Support AAAA's designated carrier and official agency

AAAA OFFICIAL HOUSING FORM

AAAA ANNUAL CONVENTION
APRIL 5-9, 1988 ● ATLANTA, GA

MAIL THIS OFFICIAL HOUSING FORM TO:

IF MILITARY/DAC — Mail this form to the AAAA National Office, 49 Richmondville Avenue, Westport, CT 06880.
IF INDUSTRY/CIVILIAN — Mail this form directly to the hotel of your choice — See address below.

Please print all information. I understand that to receive a room at AAAA Convention rates, I must register for the professional sessions or exhibits or attend at least one of the functions of the AAAA Annual Convention. Room requests will be processed on a first come, first-served basis. Room requests received after **Wednesday, March 1**, will be honored on a space-available basis. Confirm special needs directly with the hotel to which you have been assigned. NOTE: The AAAA National Office is serving as the Housing Bureau **ONLY** for Military/DAC rated rooms. Military/DAC fees and room rates apply only to Active Army and DAC personnel and to those Reserve Component and Retired persons who are **NOT** in the current employ of defense contractors on a full-time, part-time, or consulting basis. DO NOT RETURN THIS REQUEST TO THE AAAA NATIONAL OFFICE **UNLESS** YOU ARE ELIGIBLE FOR THE MILITARY/DAC ROOM RATE. If you are eligible for the Industry/Civilian rate, send this form directly to the hotel of your choice. The hotels will **ONLY** accept direct reservations at AAAA Industry/Civilian rates.

RANK NAME (FIRST, MI, LAST)

HOME MAILING ADDRESS OR NAME OF COMPANY, FIRM OR UNIT

ADDITIONAL MAILING ADDRESS

CITY STATE ZIP

COUNTRY AREA CODE DAYTIME TELEPHONE NUMBER

❶ ARRIVAL DATE ______ ARRIVAL TIME ______ NO. NIGHTS ______ DEPARTURE DATE ______

❷

INDUSTRY/CIVILIAN

Select the hotels of your choice in order of preference. If a room at the hotel of your choice is not available, this form will be forwarded to the hotel that is your next available choice. **If you work for a Defense Contractor on a full-time, part-time, or consulting basis, you are NOT eligible for the Military/DAC rate even if you are Retired Military.** Mail this form directly to the hotel of your choice — see address below.

- ☐ Hyatt Regency Atlanta, $102
  P.O. Box 1732, Atlanta, GA 30371 Tele—(404) 577-1234
- ☐ Omni Hotel, $79
  100 CNN Center, Atlanta, GA 30335 Tele—(404) 659-0000
- ☐ Atlanta American, $55
  160 Spring Street, Atlanta, GA 30303 Tele—(404) 688-8600

MILITARY/DAC

Select the hotels of your choice in order of preference. If a room at the hotel of your choice is not available, a room will be reserved at the next available choice. **NO request will be processed without at least three choices indicated.** The Military/DAC room rate applies only to Active Army and DAC personnel and to the Reserve Component and Retired persons who are **not** in the current employ of defense contractors on a full-time, part-time, or consulting basis. Mail this form to AAAA, 49 Richmondville Avenue, Westport, CT 06880 if you are eligible for the Military/DAC rate.

- ☐ Hyatt Regency Atlanta, $55
  c/o AAAA, 49 Richmondville Avenue, Westport, CT 06880
- ☐ Omni Hotel, $55
  c/o AAAA, 49 Richmondville Avenue, Westport, CT 06880
- ☐ Atlanta American, $40
  c/o AAAA, 49 Richmondville Avenue, Westport, CT 06880
- ☐ Econo Lodge at the Airport, $24
  c/o AAAA, 49 Richmondville Avenue, Westport, CT 06880

❸ **PRINT OR TYPE** THE NAMES OF ALL PERSONS SHARING YOUR ROOM **EXCLUDING YOURSELF** — CHECK: ☐ Single Occupancy ☐ Double Occupancy

1. ______ 2. ______ 3. ______

❹ PLEASE GUARANTEE MY RESERVATION FOR LATE ARRIVAL (AFTER 6 P.M.) WITH THE FOLLOWING CREDIT CARD: ☐ Yes ☐ No

☐ Mastercard ☐ VISA ☐ American Express ☐ Other (Specify) ______

Credit Card Number ______ Expiration Date ______

*Do not send any room deposit with this housing form. If a deposit is required to hold your room past 6:00 p.m., you will be notified at the time of confirmation by the hotel. Reservations will be held only until 6:00 p.m. on the indicated arrival date unless guaranteed for late arrival.

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AAAA ANNUAL CONVENTION GENERAL INFORMATION

EARLY BIRDS RECEPTION:

On Wednesday evening, **April 5**, the AAAA will sponsor an informal cash bar reception for "early arrivals" at **THE HYATT REGENCY HOTEL**. The Theme — North & South. Be prepared for Coney Island Hot Dogs and Southern Fried Chicken. You'll have the opportunity to dance to a **live** band as you renew old acquaintances.

SPOUSES PROGRAMS:

The AAAA invites spouses to participate in a program of planned activities from Thursday, April 6, through Saturday, April 8.

On **THURSDAY**, spouses are invited to enjoy afternoon tea and canapes at Pittypat's Porch Restaurant in downtown Atlanta, and celebrate the 50th Anniversary of the movie premier of Margaret Mitchell's GONE WITH THE WIND as you listen to the tales of the Old South as only Herb Bridges, creator of the world's largest collection of Gone With The Wind memorabilia, can tell. Bus transportation will depart from the Main Entrance of the Georgia World Congress Center at 2:00 p.m. and return you to your hotel by 4:30 p.m.

On **FRIDAY**, the traditional AAAA Spouses Breakfast will be held at the famed *Fox Theatre*. Bus transportation will depart at 8:30 a.m. from the Main Entrance of the Georgia World Congress Center. After a leisurely breakfast, there will be time for a tour by hostesses well versed in all of the anecdotes and history of the world famous Fox Theatre. The buses will return to the Georgia World Congress Center in time for the Reception and Awards Luncheon.

FRIDAY afternoon will be free for individual exploration. Information on Atlanta points of interest will be available at the AAAA Registration Center.

On **SATURDAY**, the program is appropriately named "Shop Til You Drop." The tour begins at 9:00 a.m. at the world famous Macy's in downtown Atlanta where Macy's experts will entertain you with a presentation on accessorizing your wardrobe. There will be time to shop at Macy's before you board buses for a guided tour through Atlanta to **Anthony's**, an authentic plantation house converted to a restaurant. You'll enjoy lunch as models show off the latest fashions for Spring. Then it's on to the Mecca for serious shoppers — Lenox Mall — with over 100 stores. Bus transportation will return you to your hotel by 4:00 p.m.

AAAA HALL OF FAME LUNCHEON:

The AAAA Hall of Fame Luncheon will be held on Thursday, **April 6**, at the Georgia World Congress Center during which the AAAA will honor its new Hall of Fame Inductees. All seats at this luncheon are unreserved.

AAAA EXHIBIT HALL RECEPTION:

The AAAA Exhibit Hall Displays will officially open with a cash bar reception from 4:30 p.m. to 7:30 p.m. on Thursday, **April 6**. Admission will be by badge.

AAAA AWARDS LUNCHEON:

The AAAA Awards Luncheon will be held at the Georgia World Congress Center on Friday, **April 7**, and will be preceded by a reception. Senior Army representatives will present the AAAA's national individual awards. All seats at this luncheon are unreserved.

THE PRESIDENT'S RECEPTION:

On Friday evening, **April 7**, the President's Reception will take place at The Hyatt Regency Hotel. Bus transportation will be provided from each of the "AAAA" hotels. The AAAA National President, **Major General Story C. Stevens, Ret.**, and **Mrs. Stevens**; the AAAA National President-Elect, **Brigadier General James M. Hesson, Ret.**, and **Mrs. Hesson**; the AAAA Executive Vice President, **Arthur H. Kesten** and **Mrs. Kesten**; and the Chief of the Aviation Branch and AAAA Presentations Chairman, **Major General Ellis D. Parker** and **Mrs. Parker**, are expected to form the Receiving Line.

AAAA MEMBERSHIP LUNCHEON:

The AAAA Membership Luncheon will be held on Saturday, April 8, at the Georgia World Congress Center during which the AAAA will honor its "Outstanding Chapter Activities" and its top recruiters. All seats at this luncheon are unreserved.

AAAA AWARDS RECEPTION AND BANQUET:

The AAAA's Awards Reception and Banquet will be held on Saturday, **April 8**, at the Georgia World Congress Center. Senior Army representatives will present the AAAA's national unit awards.

Seating at this formal Banquet is reserved. Please note any special seating requests on the Advance Registration Form. Every attempt will be made to comply with your request. Your table number will appear on your Banquet ticket. We ask that you sit at the table where you have been assigned in consideration of the other attendees.

In accordance with DOD provisions, military and government dignitaries and AAAA senior military members and their wives are invited as AAAA Banquet guests by the AAAA National Office in accordance with the invitation policies established by the AAAA National Executive Board. Invitations are non-transferable.

These guests include (1) all Active Army O-5 Members and above, (2) all Active Army GS-15 Members and above to include members of the Senior Executive Service, (3) all Active Army E-9 Members, and (4) Active Army O-4 Members, Active Army CW4 Members, and Active Army E-8 Members from the Regional area in which the Annual Convention is held. Invited guests are seated in random fashion at tables purchased by Industry Member firms to foster approved and meaningful interchange between government and industry.

Banquet guest acceptances must be received by Wednesday, **March 1**. If you are eligible to be a Banquet guest and have not received an invitation by February 1, please contact the AAAA National Office.

GET-AWAY CHAMPAGNE AND AVIATION BRUNCH:

On Sunday morning, **April 9**, the AAAA invites AAAA Convention attendees to join the AAAA President in a champagne toast in the President's Suite at the Hyatt Regency Hotel. The Aviation Brunch, which is held simultaneously, offers AAAA attendees an opportunity to say their good-byes.

AAAA ANNUAL CONVENTION SCHEDULE OF EVENTS

TUESDAY, APRIL 4, 1989

1200-1700 Registration & Ticket Sales

WEDNESDAY, APRIL 5, 1989

0800-2100 Registration & Ticket Sales
0830-1200 AAAA Scholarship Board Meeting
1200-1330 AAAA National Board Luncheon
1330-1730 AAAA National Board Meeting
1900-2200 Early Birds Reception

THURSDAY, APRIL 6, 1989

0700-1930 Registration & Ticket Sales
0700-0815 Chapter Presidents & Secretaries Breakfast
0700-0815 Speakers & Panelists Breakfast

Opening Professional Session

0825-0835 Welcome by AAAA President
0835-0905 Keynote Address by FORSCOM CG
0905-0935 Aviation Branch Chief's Update
0935-0945 "Training the Army Aviation Force"
0945-1005 Army Programs
1005-1020 Refreshment Break
1020-1050 Combat Developments Update
1050-1105 Training & Doctrine Update
1105-1130 NCO/Enlisted Training Strategies
1100-1600 TAPA Career Guidance
1130-1200 AAAA Hall of Fame Reception
1200-1400 AAAA Hall of Fame Luncheon
1400-1420 General Membership Meeting
1400-1630 Spouse Tea at Pittypat's Porch

Afternoon Professional Session

1420-1440 Reserve Component Training Strategies
1440-1455 Single Station Unit Training & Fielding
1455-1520 Logistics & Maintenance Training
1520-1540 Refreshment Break
1540-1605 Safe Training Strategies
1605-1630 Panel Discussion/Q&A
1630-1930 AAAA Exhibit Hall Reception
2100-0100 AAAA Chapter Receptions

FRIDAY, APRIL 7, 1989

0700-1730 Registration & Ticket Sales
0700-0800 Speakers & Panelists Breakfast

Morning Professional Session

0800-0830 Combined Arms Training at CTCs
0830-0850 Joint/Combined Aviation Training
0850-0910 Joint/NATO Aviation Training
0910-0930 Heavy Division Combined Arms Training
0930-0945 Light Division Innovative Aviation Training
0945-1000 Armed Reconnaissance Training
0830-1100 Spouse Breakfast at Fox Theatre
0900-1730 Exhibit Hall Displays Open
1000-1100 Refreshment Break
1100-1700 TAPA Career Guidance
1100-1200 Awards Luncheon Reception
1200-1400 AAAA Awards Luncheon
1400-1530 Refreshments in Exhibit Hall
1400-1530 Aviation NCO Professional Program

Afternoon Professional Session

1530-1545 Air Combat Training Concepts
1545-1600 Training in the Reserve Components
1600-1615 Special Operations Aviation Training
1615-1630 Aerial Exploitation Training
1630-1700 Panel Discussion/Q&A
1630-1730 AAAA Chapter President's Session
1900-2030 AAAA President's Reception
2100-0100 AAAA Chapter Receptions

SATURDAY, APRIL 8, 1989

0700-1630 Registration & Ticket Sales
0700-0800 First Light Breakfast (By Invitation)

Morning Professional Session

0800-0815 AVSCOM Update
0815-0830 LHX Update
0830-0845 Army Aviation Modernization Plan—One Year Later
0845-0900 PEO Reorganization
0900-0915 Simulation & Training Devices
0900-1630 Exhibit Hall Displays Open

Aircraft Seminars

0915-1000 AH-64, AHIP, SEMA/Fixed Wing, SOF & UH-1
1000-1045 AH-1, ASE, CH-47, LHX, UH-60

0900-1600 "Shop Til You Drop" Spouse Tour
1000-1630 TAPA Career Guidance
1045-1130 Refreshment Break
1130-1200 AAAA Membership Reception
1200-1400 AAAA Membership Luncheon
1400-1630 Exhibit Hall Social/Chapter Photos
1830-1930 Awards Banquet Reception
1930-2200 AAAA Awards Banquet
2200-0130 AAAA Chapter Receptions

SUNDAY, APRIL 9, 1989

0830-0930 AAAA National Board Meeting
0930-1030 Champagne Get-Away
0930-1200 The "Aviation Brunch"

ATHS/AI – cont. from p. 32

systems failure a manual back up mode is provided and activated from the emergency panel.

Primary interface with existing APACHE subsystems is maintained through a new Multiplex Remote Terminal Unit (MRTU). This smart MRTU also contains a 16 bit 80186 microprocessor, 8087 coprocessor, 352K Bytes of memory and two dual 1553B ports to interface with both the existing FCC BUS and the new CNI Avionics BUS.

Four Subsystem Interface Modules (SIMs) are also contained within the MRTU to interface with non-1553B aircraft systems. THE MRTU contains growth space for an additional SIM and five additional processor memory boards. The MRTU monitors all FCC BUS traffic and selectively provides the required information to the CDUs.

Magnetic Variation Map

The worldwide magnetic variation map is maintained in the MRTU memory and is updatable from the DTS at five year intervals as new information is published. All navigation Lat/Long to UTM conversions are also performed in the MRTU to overcome the Doppler limitations with multiple spheroid operation and 1553B Lat/Long resolution.

The MRTU contains significant processor and memory growth capability to easily handle additional navigation systems such as GPS. Interface with the APACHE fire control panels, fuel system, KY-58s and ARC-164 HAVE-QUICK radio are maintained through the MRTU.

A two line instrument panel mounted Remote Frequency Display is located in each cockpit to provide a continuous presentation of radio frequencies/call signs selected, plain or cipher operation, and ATHS message alert and operation. The RFD is also controlled from the CDUs.

Data Transfer System

The Data Transfer System is comprised of an aircraft mounted receptacle, a memory cartridge and a ground station to plan, format and load the memory cartridge prior to insertion in the aircraft. The DTS will provide the capability to both download data to the aircraft as well as to upload mission and maintenance data from ATHS/AI aircraft subsystems for subsequent analysis.

The System will automatically load the following data into the aircraft:

60 Radio Presets
150 Target Locations
2000 ATHS Authentication codes
2 CEOI tables
40 Navigation Waypoints
32 Laser Codes
15 Predefined ATHS Messages
APACHE checklists and Emerg Procedures

A new Audio Junction Unit (AJU) is provided to interface with the added FM radio and provide growth for a fifth radio. The AJU will also interface both the CDU and C-11746 Intercom to the pilot's flight controls. Growth provisions are provided to interface with the CPG flight controls. Interface to the ATHS processor including operator selectable ATHS tone suppression is also performed by the AJU.

MANPRINT

Logistics and Manpower Personnel Integration (MANPRINT) are also key elements of the ATHS/AI program. Computer Interactive Video Disc training is being developed and

(ATHS/AI - cont. on p. 55)

ATHS/AI MILESTONE CHART

EVENT	DATE
Contract Award	18 Mar 88
Hardware CDR	01 Nov 88
Software CDR	31 May 89
Contractor Flight Testing	Mar 89 - Mar 90
Critical Issues/User Tests	Apr - Jun 90
Deliv LRIP A/C - 25 (1 to 2/mo)	Jun 90 - Oct 91
Phase II Decision (MWO Kit Fab)	Mar 91
Deliv MWO Kits - (26/mo max)	Nov 91 - Oct 93
Phase III Decision (MWO Kit Install)	Mar 91
Deliv Prod A/C - (26/mo max)	Dec 91 - Nov 93

Interface – cont. from p. 8

avionics must be presented in a manner that does not remove the pilots attention from flying the aircraft. Likewise, the tasks which the pilot must perform to effect change within the avionic suite must not place a workload burden on the pilot.

There are a number of alternatives available for providing interaction between the pilot and the aircraft's avionic components. The advent of the digital integrated cockpit affords the ability to centralize the confluence of control and information data to a single point in the avionic suite aboard the aircraft. This reduces the man/machine interface to one between a mission processor and the pilot.

A large array of input/output devices are available to designers of digital integrated avionic suites, but they can be grouped into a relatively small set:

a. CRT terminals, both interactive or otherwise;
b. Status panel strips (non interactive) of varying complexity;
c. Discrete switches placed on a cyclic or elsewhere;
d. Symbology overlays on goggle devices such as NVGs;
e. Voice recognition and generation systems.

AVRADA's ICNIA ADM Flight Test program will use each of these types of devices except the NVG. Symbology overlay capability with devices such as NVG are not possible in this test due to funding constraints.

Several technologies that push the state of the art will be integrated into the flight test program in addition to Input/Output MANPRINT issues, and the intent of integrating these technologies with the ICNIA ADM Flight Test is to develop a base line interface between the pilot and the avionic suite. In this case, the avionic suite consists of the CNI functions of the ICNIA ADM hardware.

Flight Test Environment

The ICNIA ADM will reside within a computer controlled, integrated environment. The computer driven environment will form a shell around the functions that the ICNIA hardware can provide, in essence screening the pilot from operating the CNI equipment. Voice recognition and synthesis hardware will perform a primary role in the pilot/machine interface. Visual and manual data entry systems will perform a backup role to the voice recognition system and provide information not suited to voice, such as a digital map system and color graphics symbology. A Control and Display Unit (CDU) is used for interfaces with the mission processor that require heavy usage of alphanumeric input.

Voice Recognition System

The prime method of pilot/machine interface for each of the CNI functions will be voice recognition. The premise used for the voice recognition system is that a selection will be made from a specific set of available commands, each of which will illicit a particular response from the avionic system (the ICNIA ADM, and the associated hardware and software that manages the pilot/machine interface).

The voice recognition system used in the flight test is a connected phrase recognizer, so that the pilot is not forced to separate his command into discrete words, but may "run the words together".

The set of commands is discrete, however, and a specific grammar and vocabulary are required. This basically means that for each of the commands in the set of possible commands, the words used must belong to the set of words the voice system recognizes and the order of those words must be correct.

The command that is spoken into the voice recognition system will be displayed to the pilot on a two-line status panel in real time. The status panel is located at the top of the cockpit panel, and will provide visual feedback without requiring the pilot to completely remove his attention from events occurring out of the cockpit. The pilot has the opportunity to countermand a mispoken command by issuing a "DISREGARD" command.

Interactive CDU

The interactive CDU consists of an alphanumeric keyboard and a small interactive display. It provides the primary I/O backup to the voice recognition system. The CDU can effect all aspects of avionic control in the advent that the voice recognition system fails.

The unit uses a series of display pages that are hierarchically structured and can be accessed via a menu driven traversal of the control page hierarchy. In cases where a lot of character input data is required, the CDU is the prime

Pilot interface device.

An interactive color CRT will be used to display graphics symbology and digital map data. A digital copy of a terrain map, with overlaying cultural features, will be a part of the basic ICNIA Flight Test Environment. The capability also exists to overlay the map display with tactical data or symbology of general interest. The digital map is activated via a voice command, and several modes of declutter will be available via line select keys located around the perimeter of the color CRT.

The color CRT will also be used to graphically display the internal status of the ICNIA ADM hardware. The purpose of this mode of CRT operation is to track artificially induced ICNIA faults and the effects these faults have on the allocation of ICNIA's modular assets. Reconfiguration of these assets can then be displayed in real time as the failures are induced.

The digital map and graphics display modes of the Color CRT will not be simultaneously available at the time of the flight test due to funding restrictions.

Management of ICNIA Functions

Radio management consists of more than just tuning a radio to a particular frequency. The Communications Electronics Operating Instruction (CEOI) is a database that allocates frequencies, call signs, nets, etc., to specific units. In present systems the search of this CEOI database is manual and quite time consuming. The AVRADA ICNIA Flight Test Environment will automate and integrate this function, as well as authentication functions, into the ICNIA radio management system. The pilot will just ask for a radio channel and who he wants to speak to. The interface system will search and the CEOI will set the radio functions of ICNIA appropriately. CEOI information concerning the unit presently active on the communications channel will be displayed on the two-line status panel. The capability of ICNIA to support presets and mission phase groupings of frequencies will also be controlled by a database.

Capability will be available to change the configuration of a communications channel on a dynamic basis (in real time). This will be provided on a channel by channel basis and will be controlled by a set of pages on the CDU. The pilot can bring up the appropriate communications control page by a voice command, and then enter the configuration changes on the CDU's interactive keyboard.

Identification functions will be handled in a manner similar to that used in radio management. The primary interface with these two functional groupings of the ICNIA hardware will be by voice, with the CDU playing a backup role. Large portions of the mission data will be placed within databases that are loaded prior to the start of the flight.

Navigational information provided by ICNIA will be displayed in various ways. The position of the aircraft will be shown with respect to the digital map via an appropriate stationary icon, with the map scrolling beneath it. Waypoint data prepared in a mission planning station prior to flight may also be overlaid on the digital map. In this manner, tactical points of interest can be indicated on the map in relation to the position of the aircraft.

Direction information can also be displayed on the color CRT via more standard graphics symbology. Direction to points in the waypoint database may be included in the direction display. All of the directional navigation data will be displayed on a graphics icon that emulates the standard analog compass. The compass icon will be animated so that directional data will change in real time.

Implementation

The pilot interface system that will be used in the ICNIA flight test makes extensive use of several new technologies. A multiprocessing computer will be used as the mission processor, and will use several advanced software concepts, such as multitasking, real-time process control, and object oriented software design. The voice recognition and synthesis system is emerging technology and while it will present challenges to integrate, the payoffs in pilot workload may be high.

Integration of these varying technologies will allow the creation of a state-of-the-art interface between the pilot and the avionic suite that assists in successful mission performance. The use of this interface in testing the ICNIA ADM will provide not only a test of the functionality of the ICNIA hardware, but also the test of ICNIA's use in an environment specifically tailored to MANPRINT interface issues. IIIII

Radio – cont. from p. 17

Army aircraft due primarily to limited antenna installation possibilities, noisy channels, and lack of training and understanding of HF propagation characterisitics. Recent advances in technology have made possible improvements in HF radio performance.

By improving receiver design, applying digital signal processing techniques to remove received noise, and improving the design of the coupler and antenna, industry experts have stated that an improvement of up to 20db over today's system could be expected. This improvement would result in increased reliability of communications in those instances where operation is now marginal. The next generation HF aircraft radio should incorporate these design features.

Proposed HF Radio System

A flexible HF radio system architecture is shown in Figure 1. This architecture consists of:

- A simple, user friendly, controller capable of accepting electronic CEOI data from a compatible fill device. All net variables would be stored in the fill device (the standard device is the Battlefield CEOI system) and input to the the controller. These variables would then be transferred to the R/T to set up to the proper mode of operation, thereby minimizing inputs from the operator. The controller would also act as a manual input device for the airborne data modem.
- A HF receiver/transmitter capable of providing basic HF communications capability, and capable of being interfaced to frequency hop controllers, COMSEC devices, and data modems.
- Separate frequency hop applique and COMSEC/data devices.
- An antenna coupler and element designed for the specific aircraft platform.
- The capability for ALE could reside in either the R/T or the frequency hopping applique.

This architecture allows flexibility to adopt new standards for frequency hopping, COMSEC, or data handling capabilities as they become available. This is particularly true of frequency hopping since it is known that a new faster hopping standard is being developed and will be fielded sometime after the year 2000.

Next Generation

The next generation aircraft HF radio will be by acquisition of an NDI item. Involvement by industry, both through IR&D and providing equipment for test, will be encouraged throughout the requirements definition and acquisition phases of the program.

In May 1987, AVRADA published a market survey in the Commerce Business Daily. The CBD announcement requested information on current industry developments related to frequency hopping HF radios and offered the opportunity to flight test prototype hardware.

Periodic program announcements will continue to be published in the CBD asking for participation and providing key program guidelines. The first phase of the program is underway with four key industry participants. In this phase, participants will be allowed to operate their IR&D hardware in a tactical helicopter environment and obtain valuable engineering information. The government will benefit by obtaining technical performance characteristics needed for the eventual system trade-off analysis. In addition, a Concept Evluation Plan (CEP) phase in 1990 is being coordinated with U.S. Army Aviation Center, Ft. Rucker, AL to refine operational requirements consistant with the STAJ system capability. The results of these efforts will be used to establish realistic functional requirements for the NDI Airborne STAJ radio acquisition in the 1992 timeframe. ■

1/228 – cont. from p. 27

and economically dependent part of the world. Our allies have learned to depend on United States Army South and the 1st Battalion, 228th Aviation Regiment, to provide prompt and effective assistance whenever and wherever it is needed. ■

TWOs – cont. from p. 26

way we manage our warrant officer force and will enhance our ability to meet current and future Army war-fighting requirements. The success of TWOS will take Army-wide support and understanding during this critical period of transition. We in Warrant Officer Division will do our best to provide the Army the right officer at the right time with the right qualifications for the right job. ■

Doppler – cont. from p. 14

mine the performance of the offferor's system while undergoing flight dynamics typical of Army tactical operations. The flight testing was conducted on UH-1 (Iroquois) and UH-60 (Black Hawk) platforms over a period of ten months, using a surveyed overland navigation course located in the vicinity of the Naval Air Engineering Center (NAEC) Lakehurst, NJ and on an over-water navigation course extending from Seaside Heights to Avalon, NJ.

A total of 46 hours were flown counting up to 182 separate legs of various distances with a total accumulation of 3790 kilometers. The findings of these tests showed that the F3 Doppler met the performance characteristics as indicated in the Product Specification.

The F3 Doppler will provide Army helicopter programs with current technology of a single LRU and with the attendant benefits of reduced size, weight, power consumption and increased reliability. A comparison of these characteristics for the F3 Doppler vs the AN/ASN-137 is shown on the first page of this article. As noted, there is a direct weight reduction of 16 lbs from the hardware alone.

Also, an additional 10-20 lbs estimated weight savings will be achieved by a reduction in the overall amount of cabling that will be required for the single LRU installation. The actual weight savings will vary by aircraft type.

The accuracy of Doppler Navigation Systems is typically specified as a percent of distance traveled and is often compared to navigation error per unit of time. For accuracies achieved by typical Doppler and Inertial Navigation Systems (1% of distance traveled vs 1 nautical mile per hour), the Doppler performs more favorably for the relatively slow flying helicopter. However, many advanced helicopter navigation suites will be comprised of both Doppler and inertial elements to take advantage of the complementary characteristics of the two technologies.

Recognizing the Army's commitment to the Doppler as an effective means of self-contained navigation, the program office continues to improve this technology. While the new generation Doppler is not yet deployed, AVRADA is working on further doppler enhancements. The objectives of these AVRADA programs are to improve Doppler performance for overland and overwater operations. The end result will be the increased capability of Army helicopters to navigate accurately in a tactical environment. ■

Activities – cont. from p. 7

and Industry personnel alike on our demonstrations of AVRADA's tremendous capabilities in our exhibits.

Monmouth Symposium

The AAAA Monmouth Chapter held its sixth biennial avionics symposium in May 1988, at the Berkeley Carteret Hotel, Asbury Park, NJ. The theme was "Technological and Managerial Thrusts in Army Avionics."

The two-day unclassified sessions explored the current developments in avionics and their impact on the management, doctrine, technology, and readiness of Army Aviation.

Among the guest speakers were MG Stephenson; the Honorable Jay R. Sculley, Assistant Secretary of the Army; BG William H. Forster, then Program Executive Officer (PEO), Combat Aviation; and LTG Jerry Max Bunyard, Deputy Commanding General for Research Development and Acquisition at Army Materiel Command (AMC).

The ADAS/STAR and the "NAV" Mobile Van were displayed and demonstrated outside the hotel. Inside displays included the "FLIPS" (Flight Integration Planning Station), and the components of the Global Position System (GPS).

Papers were presented by AVRADA personnel on 'Future Avionic Systems," by Dr. Joseph Dasaro, "Advanced Speech Recognition Utilizing a Human Recognition Paradigm and Concurrent Processing," by Lockwood Reed, and "Voice Interactive Avionic Demonstrations," by Robert F. Swieder.

Scholarship Fund

The AAAA Monmouth Chapter AAAA, donated $25,000 to the AAAA Scholarship Foundation. In addition, the Chapter supports three Memorial Scholarships totalling $5,000 and one Perpetual and one Matching Scholarship at $1,000 each. The Chapter intends to increase its support by giving another $25,000 to the Foundation.

Other Demonstrations

AVRADA displayed the ADAS/STAR and the Huey at Fort Monmouth's Armed Forces Day celebration. Impending rain, which delayed the arrival of the helicopters, did not dampen the crowd's enthusiasm. Loud cheers greeted the ships as the sun broke through the clouds and the two approaching specks grew bigger and bigger. Anxious spectators had to be held back by security guards until the helicopters landed and their rotors came to a halt. As soon as they were admitted to the field, throngs of adults and children gathered around the helicopters.

On another occasion, a Huey demonstration was given to 40 grammer school children at AVRADA's heliport. Although it was raining slightly, the children were so excited to see a helicopter and how it works, that they didn't seem to mind the rain.

When fifteen high school students and four West Point Cadets visited the Flight Information Division they were allowed to "fly" the Tactical Avionics System Simulator in the cockpit simulator. The Cadets were also given a flight demonstration of the System Testbed for Avionics Research Aircraft, at Lakehurst, NJ.

Employees Have Heart

Under the Leave Sharing Program, AVRADA employees donated 132 hours of their leave to an employee in our Joint Research Program Office at NASA Langley in Hampton, VA. I'm sure this employee, who did not have enough leave to cover time out for major surgery, will be forever grateful to AVRADA.

Winding Down or "R&R"

"All work and no Play..." You know that old adage, well AVRADA took time out for play...or was it? The golfers at the AAAA Sports Day, held in August, were very serious about competing to win a "Hole-In-One" car, donated by Schwartz Chrysler-Plymouth for the golf tournament. But alas, no golfer was lucky enough to win the car. The closest was 5 feet 4 inches (that doesn't even count in horseshoes!).

The Sports Days, consisting of golf and tennis, were held at the Fort Monmouth Officer's Club. The Sports Days climaxed with a banquet that would "tickle anyone's palate". Over $2,700 was raised for the Monmouth Chapter's Scholarship Fund.

We feel it is important to show people what we do and how we do it. We've already started ambitious programs for FY89. We exhibited at the Aviation Brigade Commander's Conference, Ft. Rucker, AL in December and plans are being made for the Annual AAAA Convention to be held in Atlanta, GA, April 5-9, 1989. We at AVRADA are proud of our commitment to the furtherance of AAAA programs and other avionics activities.■

JRPO – cont. from p. 21

JRPO – cont. from p. 21

NASA aviation electronics program at Langley Research Center and the benefits of a cooperative Army-NASA avionic technology program, authorized the establishment of the AVRADA JRPO at NASA Langley.

In 1986 AVRADA began staffing JRPO with Army research engineers and a joint Army NASA avionic technology program was initiated. This joint Army-NASA program is currently focused on three technology areas: Advanced Antenna Technology and Electromagnetic Research, Advanced Cockpit Display Technology, and Fault-Tolerant Information Processing Technology.

Antenna/Electromagnetics

A joint Antenna/Electromagnetics research program has been established with the NASA Antenna and Microwave Research Branch (AMRB) to specifically address the antenna and electromagnetic needs of Army helicopters.

NASA Langley's AMRB is widely recognized for its many significant achievements, the stature of its technical personnel, and outstanding facilities. Facilities which are available to support Army research at Langley include an automated fully-shielded anechoic chamber, over 100 feet in length; a large state-of-the-art indoor compact range; an outdoor antenna test range; microwave/millimeter laboratories; and extensive computer resources.

Placing motivated Army research engineers in the AMRB environment to work with NASA researchers to develop an Army antenna/electromagnetics technical competence has been a high JRPO priority. To date the focus of the joint AVRADA/AMRB program at Langley has been the development of analytical tools to predict antenna performance on helicopter structures and utilization of advanced electromagnetic materials to improve antenna performance and airframe integration.

This analytical thrust is leveraging on previous research performed by AMRB and Ohio State University (OSU) in developing analytical computer codes for predicting antenna patterns and optimizing antenna site locations for spacecraft and fixed wing aircraft. AVRADA and NASA AMRB engineers currently are working with OSU to extend the analysis methods to cover lower Army communication frequencies and helicopter geometries.

A recent review of current Army helicopter antennas and the helicopter industry antenna engineering program has concluded that advances in antenna technology are lagging far behind the technology advances of other avionic disciplines. To correct this situation, AVRADA and NASA are planning a government-industry-university consortium to focus emerging electromagnetics technology on Army helicopter applications. The consortium will be open to all interested organizations associated with the helicopter community and will be administered by a major university research center.

Ideally, the consortium will help to advocate electromagnetic aspects of advanced helicopter design, define the electromagnetic requirements for future helicopter systems, and coordinate the efforts of participants from the government, industry, and universities for efficient implementation of new technology and concepts.

Cockpit Display Technology

A joint cockpit display technology research program has been established with the NASA Crew Vehicle Interface Research Branch (CVIRB) to address advanced cockpit display technology for Army helicopters.

CVIRB's advanced cockpit research program is at the forefront of the state-of-the-art in advanced display media, display graphics generation, multifunction I/O devices and subsystems, and information management techniques using reconfigurable displays and innovative automation concepts. Several of CVIRB's senior research engineers are nationally recognized for their technical expertise in advanced display technology, are active participants in DOD/NASA advanced display technology programs, and have made substantial contributions to professional society (IEEE, AIAA, SID, and DASC) conferences and workshops in the areas of advanced cockpit technologies. CVIRB's Crew Station System Reserch Laboratory (CSSRL) provides a near-real operational environment for advanced cockpit technology research.

Major elements of the

(JRPO — cont. on p. 48)

JRPO – cont. from p. 47

CSSRL are a reconfigurable research cab, the Advanced Display Evaluation Cockpit (ADEC), a simulation host processor, a high-performance raster display generator to drive cockpit displays, and a Display Device and Materials Lab. A variable lighting system provides a realistic lighting environment for evaluating electronic displays installed in ADEC. This lighting system is capable of presenting the full range of lighting conditions encountered in flight, from total darkness to direct sunlight with diffuse through direct sunlight conditions.

The goal of the joint AVRADA/CVIRB program is to develop a research and technology base and establish an evaluation facility for advanced Army helicopter cockpit displays at Langley Research Center. The initial efforts of this joint venture have been directed toward modification of the NASA laboratory facilities for Army helicopter cockpit technology evaluations. In addition, two noteworthy joint AVRADA/CVIRB research efforts have also been initiated: a design study for a full color raster graphics stereo wide-field-of-view helmet mounted display, and the initial development of a graphics software capability to drive graphics engines for wide-field-of-view panoramic displays.

Performance Evaluation

Future aircraft will employ digital electronic systems to perform flight critical functions which must be ultra-reliable as failure could result in the loss of the aircraft. The design and validation of ultra reliable systems present special problems not found in the design and validation of conventional systems; therefore, new techniques and methods are needed to evaluate their performance and reliability. No longer will exhaustive testing be practical because of the excessive time required and cost incurred to build confidence that the reliability requirements can be met.

Defining Techniques

Attention must be given to defining techniques and methodologies for ensuring that advanced system designs meet performance and reliability requirements without having to rely on exhaustive testing. The NASA Information Systems Division (ISD) at Langley has been a leader in fault-tolerant systems research for a number of years. NASA is conducting research at Langley to provide an effective validation methodology, techniques for conducting comparative analyses of advanced system concepts, and guidelines for designing fault-tolerant systems whose performance will be easier to validate.

ISD has developed and implemented the Avionics Integration Research Laboratory (AIRLAB), a unique national laboratory facility that provides opportunities for cooperative research activities between NASA, industry, academia, and other government agencies in the design and validation of highly reliable fault-tolerant information processing systems.

AVRADA research engineers are currently participating in two joint research projects in the area of fault tolerant avionic systems. One project is directed toward the development of design guidelines and performance assessment methodologies for advanced fault-tolerant system architectures and the other is investigation methods for estimating software reliability for ultra-reliable systems.

Summary

The AVRADA JRPO has been in existence at the NASA Langley Research Center for only a short period of time with a small number of research engineers and a very limited research budget.

However, by leveraging on NASA research facilities, NASA technical experts who are interested in Army aviation technology problems, NASA-University connections, and a NASA managment committed to the success of the joint AVRADA/NASA avionic program at Langley, JRPO has enriched the avionic technology base well beyond what one would reasonably expect. Many additional opportunities exist for joint Army/NASA avionic R&D both within and beyond the technologies being addressed in the current program.

As additional resources are provided to the joint Army/NASA Langley avionic R&D program, AVRADA's JRPO can be expected to be a major contributor to the technology base necessary to provide the reliable, economical, and high performance avionics required for future Army aviation systems. IIIII

MGU — cont. from p. 10

basis for an order of magnitude reduction in size and weight of the available GPS receivers.

In 1985, the Defense Advanced Research Project Agency (DARPA) sponsored a competitive program to reduce the size and weight of the GPS receiver.

A much smaller receiver was developed employing Gallium Arsenide (GaAs) technology which provided much faster processing rates.

The Army conducted a study to investigate the applicability of the DARPA receiver to its own system designs. The DARPA front-end, the portion of the system which is responsible for receiving the satellite's signal, was found appropriate for the MGU program.

A controller is still required to provide control to the front-end and interface to the aircraft avionics. This controller could employ today's state-of-the-art microprocessors providing an increase in speed and memory size as well as a large reduction in size, weight and power. As the research progressed it became obvious that a single Line Replaceable Unit (LRU) design would have significant benefits over today's multiple LRU GPS systems. Such benefits include weight and size reductions, lower integration costs and unburdened logistics.

Thus, the Miniature GPS Unit (MGU) program resulted from a requirements pull for a smaller and lighter single LRU GPS system and the technology push of advanced microelectronic technology.

Program Plan

In September of 1988, the MGU entered the requirements definition phase. AVRADA is currently preparing the technical specifications. These documents include the System Specification, Software Requirement Specification (SRS), Interface Requirement Specification (IRS) and the Multiplex Interface Control Document (MICD). The specifications are being prepared such that the MGU can ultimately be acquired using a fit, form and function specification.

It is also intended that the MGU controller software be reprogrammable to easily accommodate modifications. This requires that the Army retain total configuration control of the software.

For this reason, the Army will require that the MGU have the operational program stored in non-volatile Electrically Erasable Programmable Read Only Memory (EEPROM) and retain unlimited rights to the software. It is also required that the software be programmed in the DOD programming language, Ada, so that the program will be transportable, supportable, and reusable.

MGU Design Requirements

The MGU will house the antenna, receiver and controller in one LRU as opposed to the existing GPS systems with separate LRU's in different aircraft locations. Combining these functions into one LRU greatly reduces integration costs. The amount of cabling, couplers and connectors will be minimized which will reduce the size, weight, and cost requirements and also will improve reliability. Another plus to the single LRU design is logistics unburdening. Requirements such as fielding, depot maintenance, storage and paperwork will be reduced by supporting one LRU as opposed to multiple LRUs.

Plans are to have the MGU capable of receiving and tracking five channels. The GPS receiver will provide position accuracy of 15 meters, Spherical Error Probable (SEP).

The MGU will interface to the aircraft via the MIL-STD-1553B Bus as a Remote Terminal (RT) and will respond to a subset of the present 1553 GPS message set. The existing Interface Control Documents (ICD) will be a guide in the selection and design of the bus message structure. The MGU electronics will be partitioned into two subsets, known as the Receiver and the Controller Modules.

The receiver module will be responsible for reception of the satellite signals, computing the pseudo-range and pseudo-delta-range, and providing status information. The requirements for this module are fairly generic in nature; therefore, several existing designs are being considered.

As mentioned before, the DARPA Gallium Arsenide front-end is a candidate for this MGU Receiver Module. Other designs from various GPS vendors are also being considered.

The Controller Module will interface to and control the Receiver Module and also interface to the MIL-STD-1553B Multiplex Bus as a Remote Terminal to calculate the system's Position, Velocity and Time

(MGU — cont. on p. 52)

JIAWG – cont. from p. 20

gram managers from the LHX, ATF, and ATA Program Offices. The JIAWG is supported by both the prime contractors for the three aircraft programs and the avionics industry in general.

Organization

The Steering Committee, the primary decision-making body within JIAWG, reports to an Executive Committee made up of the three Program Executive Officers (PEO's) and periodically reports to the Services senior staffs, Service Acquisition Executives, and to the Office of the Secretary of Defense (OSD). Six Task Groups report to the steering Committee: Architecture, Software, Sensors, Electronic Combat, Communications Navigation Identification/Communications Security (CNI/COMSEC), and Supportability. The Architecture Task Group's principal members have also been given the responsibility for managing the operation of the other task groups and therefore have the power to task the other groups for inputs, plans, and reports. The Steering Committee meets with the Task/Sub-Task Groups quarterly to disseminate policy and hear reports of status, plans, and issues. The Steering Committee in turn reports to the OSD approximately semi-annually.

Approach

JIAWG is defining the requirements for common avionic modules, software modules, and development tools, which can be used like building blocks to develop an avionic suite tailored to the needs of an individual aircraft. Each common module type will be totally interchangeable between aircraft of different types as well as within each fleet. Software modules will have standard interfaces and documentation requirements for re-use and transportability. A standard Software Engineering Environment (SEE) will assure standard code generation from the same Ada source code to allow interoperability of software and reduce development costs.

Hardware modules will be designed for two-level maintenance. Each will have Built-In Test (BIT) and a fault indicator. Upon indication of a fault during flight, unit maintenance personnel would replace the module and ship the failed module to a depot or designated repair facility. The common module approach will enhance two-level maintenance by reducing the total cost of spares required at unit maintenance level.

Mounting

Modules will be mounted in non-standard enclosures which are tailored to the needs of each application, but have common interfaces to the modes. Most of the Electronics modules for processing will be in the Standard Electronic Module (SEM) "E" form, which is about 6x6x0.6 inches with high density connector for connection to a "motherboard". Each module will be designed to JIAWG form, fit, function, interface, and performance specifications, which includes a common environment for the three services' applications.

Modules of one type may be built by many different manufacturers with different internal designs and yet retain the capability for unconditional interchangeability if they meet JIAWG requirements as determined through certification.

Typical enclosures will be 3/4 Airline Transport Rack (ATR) boxes and integrated racks. Racks will contain more than one motherboard for module interconnections and could be either part of the aircraft structure or isolated from vibration.

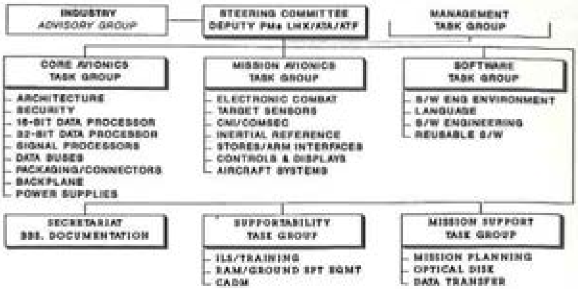
Architecture

Designing all modules to the Advanced Avionic Architecture Standard will give the capability of integration modules both physically and functionally. Integration will allow reconfiguration of the shared resources using fewer spares and yet retain mission capability even after multiple failures. Functional integration will allow the benefits of advanced processing algorithms such as automation and expert systems. Maximum integration will be possible in the signal and data processing avionics. These modules will communicate over a network of buses on backplanes and between backplanes.

Included on each backplane will be the parallel interface (PI) and Test and Maintenance (TM) buses. Between backplanes will be High Speed Data Buses (100 MHz fiber optic). Both MIL-STD-1553 (1 MHz) and MIL-STD-1773 (1 MHz fiber optic) can be used to connect processing resources to subsystem avionics.

Video and RF sensors such as radar, FLIR, TV, and electronic warfare, will be connected to signal processors by a fiber optic sensor data distribution network (500-1000 Mbits/sec). Architectures will also be standardized within subsystems such as defensive avionics, controls and displays, flight control, power distribution, and communication/navigation/identification avionics in order to specify common modules for other functions such as RF processing, video generation, flight critical processing, and power control/switching. Common modules will be applied to avionics wherever it makes sense for more than one application. In some cases, a module may only be used initially in one application, but it will be available for use by the other services and compatible with the architecture.

JIAWG
TASK GROUP REORGANIZATION



AVRADA Support

AVRADA is supporting JIAWG in the following groups: Architecture Task Group (TG), 16-Bit Data Processors Sub-Task Group (STG), 32-Bit Data Processors STG, Data Buses STG, Controls and Displays STG, Navigation STG, Optical Disk STG, Software TG, Sensors TG, CNI/COMSEC TG, and Supportability TG. AVRADA support includes about 14 persons.

Reorganization

Reorganization of the JIAWG Task Groups was proposed as shown in Figure 2.

There have been a number of deficiencies in the organization which should be corrected by the new organization. The Management Task Group would be responsible for validation and verification, life cycle cost analysis of alternative strategies, determination of data and patent rights policy, qualification of vendors and products, configuration management, module certification, product support policies, etc. The Secretariat is an administrative function to coordinate activities, put documents in the proper format, track document preparation and issue resolution, and to provide a communications node (Bulletin Board System), etc. Involvement of contractors is encouraged through formation of an Industry Advisory Group at the Steering Committee level and creation of a list of contractor principal members corresponding to the government membership list.

Defensive Systems, Sensors, and CNI/COMSEC Task Groups would be combined with some functional sub-task groups from the Architecture Task Group to form a new Mission Avionic Task Group. A new Mission Support TG would be formed to seek opportunities for commonality in areas such as mission planning systems.

Product

The product of the JIAWG is standards and specifications for common modules which conform to the Advanced Avionic Architecture (A3) Standard. The A3 Standard is based on the Air Force Pave Pillar Specification and includes parts of the Navy's Standard Hardware Acquisition and Reliability Program (SHARP). The A3 Standard calls out a set of common modules which are required to be interchangeable among the three aircraft. The A3 Standard also calls out specifications for standard packaging, functions, interfaces, environment, development tools, validation/verification, and supportability. These standards and specifications comprise the Common Avionic Baseline (CAB). Six releases of the CAB are scheduled. CAB I was released in 1987 and the present baseline, CAB IIA, was released in 1988. CAB

JIAWG – cont. from p. 51

IIB was scheduled for release in December 1988. Future CAB releases are scheduled as follows; CAB III in December 1989, CAB IV in August 1992, and CAB V in August 1995. CAB IIA included the following documents: Environment Guidelines; Standard Connector Specification; Standard Connector Specification Issues; Common Avionics Processor — 16 Bit (CAP-16) Specification; CAP-16 Issues; Core Software Engineering Environment; Backplane Concept Paper; Standard Module Format E Standard; Linear Token Passing Multiplex Data Bus Standard; Linear Token Passing Multiplex Data Bus Standard Issues.

Each standard and specification has an associated Issues document. It was decided at the Steering Committee meeting in September 1988 that there should also be an associated Rationale document with each standard and specification to help explain why certain requirements were written.

Development and Application

Initially the common modules will be developed by the prime contractor teams for application to the three aircraft programs; LHX, ATF, and A-12. They will be qualified to common specifications and standards from the CAB. The qualified common modules form the "Catalog of Common Avionics" which will become available to other programs and may be re-procured competitively. In all cases the system designer must decide which common modules are suitable for his application and which new modules must be developed to meet his unique requirements. By adhering to JIAWG standards in the development of new common modules, compatibility will be maintained between future developments and original hardware modules, software modules, and development tools. IIIII

Overview – cont. from p. 6

FY89, the Automated Battle Management Program will conduct the CEP II. This will demonstrate voice control of communications, navigation and ATHS functions as well as various systems that can display flight symbology on the ANVIS goggles. ICNIA is scheduled to be flight-tested on the STAR aircraft during the first quarter of FY90. This will be a combined Army/Air Force flight test program and will be designed to demonstrate many of the unique features provided by this highly integrated technology.

Recent AVSCOM marinization programs, along with a heightened awareness of electromagnetics effects on aircraft, have caused the Army to increase its emphasis in this area. In response, AVRADA has expanded its EMI capability and will be focusing on the electronic subsystems. The Directorate of Engineering (DE) has also increased its capability and is focusing on the aircraft as a system. With AVRADA and DE working together to develop this expertise, AVSCOM will be much better prepared to address these issues in the future.

AVRADA has had an active year; with the LHX, the MSIPs and JIAWG all moving rapidly, we anticipate an even busier 1989 and will again be at the forefront of Army Aviation. IIIII

MGU – cont. from p. 49

(PVT) solution and perform Kalman Filtering. The Controller module hardware design will be based upon a state-of-the-art microprocessor employing EEPROMs for program and data storage. The MGU software design will be programmed in Ada. EEPROM has been selected for program storage of the Controller Module primarily for the purpose of inserting and verifying software modifications to the MGU, in the field or depot, without removal of the system's cover. The reprogramming of the MGU will be commanded by a bootstrap program stored in the Control Module's Read Only Memory (ROM) interfaced via the MIL-STD-1553B bus or RS-422 port.

Conclusion

The space and weight requirements of future generation aircraft can simply not afford that of the current GPS units. Using today's technology in the MGU, combining the existing Gallium Arsenide GPS front-end receiver design, the latest available microprocessor, and software programmed in Ada, the size, weight and cost of the GPS receiver will be reduced by an order of magnitude. The AVRADA MGU is the definitive answer to a small lightweight single LRU GPS sensor. IIIII

System – cont. from p. 23

Mercator rectangular coordinate and projecton system is both conformal and, by convention, discontinuous every 6 degrees of Longitude).

The ARC coordinate system has been selected as the standard *display* coordinate system for Army mission-planning. The slight amount of East/West distortion associated with maps displayed in the ARC coordinate system is not of concern as long as the computer is used to make point-to-point measurements of distance and bearing. The use of computerized coordinate transformations, to bi-directionally convert the user-selected coordinate system (e.g., Universal Transverse Mercator or geographic Latitude/Longitude units) to the ARC coordinate system, makes the system accurate as well as user-friendly.

A primary requirement for the Army mission-planner is to accept these standard DMA digitized products as direct inputs to the PC computer system. Any reformation or transformation of these data must be autonomously performed within the mission-planning system without contractor, DMA or other Government Agency support.

Video Graphics Adapter

The incorporation of a state-of-the-art videographics adapter (e.g., based upon the TI 34010 graphics system coprocessor) into the Class 2 system provides a quantum jump in display and processing capability over the Class 1 mission-planning system. One may configure such a product to provide a user-programmable 40 MHz graphics coprocessor, which might be used to accelerate the execution time of the route-optimization algorithm, a four MB dual-ported video memory, and an eight MB program memory expansion. An important biproduct of this coprocessor configuration is the circumvention of the usual 640 KB limit on program memory size associated with the PC central-processor.

Typically, one would display a 1024 by 768 pixel map image from the video memory, obtained by compression of the 24 bit per pixel ADRG image stored on the CD-ROM (i.e., eight bits for each of the red, green and blue components of the digitized image) into an eight bit composite image.

The specific color-coordinates of the resulting 256-color palette would be computed from the CD-ROM image as part of the color-compression process typically associated with digitally-based map-display-systems. The eight bit per pixel composite image as above may be directly displayed via the 4MB video-memory while output of the latter process must be spatially-decompressed by the airborne map-display equipment prior to image presentation.

The data-input medium for a Class 2 planning system would consist of: (1) the 3 1/2 inch floppy disc for the threat-location/threat-type array and aircraft-specific information, (2) a CD-ROM reader for the DMA-produced digitized map-images and digitized terrain-elevation data, and (3) a full-color, tabletop-sized, image scanner to digitize reconnaissance photography, DMA maps not readily available on the CD-ROM medium, enemy maps, or any other hard-copy data source which might provide the necessary geographical context for the N-checkpoints and the threat array.

The data-output mediums for a Class 2 planner would consist of: (1) the Tactical Data Loader (TDL) to transfer the N-checkpoints/flight-plan to the aircraft navigation equipment, (2) a full-color printer to produce the hardcopy, kneeboard-format presentation of the checkpoints and threats in a geographic context, and (3) a Write-Once-Read-Many (WORM) optical-disc to act as an archival medium for the reformatted terrain-elevation and map-imagery data such as the eight bit per pixel composite images of the previous paragraph.

Class 3

The need for a Class 3 mission-planner develops as the result of upgrading the in-cockpit graphic display capability from the Class 2 hardcopy kneeboard-formats to a state-of-the-art Digital Map Display Generator (DMDG), although the kneeboard-formats would almost certainly be retained as an in-flight backup to the DMDG.

In its most basic utilization, the DMDG brings to the cockpit environment, a dynamic display of the threat and navigational data, geographically-referenced to a topographic map image. In reality, this perspective makes little use of the quantum jump in

(System — cont. on p. 54)

System – cont. from p. 53

in operational capability provided by the inclusion of a DMDG in the cockpit. The DMDG should not be blandly viewed as a source of dynamic background imagery in the historical context of a map display.

The system, when equipped with an efficient operator and display capability, an inflight capabiltiy which may exceed the preflight capability provided by either the Class 1 or Class 2 mission-planning systems. Since the terrain-elevation data base will be available in the air for the Class 3 application, nominally for purposes of displaying the interactions of these elevation data and real-time updates to the threat-location/threat-type array, airborne implementation of the computerized model of relevant parameters for each threat-type and the route-optimization algorithm, would permit automated route-planning to occur in the cockpit.

A prime requirement for the Class 3 mission-planner, over and above the navigational route-planning objective of this discussion, is to prepare the tactical situation data base, which would include enemy situation, friendly situation, flight plan, and target overlays as well as a myriad of annotated information relative to specific elements in this situational data base, for interactive use in the preflight or airborne environments, perhaps in conjunction with situational updates via a real-time data link.

To support the DMDG in the cockpit, the Class 3 mission-planner must incorporate the means to: (1) reformat the digitized terrain-elevation data and digitized map-images from the archival format on the Class 2 WORM optical-disc into a DMDG-compatible format, (2) load the reformatted information onto an airworthy DMDG-compatible storage medium (e.g., the AV-8B militarized WORM optical-disc or the MH-60K and MH-47E solid-state Data Transfer Module DTM), and (3) load the tactical situation data base, including the N-checkpoints and the threat-location/threat-type array, onto the TDL.

To minimize the required capacity of the DMDG-compatible storage device, the spatial correlation of the map-image data bases is removed via a set of esoteric spatial-compression algorithms which typically reduce the storage requirements from the color-compressed eight-bits per pixel image to perhaps one or two bits per pixel. The need to execute these spatially-oriented compression algorithms is the most significant additional complexity associated with the Class 3 system.

As mentioned previously, one must execute the inverse of the spatial-compression algorithm prior to display of the image in the cockpit (i.e., the inverse algorithm must be executed by the DMDG itself). While one may expect to encounter execution-time difficulties with these algorithms in the PC-based environment, especially the really efficient ones as the amount of premission computation dramatically increases with lower bit-per-pixel compressed images, the more difficult problem may be a legal one. Vendors are typically extremely protective of the details of the compression algorithms as they are, or are usually perceived to be, the essence of the operation and performance of DMDG equipment itself.

The potentially-excessive compression-algorithm execution-time may be necessarily eased by incorporation of an additional PC-based coprocessor, expressly designed for digital signal processing (e.g., computing fast-Fourier transforms).

From a logistics perspective, the TDL would contain the more-fluid intelligence/tactical information while the DMDG storage medium would contain the more-immutable topographic information. The partitioning of the airborne data set into distinct tactical and topographic components is singularly important to take full advantage of the capability provided by the DMDG while avoiding certain logistical pitfalls, particularly those associated with the need to spatially-compress the topographic data set to minimize data storage requirements. One should not subject the more-fluid tactical data base to this type of processing.

The merging of the tactical component with the topographic component, for purposes of airborne display, would occur in the airborne equipment (i.e., in the DMDG as compared to the ground-based combination and hard-copy display of these data components by the Class 2 planner). For an aircraft with a

(System — cont. on p. 55)

PLS – cont. from p. 11

ment. Air Force Special Forces are also adapting their equipment to meet their missions. Initial Production Contracts have been awarded for both AN/ARS-6 (V) and AN/PRC-112, with a mix of customers from all three services.

PLS, by meeting all the requirements of the Army ROC, and offering enhancements necessary for the other services, provides tri-service and NATO interoperability, optimum logistics supportability and program management efficiency, and affords the latest in CSAR mission effectiveness at minimum cost to the Government. IIIII

ATHS/AI – cont. from p. 41

validated to assure that pilot and maintenance training tasks and skills are optimized for Army needs.

Unused aircraft wiring will be removed to further facilitate maintenance and troubleshooting and to simplify repairs. Location of boxes within the aircraft will be based upon extensive HFE analysis to assure that all operator and maintainer tasks are optimized. Hardware design emphasizes built-in test with results and failure modes reported to the CDU. The CDU will store these test results and upon mission completion upload a complete summary of test results to the DTS for subsequent printout for maintenance personnel.

Three Phases

The ATHS/AI contract with Collins Government Avionics Division is divided into three phases (see chart). The initial phase includes the development, fabrication, installation and qualification of three prototype systems installed in early, mid and late model AH-64A helicopters. In April 1990 these helicopters will be subjected to a three-month critical-issues user test to verify that the program objectives of integrating

"Near term improvements of ATHS/AI and ATAS will provide APACHE with increased fighting effectiveness"

ATHS with increased mission effectiveness, reduced mission timelines, and reduced crew workload have been met. The Phase One effort also includes the ATHS/AI modification of 25 additional Low Rate Initial Production helicopters.

Phase Two is a priced option to the ATHS/AI contract for additional Modification Work Order (MWO) Kits scheduled to be awarded by March 1991. The Phase Three priced option includes the installation of the additional MWO Kits into the APACHE fleet.

The program is being managed by the PM AH-64 ATHS/AI within the AAH-PMO to assure that all program objectives are met, and that the installation schedules are common with Air-to-Air Stinger (ATAS) and possibly other funded product improvements in order to minimize aircraft downtime. Once implemented, the near term improvements of ATHS/AI and ATAS will provide APACHE with an increased measure of fighting effectiveness and staying power into the next century. IIIII

System – cont. from p. 54

DMDG system, one has the potential to completely eliminate the TDL from the system by using the DMDG storage medium to promulgate both database components (i.e., tactical and topographic) in the field.

However, one must be prepared to deal with the logistics of a larger, more expensive, less portable, and possibly non-volatile transfer medium when compared to the TDL.

A compromise solution may be to use the 3 1/2 inch floppy disc as an inter-echelon distribution medium for the more fluid tactical component, subsequently loading the updated tactical component onto the DMDG storage medium via a lower-echelon portable system (e.g., a Class 1 hardware configuration). Similarly, the DMDG storage medium would contain the geographically-appropriate topographic component, assembled from an archive of 3 1/2 inch floppy discs. The floppy-disc archive would be created by the higher-echelon Class 3 system, but maintained at the lower-echelon location. Each disc would hold a specific geographical patch of DMDG-compatible topographic data and the mission-specific data base would be sequentially-assembled on the DMDG-related storage medium by the lower-echelon portable system. IIIII

Enlisted
(continued from page 4)

By 1981 problems with the self-paced instruction implemented during the 1970s were being perceived, and group-paced instruction began to be implemented in some courses.

As a result of the Training and Doctrine Command (TRADOC) - sponsored restructuring of Army training programs embodied in School Model 83, the Department of Academic Training was abolished, and the Department of Enlisted Training (DOET) was created and given responsibility for almost all enlisted training at the USAAVNC. The DOET consisted of two training divisions, Air Traffic Control and Maintenance Training, and conducted academic Training to support ATC, flight maintenance, flight operations, and NCOES.

On October 1, 1984 the leadership of DOET changed from officer to enlisted. The first enlisted director was Sergeant Major William R. Dunn, succeeded in February of 1986 by CSM John P. Traylor. School Model 83 also hastened the implementation of group-paced instruction; by the end of 1984 the self-paced approach had been almost totally abandoned.

During the mid 1980s, following the implementation of School Model 83 and the creation of the Army Aviation Branch in April 1983, most of the training of enlisted personnel in aviation related MOSs was still conducted at other posts, and other branches maintained proponency for their training. The USAAVNC essentially had the same enlisted training responsibility that it had a decade earlier. This situation began to change in 1986.

In October 1986 the U.S. Army Air Traffic Control Activity was moved from Fort Huachuca, Arizona, to Fort Rucker and made subordinate to the USAAVNC commander. This gave the Aviation Branch proponency for all training in career management field (CMF) 93. In 1987 the Aviation Center NCO Academy was established at Rucker under the command of CSM Hartwell B. Wilson, who had also succeeded CSM Traylor as the director of DOET in April of that year. The NCO Academy now provides both basic and advanced training for NCOs in CMF 93 in a highly structured live-in environment. These NCOs are taught the technical standards and skills required of every soldier under them and for every piece of equipment within their watch, thereby enhancing their supervisory competence. When the Academy was established in 1987, the ANCOC training was limited to MOSs 93C and 93P, and BNCOC, to 93B, 93C, and 93P. In October 1988 ANCOC training was added for 93D and 35P, and BNCOC training is slated to begin for 93D in FY90.

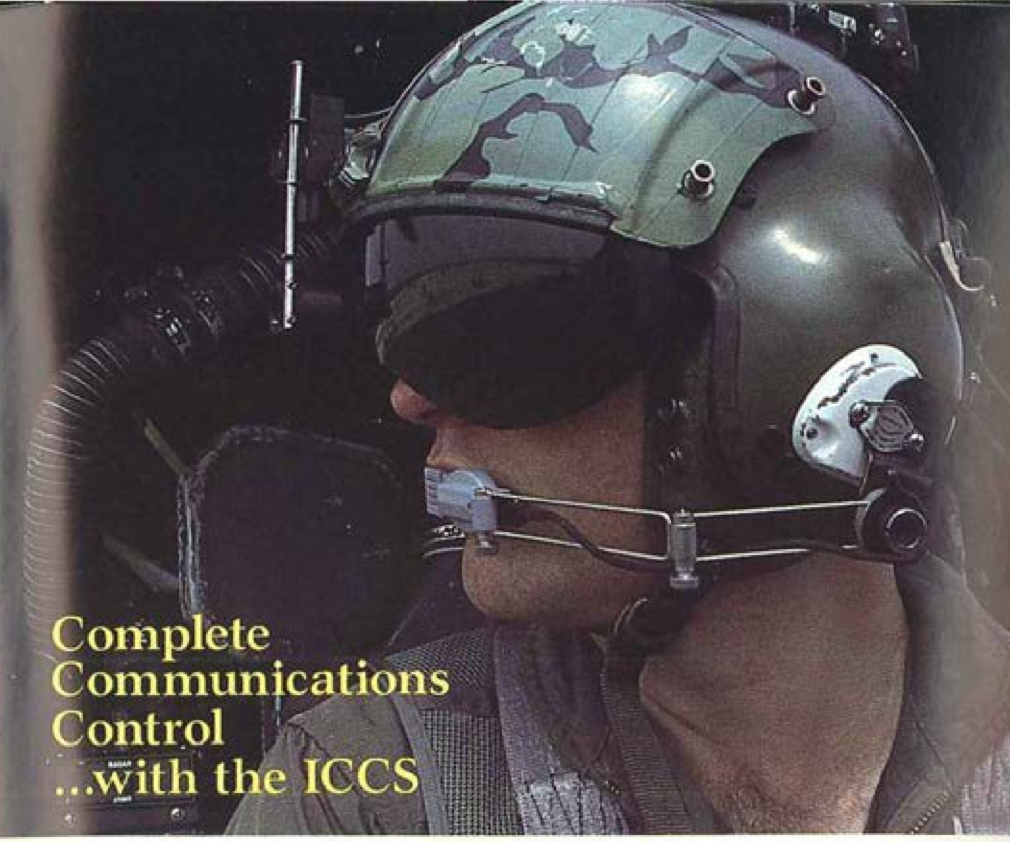
In 1986 also, the Aviation Branch assumed proponency from the Signal Corps for the training of enlisted personnel in CMF 28. Since then the merger of CMF 28 with CMF 67 has been approved for implementation in the near future. In the meantime, a study is underway to determine whether to leave the CMF 28 training at Fort Gordon, bring it to Fort Rucker, or send it to Fort Eustis, where most of the CMF 67 training still takes place.

USAALS

The last major development occurred in October 1988. Until 1983, the proponent for all CMF 67 training had been the Transportation Corps at Fort Eustis, Virginia. A separate Army Aviation Logistics School (USAALS) with proponency for this training was formed in 1983. The USAALS was located at Fort Eustis, however and, until recently, was subordinate to the Transportation School. This meant that the majority of enlisted soldiers in Army Aviation were subordinate to the Transportation Corps. We enjoyed excellent cooperation from the commandants at Fort Eustis and no particular problems resulted under this arrangement, but there remained a need to institutionalize Army Aviation's responsibility for the training of its own personnel.

In 1987 the Vice Chief of Staff of the Army ordered a study which resulted in a recommendation that proponency be transferred to the Aviation Branch. The transfer was approved by the TRADOC commander and formalized in a memorandum of agreement signed in September 1988 by the Transportation Corps chief, MG Samuel N. Wakefield, and myself. Implementation of the proponency transfer occurred on October 1, but no moves of personnel, equipment, or facilities took place. The training of mechanics and crew chiefs for all currently used helicopters except the UH-1 and OH-58 will continue to be conducted by USAALS at Fort Eustis.

I firmly believe that all of these recent and anticipated future developments will promote greater unity of purpose and cohesion within the branch, and thereby enhance our ability to serve the Army and the country. IIIII



Canadian Marconi's Integrated Communications Control System (ICCS) provides audio distribution, voice warnings, data transmission, and control of government-furnished crypto equipment and radios in a single package. The ICCS provides high-quality audio distribution of up to 24 channels. Crew-to-crew, crew-to-radio, and aircraft-to-crew communications are handled with complete flexibility via either a MIL-STD 1553B interface or discrete input lines.

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Soldiers
(continued from page 3)

was in contact and had taken two casualties — one being the team leader. My First Sergeant and I immediately went across the air field to the Division Aviation Operations Center and updated the Operations Officer on the situation. He told us that a helicopter was immediately available and for us to get aboard and he would extract the team. In about 20 minutes we were over the team. In the meantime helicopter gunships were on station suppressing the enemy, who were making an all out effort to annihilate the team. Within minutes the gunships stopped the assault and allowed us to land on an old fire base approximately 500 meters away from the team. I told the pilot, Captain Jackson, to drop us and leave because of the incoming small arms fire. He said, "We will wait for you." He then gave me his individual protection pistol saying that we might need it. We did extract the team. Three team members survived the experience.

• Camp Paige, Korea, 1985. While talking with a group of young Privates First Class and Specialists who were BLACK HAWK Crew Chiefs (a required Sergeant position) I asked them if they were experienced enough to perform the tough Crew Chief tasks and what they thought about the helicopter. One of the privates looked me in the eye and said, "Sergeant Major, the BLACK HAWK is the best helicopter in the world, our birds are ready to fly 24 hours a day, seven days a week. Give us a training or live mission and we will make it happen."

• Fort Rucker, Alabama, 1987. A newly-trained Specialist Scout Observer was giving me a comprehensive briefing on the OH-58 scout observer helicopter and his job. After the detailed briefing I commented to the soldier that it appeared to me that he and the pilot would be exposed to enemy fire. The soldier quickly responded, "Sergeant Major, that is what is expected of us; we can and we will do it. Besides, they will never see us."

• During REFORGER 88, I stated to an APACHE pilot and Crew Chief, "Now that you have performed continuously both day and night for about a week, how do you feel about your aircraft and yourselves?" The pilot said, "Combined with the ground forces, we are an awesome team." The Crew Chief said, "We will win the battle over here."

Aviation technology has increased our soldier's warfighting capabilities ten-fold since the early Sixties. Technology of the 21st century will provide Army Aviation with the capability to transport and support large units, nonstop, anytime, anywhere, to include across the high seas and into the heat of battle. I envision that someday Army Aviation will transport soldiers into space. One thing for certain, advanced Army aircraft will not fly by themselves. No matter what the future Aviation technology advances may bring, there will always be a requirement for quality Soldiers.

The underlying reason that the U.S. Army Aviation is the best in the world is because of dedicated, courageous, tactically and technically proficient soldiers. I salute all of you for your past, present and future contributions to our Army and to our country. You have made a difference!IIIII

AAAA

TRAINING THE ARMY AVIATION FORCE

AAAA Annual Convention
Atlanta, Georgia
April 5-9, 1989

CAREER TRACK

If you'd like to take advantage of the Career Track employment referral service, but you're not yet a member of AAAA, the solution is simple: Just fill out a membership form and send it in along with your request for a Career Track application. Your ad will run in the next available issue.

Active AAAA members may have a 30-word classified employment ad published in two consecutive issues of ARMY AVIATION MAGAZINE free of charge. Write to the AAAA National Office, 49 Richmondville Avenue, Westport, CT 06880-2000, or call (203) 226-8184 for Career Track applications.

Corporate Flying Job Hunting. ATP Multi. Commercial Airplane Single Engine. Rotorcraft - Helicopter. Instrument - Airplane and Helicopter. Certified Flight Instructor, Airplane, Instrument, Multi, Rotorcraft - Helicopter. BS, Aviation Management. 12-01

Captain, Army Aviator with B.S. degree. Nine years experience in aircraft maintenance. 1,500 hours flight time, rated in the UH1-H, CH-47 and maintenance test pilot in the UH1-H aircraft. 12-02

Seeking position in Marketing/Business Development. 24 years experience marketing Avionics/Communications equipment to U.S. DoD. HF Radio a specialty. Will travel and relocate. 12-03

Master Aviator, retired Oct 88, B.S. Aerospace Mgmt., Fixed/Rotary Wing Qualified, Extensive Command, Air Cav, Avn R & D, Topo Mapping, and Terrain Analysis experience. Seeking employment in Business Development or Project Mgmt. role. 12-04

Master Army Aviator, MBA. Combat Developments, RDT&E, PPBES, Project Management background. Current in LHX, Army Aviation Master Plan requirements. Current Pentagon, recent AMC assignments. Seeking Business Development, R&D, Marketing/Representative position. 12-05

Captain, USMA 1982, B.S. — Quantitative Business Management. 6 years active. Detachment Commander, Co. opns officer, and platoon leader. UH-60A. Seeking Industrial or Financial Management position in Atlanta, Georgia area. 1-01

“possible acquisition of the APACHE is being explored by several countries.”

Sales – cont. from p. 31

of aircraft would be repaired and overhauled as necessary and placed in storage in order to be available for immediate issue to a high priority requirement such as in Central America. In the past, these type requirements have been filled at the diversion of U.S. Army Assets.

Attack/Scout

Procurement action is proceeding on the Bell Helicopter 406 Combat Scout (CS) for the Kingdom of Saudi Arabia. AVSCOM awarded a contract to Bell in May 1988 for long lead time items. Final contract award is anticipated by November 1988 with deliveries commencing mid 1990.

Activity on the McDonnell Douglas Helicopter Company (MDHC) Model 500 series aircraft has continued at a steady pace. In addition to various ongoing support efforts, aircraft are scheduled for delivery to El Salvador in late 1988. New FMS cases are in process for aircraft purchases for the Philippines, Kenya, and Bahrain.

The government of Thailand will receive delivery of 24 Schweizer 300s with 12 to be delivered in November 1988 and 12 in January 1989. In addition, production is underway of four AH-1F COBRAS for delivery to Thailand in mid 1990.

On the AH-64 APACHE front, the possible acquisition of the APACHE is being explored by several countries either through the FMS process or as a direct sale. ▮▮▮▮▮

HAI Booth No. 1624

BRIEFINGS

COL **Theodore S. Orvold,** Chief, Fielded Aviation Systems Management Office, AVSCOM, St. Louis, MO will run a Q&A session and briefing on the **Foreign Military Sales Pool**, regarding UH-1 retirement after the Joseph P. Cribbins Product Support Symposium, February 16 at 1:30 pm in St. Louis. Contact COL Orvold for further details. (314) 263-2178/2932.

The U.S. Army School of Aviation Medicine (USASAM) will be hosting the **Tenth Annual Operational Aeromedical Problems Course** at Fort Rucker, AL April 3-7, 1989. Contact LTC David J. Wehrly, Dean, U.S. Army School of Aviation Medicine, Fort Rucker, Alabama 36362-5377 or call (205) 255-7460/7408.

The **10th Annual Reunion** of the **DUSTOFF Association** will be held at the Menger Hotel on the River next to the Alamo in San Antonio, Texas, on March 3, 4, 5, 1989. The DUSTOFF Association welcomes all officers and enlisted Army Medical Department personnel, aviation crewmembers, and all others engaged in Army Aeromedical Evacuation programs. For further information please contact the DUSTOFF Association, P.O. Box 8091, Wainwright Station, San Antonio, Texas 78208, or telephone Roy Hancock (512) 657-5163.

MOHAWK REUNION

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General Instrument Corporation announced the formation of its **Defense Systems Group** to consolidate the existing **Government Systems Division** with the newly-acquired **Dalmo Victor** operation. Mr. Eugene A. Weisberger has been named president of the Defense Systems Group and Mr. Thomas C. DeFazio has been appointed executive vice president — operations of the group. Mr. Urban E. Hilger continues as president and general manager of the Dalmo Victor Division.

AWARDS AND HONORS

The following information is provided by the U.S. Army Aviation Center at Ft. Rucker, AL:

Aviation Officer Advanced Course Class 88-4 (11/17/88): CPT Maureen E. Fitzgerald, Exceeded Course Standards, Master Tactician Award, Master Logistician Award and Communicative Skills Award; CPT John R. Gividen, Exceeded Course Standards, Master Tactician Award and Communicative Skills Award; CPTs Shaunessy P. Cory, Carl M. Horrell, Jr., David L. Maples, 1LT Charles B. Rogers, Jr., Exceeded Course Standards and Master Tactician Awards; CPT Jonathan M. Johnson, Master Tactician Award and Master Logistician Award; CPT Rodney Smith, Master Tactician Award and Communicative Skills Award; CPTs Michael E. Bryson, Roger A. Pretsch, Exceeded Course Standards, Master Logistician Award and Communicative Skills Awards; CPTs Bruce D. Redline, Exceeded Course Standards and Master Logistician Award; CPT Richard W. Brooks, Master Logistician Award and Class Leader; CPT Paul R. Disney, Jr., 1LT Leslie E. Bryson, Exceeded Course Standards and Communicative Skills Award; CPTs Robert D. Sewall, John A. Soos, Communicative Skills Awards; CPTs John H. Bock, Kevin B. Keenan, Gregory J. Lund, Robert H. Morgan, Craig S. Priest, Wayne R. White, Raven M. Wilburn, 1LT John G. Dean, Exceeded Course Standards.

Initial Entry Rotary Wing Aviator Course Class 88-10 (11/18/88): 2LT Wayne P. Hagan, WO Everett W. Rose, Distinguished Graduate; WOs Michael G. Bailey, Michael W. Ferguson, Alan D. Phillips, John R. Kleven, Honor Graduates.

Initial Entry Rotar Wing Aviator Course Class 88-11 (12/07/88: 2LT Harld M. Hinton, Jr., David K. Stallknecht, Distinguished Graduates; WOs Robert C. Harbuck, Joseph K. Johnson, Dennis M. Osborne, Joshua B. Watkins, Honor Graduates.

Master Warrant Officer Training Course Class 88-1 (12/08/88): MWO Wilbur L. Woods, Distinguished Graduate; MWOs Patrick A. McCullagh, Harvey E. Fox, Manfred F. Meine, Perry A. Thompson, Honor Graduates.

Aviation Warrant Officer Advanced Course Class 88-10 (12/09/88): CW3 Michael R. Loats, Distinguished Graduate, CW2s Joong H. Kim, Gary S. Fisher, John D. Wright, Douglas W. Trampler, Honor Graduates.

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1417 CEDAR BLUFF DRIVE
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SPC Daniel Jager

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1SG Larry M. Buffkin
1SG Arthur A. Bustamante
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SSG Jose F. Garcia
SPC Richard L. Goodrich
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SPC Douglas G. Hirt
SPC Leo G. Hopper
WO1 Michael T. Nysewander
1SG James E. Parker
SPC Vincent M. Parker
MAJ James D. Prater
SFC Dwayne D. Surls
SPC Randy W. Walsdorf
SGT Terrence Q. Williams

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Mr. Steve B. Aplin

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1LT Samuel L. Askew, II
CPT Gary A. Barber
WO1 Edward A. Bass
WOC Paul E. Baxter
SGM Eugene H. Bingham
2LT Richard M. Bliss
CW2 Keith C. Blue
WOC Howard B. Brandt, II
WOC Albert S. Briseno
WOC Billy J. Brown
2LT Randall K. Brown
WOC Todd A. Bryant
WOC Stephan J. Buchanan
WOC Chris A. Buckner
WOC James R. Burke
2LT Andrew C. Campi
MAJ Walton C. Carroll
MAJ William L. Carter
2LT James A. Caruso, II
WOC James C. Charles
WOC Dean P. Clarke
WOC Jon T. Clines
WOC Joel E. Cloakey
WOC Patrick B. Cooper
MAJ Rhonda L.S. Cornum
MAJ Jerry D. Crum
WOC Danny A. Cumbee
CW3 Roy E. Daughtry
WOC Randy A. David
CPT Lee A. Davis
WOC Chris M. Deronda
2LT Thomas E. Detrick
WOC Charles P. Dicker, Jr.
1LT Donald E. Distler, II
WOC Timothy C. Doyle
2LT Elizabeth E. Dreiling
WOC Robert James Duffney, Jr.
2LT Russell L. Dunford
Ms. Constance H. Ecker
Mr. Byron C. Edmonds
WO1 James M. Ertegard
2LT Douglas J. Estey, Sr.
WOC Glenn A. Fajardo
WOC Michael W. Ferguson
WOC Robert A. Ferry
WOC Ashley G. Fisher
WOC Patrick C. Foley
WOC William F. Foshe
WOC Eugene D. French
CPT Joseph L. Fulbright
SGT Barton J. Galambos
2LT Bruce K. Galbreath
CPT Peter M. Garibaldi
WOC Robert L. Gatrell, Jr.
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WOC Nicola Grasso
WOC Jonathan W. Greene
1LT Carl L. Gustafson
WOC John S. Hedges
WOC Kenneth S. Helgren
WOC Mark E. Herd
2LT Thomas J. Herrlich
WOC David M. Hilemon
2LT Mason K. Hogan
2LT Richard S. Huck
WOC Keith M. Hurley
WOC Albert B. Isennock
1LT Michael E. Jenkins
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WOC Alan G. Jewett
2LT Larry E. Johnson
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COL Clifford L. Massengale
WOC Paul A. McDonough
WO1 Earl Garvin H. McKenzie
WOC Lucky Lee Mertes
2LT Gregory S. Morzano
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Ms. Nancy O'Boyle
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2LT John J. Pflaumer
WOC Marlin K. Phillips
2LT John D. Piccolo
WOC Ronald J. Poynter
2LT Aquiles C. Ramirez
WOC John M. Raybon
WOC Duane R. Reh, Jr.
2LT L. Drew Reimers
2LT Jeffrey K. Robinson
SGT Terri L. Robinson
2LT Farley B. Russell
2LT David E. Salter
2LT William T. Sawyer
1LT Vernon O. Schuety
2LT Bruce J. Scott
WO1 Daniel J. Sebastion
2LT John Drake Selmer
2LT Michael L. Shenk
2LT R. Brian Shields
2LT David L. Silvernail
WOC Michael P. Sloat
WOC Trenton V. Smith
WOC Wesley R. Smith
1LT Daniel A. Soltan
SPC Maria L. Somera-Grande
CPT Robert W. Soniak
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CW4 Lawrence J. Steck
2LT Gary D. Stephens
CPT Robert S. Stolz
LTC Guy C. Stong
WOC Steven T. Sund
MAJ Linda C. Taggart
CPT Thomas J. Taggart
WOC James P. Tardif
WOC John W. Teeling, Jr.
WOC Christopher A. Thompson
1LT Vincent M. Tobin
WOC Paul J. Tompkins
MAJ Allen E. Vannoy
WOC Eric G. Vonbosse
2LT Kenneth E. Walraven
2LT George R. Wallack
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Mrs. Margaret R. Olsson
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Ms. Cyndi S. Riehle
Mr. John A. Riehle
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Mr. Robert H. Wolter

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Mr. George Bowling

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2LT Joseph J. Burke, Jr.
WOC Craig N. Hoover
Mr. Daniel Joseph Rice
MAJ Arthur J. Sosa

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CPT Charles H. Coram
CW2 Ralph W. Day

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Mr. Francisco C. Cabrera
Mr. Keith R. Collier, Jr.
Mr. Fidel A. Covarrubias
Mr. Ross O. Deweese
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Mr. Noe Garza
Mr. Pete G. Gonzales, Jr.
Mr. Ramon B. Hirojosa
Mr. Daniel Leal
Mr. Donald R. Mabry
Mr. Damasio Perez, Jr.
Mr. George F. Raabe
Mr. Edelmira C. Rodarte
Mr. Armando P. Rodriguez
Mr. Noel O. Saenz
Mr. Richard G. Schoggins
Mr. Alfredo R. Serna
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Mr. Wesley M. Bundy
Mr. Joe Tim Burch
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Mr. Dennis M. Miller
Mr. Gary S. Simpson
Mr. Robert F. Wallach

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SFC William H. Feeney, Jr.
CW4 Donald D. Pierce
SGT Carlos R. Rivera, II

SGT John S. Wilson

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ATLANTA, GA

Mr. Graydon A. Elliott

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GERMANY

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SPC Debbie J. Gifford
SPC Marcus Johnson
SPC Kevin S. Kieper
SPC John Zumot

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INDIANTOWN GAP, PA

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

WOC Craig W. Dowd
WOC Jerry L. Lively, Jr.

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Mr. Charles Glen Buttrey, Jr.
Ms. Sue R. Hoff
Ms. Lisa M. Marcotullio
LTC William M. Pekny
Mr. Tuan Nang Pham
Ms. Karen L. Somers
Mr. Paul D. Soracco
Ms. Bonnie D. Taylor
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Ms. Debra Kay Willman

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MAJ Robert E. Landstrom

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SPC Kenneth A. Ayers
PV2 Douglas R. Barnett
SSG Christopher J. Beneat
SPC Gurney G. Byrd
2LT Robert M. Cassidy
PV2 Robert S. Cole
SPC James E. Crichfield
PFC John C. Falcon
PFC Michael A. Fanning
WO1 Kenneth G. Fischer, III
SGT Brock S. Fleshman
SPC Fredrick G. Focken
CPT Robert E. Fogel
SPC Christopher J. Fullen
SPC Stephen P. Giza, III
1LT Jerald D. Hajek
E7 Alfredo A. Hay
SGT Michael J. Hensley
SPC Kevin L. Hurdle
SPC Spence K. James
BG John R. Landry
1LT Robert Warren Lane
2LT Ronald F. Lewis
WO1 James A. Marcantel
WO1 Kevin I. Mason
SSG Edward G. McNair
SPC Darryl P. Melodias
CPT Joel T. Payne
SPC Jeffrey M. Peterson
SPC John T. Purvis
Mr. Harry H. Rorick
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SGT Daniel L. Simms
CW1 Daniel S. Smith
PFC Kenneth L. Smith
1LT Michael S. Spingler
PSG Jimmie L. Walls
SFC Ronnie L. West
SPC Alvin D. Whitehead

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FORT RILEY, KS

COL Wayne L. Cline

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FORT MONMOUTH, NJ

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Mr. Anthony Lisuzzo
Mr. Scott J. Mollica
Mr. James White
Mr. Ronald L. Williams
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FORT ORD, CA

SFC Gale A. Miller

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SPC Glenn B. Blum
Ms. Yvonne D. Colley
CSM William E. Dungey
SGT Freddie J. Freeman
SPC Ana M. Goulart
SPC T. Jackson
Mr. In Suk Jo
SPC Wade A. Lopez
CPT Frank N. Morin
SPC Willis D. Page
PFC Jennifer A. Pointer
CPT Margaret E. Rains
SGT John J. Silvers
SPC Eric W. Smith
CW4 Norman T. Thompson
SPC Samantha L. Truesdale
SGT Bobby D. Whitener

MOUNT RAINIER CHAPTER
FORT LEWIS, WA

WOC Wayne E. Gore
1LT Dale N. Johnson

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DALLAS/FORT WORTH

Mr. Ronald R. Rhoads

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SGT Ronald A. Rosano

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MAJ Frank J. Gunning
MAJ Joe C. Miller
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SGT Terry K. Tonie
CW3 Robert K. Tyldesley

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1LT Douglas J. Balsbough
MAJ/P Paul C. Walker

PIKES PEAK CHAPTER
FORT CARSON, CO

1LT Ernest A. Erlandson, Jr.
WOC Robert E. Hughes
WOC Everett W. Rose

REDCATCHER CHAPTER
NURNBERG, GERMANY

WO1 Christopher L. Farrow

RHINE VALLEY CHAPTER
GERMANY

MAJ Dennis A. Bryant
WO1 Blake F. Robinson
WO1 Edward R. Stettin
Mr. Pearl A. Wilson

SCHWAEBISCH HALL CHAPTER
GERMANY

PFC Brian Bey
SPC Seth R. Chalnick
PFC Lee Currier
SSG Judson Edge
SPC Larry Hawthorne
PV2 Sonia Isaberra
CW4 James J. Jones
PFC Anagelia M. Kendrick
PFC Douglas Kicklighter
SPC Chris L. Kidd
SPC Alonzo D. Liddell
SGT James E. McCleary
SPC Chester B. Miles
WO1 Peter A. Nelson
SGT Terry A. Parker
2LT Mark C. Patterson
SGT Allen Plautsch
PFC Paul Sankey
SPC Janice Spooner
SSG Dirk Stone
SPC Susan M. Trujillo

SOUTHERN CALIFORNIA CHAP
LOS ANGELES, CA

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CPT Garvin Scott Bergey
Mr. Bing John D'Agostino
Mr. Robert J. Hunt
CPT William H. Stormer

STUTTGART CHAPTER
STUTTGART, GERMANY

Mr. Dirk A. Megchelse, Sr.

THUNDERHORSE CHAPTER
FULDA, GERMANY

SPC Mario E. Case
CPT Mark D. Craft
SPC Allen Creswell
PFC Allen Hamilton
PFC Jeffrey A. Hamilton
WO1 Philip E. Nusbaum
SPC Mark Anthony Prince
WO1 Randall M. Rivers

TU-CAN CHAPTER
CANAL ZONE

CW3 William John Robertson

WASHINGTON DC CHAPTER
WASHINGTON, DC

COL John R. Aldridge, USMCR
LTC Errol R. Bergsagel
LTC Timothy H. Couch
Mr. John E. Driver
Mr. Anthony C. Duthie
Mr. Jeffrey R. Fausett
Mr. Robert J. Gladwell
Mr. Ian Leese
Mr. Keith S. Robson
Mr. John Varde
MAJ John H. Walker, Ret.
LTC Arthur Warnack, Ret.
MAJ Philip L. Wilkerson, Jr.

WINGS OF THE MARNE CHAP
GERMANY

2LT Kathleen A. Cannon
CPT Wayne S. Simoni

MEMBERS WITHOUT
CHAPTER AFFILIATION

2LT Thomas J. Beckman
CPT Donald L. Benton
Mr. Tommy N. Brackman
2LT Kent P. Cassella
Mr. Donald J. Childs
MAJ John W. Clapper, Ret.
2LT James M. Daum
COL Robert L. Degrant, Ret.
WOC Daniel D. Delamarter
CW4 Grady M. Dry
1LT Christopher T. Eaker
Mr. Larry D. Fulbright
CW2 David M. Gaston
WO1 James L. Habermehl
WO1 James M. Hopper
Mr. Steve B. Huffman
Mr. Thomas A. Kane
CW4 Glenn F. Kluttz
1LT Edgar W. Koby, Jr.
CW2 Steven A. Langley
MAJ George B. Maly
CW2 Wallace S. Mangum
Mr. Martin L. Mayo
WOC James K. Moore
LTC Jasper G. Owens
1SG Dennis A. Peterson
CPT Michael A. Petrash
Mr. David F. Pike
Mr. David M. Reilly
COL Robert A. Rosati
2LT Brett D. Russ
WO1 Luther R. Semper
CW2 James L. Stephens
CW4 Charles H. Stirewalt
WO1 David A. Szopinski
WOC Billy J. Tatum
MAJ Edward F. Vengrouskie
2LT William R. Wright

Aviation Soldiers of the Month

SPC Kevin S. Kieper, Hanau Chapter (March)

SPC Mario E. Case, Thunderhorse Chapter (March)

SPC Marcus Johnson, Hanau Chapter (April)

SPC Debbie J. Gifford, Hanau Chapter (May)

SPC John Zumot, Hanau Chapter (June)

SPC Terry D. Boehmler, Hanau Chapter (October)

SPC Maria L. Somera-Grande, Army Aviation Center Chapter (November)

SGT Tonie K. Terry, Old Tucson Chapter (November)

Honorary Members

The following person has been selected by the Mainz Chapter as an Honorary Member. He'll receive a complimentary one-year membership, citation in these pages, and a "Certificate of Honorary Membership."

MAINZ CHAPTER

BG John R. Landry, Assistant Division Commander for Support, 8th Infantry Division (Mech), USAREUR and Seventh Army.

New AAAA Officers

The following members were elected to the Executive Boards of their respective Chapters:

CPT Roger J. Raney, (VP, Mil. Affairs), **Arizona Chapter.**

LTC Michael S. Byington, (VP, Programs), **Army Aviation Center Chapter.**

COL Martin Kleiner, (President), **Bonn Area Chapter.**

LTC Doug Warne, (VP Membership), **LTC Gene Lacoste,** (VP North), **LTC**

(continued on next page)

AAAA Overview

Joseph P. Cribbins Product Support Symposium

by Howard DeMere

The Joseph P. Cribbins 15th Annual Product Support Symposium will convene in St. Louis with a new wrinkle or two in addition to the expected highlights.

Hosted each year in St. Louis by the Lindbergh Chapter, AAAA, the Feb. 14-19, 1989 symposium is designed to improve relations and communication between AVSCOM and industry. This year's event will feature a Competition Advocates Shopping List (CASL) workshop.

Advance Input

The difference is that it will be held *before* instead of after the symposium, thus the CASL is expected to provide advance input for symposium attendees. It will provide for an exchange of ideas with more thinking expressed by smaller contractors, revealing a larger cross section of industry opinion.

The CASL workshop will offer an opportunity to debate competition issues in Army Aviation and to get AVSCOM's projected spare parts and overhaul buys for the next three years.

The workshop will be held at the Stouffer Concourse Hotel, site of the Product Support Symposium, from 7 a.m. to 4 p.m., February 14.

Back in 1978, when the Product Support Symposium was little more than a gleam in the eyes of Don Luce and Paul Hendrickson and other Army Aviation pioneers, the numbers were small, both in attendance and payoff.

That 1978 symposium drew only 66 attendees, with 56 persons from industry and ten non-industry representatives. The financial return was $858.

Last year the symposium attendance was 368 with 161 from industry and 190 non-industry. More impressive still was the income, which amounted to $7,683.

This year, planners hope to better the bottom line, possibly reaching $10,000. From that amount, several worthy young people will benefit from the portion that goes to the AAAA Scholarship Foundation Bunker and Besson scholarship funds.

Old Friend To Return

BG William H. "Bud" Forster will return to St. Louis for the Product Support Symposium. The former PEO for Combat Aviation at AVSCOM will be the keynote speaker for the Army at the Feb. 15 opening session of the symposium. Forster is now Director of Requirements Integration, Deep Operations, ODCSOPS. IIIII

Chapter News

NORTH TEXAS CHAPTER, DALLAS/FT. WORTH, TX — The Chapter's Defense Systems Acquisition Overview Seminar on September 22, 1988 boosted membership considerably. One hundred eight persons joined the North Texas Chapter as a result of participating in the Seminar. The North Texas Chapter will sponsor an AAAA Scholarship in 1989 which will be available to sons and daughters of AAAA North Texas Chapter members.

HANAU CHAPTER, APO NY - LTC Michael Mague, VP Publicity, reports that MG George A. Joulwan, Commander of the 3rd Armored Division, was recently made Honorary President of the Hanau Chapter in recognition of his outstanding

support of Aviation. MG Joulwan is accepting the award from Senior VP LTC Charles F. Nowlin.

TENNESSEE VALLEY CHAPTER, HUNTSVILLE, AL — The Chapter met on Thursday, October 13, 1988 at the Officer's Club, Redstone Arsenal, for a buffet style dinner meeting. There were approximately 65 members and guests present including special guests MG August M. Cianciolo, CG, U.S. Army Missile Command, Redstone Arsenal, AL, and his wife Sheila along with BG Robert L. Stewart, DCG, U.S. Army Strategic Defense Command, OCSA, Huntsville, AL, and his wife Mary. LTC Garnett E. Crask, Ret., Chapter President, opened the meeting at 1900 hours. MG Cianciolo gave an overview of the Aviation Modernization Plan. MAJ Harold W. Stitt, long-time treasurer for the Tennessee Valley Chapter, was presented a plaque for his outstanding, dedicated service to AAAA.

TAUNUS CHAPTER, APO NY — A General Membership Meeting and Reception for the 5th Squadron, 6th Cavalry was called to order at 1530 hours at Wiesbaden Airbase Club September 30, 1988. LTC David E. Cowley, Chapter President, opened the meeting by welcoming the membership and introducing the guest speaker, COL Jack E. Easton, Commander, 12th Aviation Brigade. LTC Cowley formally recognized LTC Michael K. Mehaffey, Commander, 5/6th Cavalry and each Troop Commander. The AAAA members of the 5/6th Cavalry transferred their membership to the Taunus Chapter. After COL Easton provided a presentation on the "Army Aviation Modernization Plan," LTC Mehaffey was elected Senior Vice President of the Taunus Chapter.

AAAA Officers Cont.

Allen Ricketts, (VP Central), **CSM Roop Sharma,** (VP, Enlisted Affairs - Central), **CSM William Dungey,** (VP Publicity), **Morning Calm Chapter.**

LTC J. Dan Keirsey, (President), **CPT Larry Gissentanna,** (VP, Member Enrollment), **CSM Willie Mabry,** (Publicity), **SGT Lawrence Thompson,** (Programming - Enlisted), **Stuttgart Chapter.**

LTC Michael K. Mehaffey (Senior VP), **Taunus Chapter.**

Aces

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

Ms. Lois Contreras
MAJ Mark A. Cooper
Ms. Sarah C. Ervin
CPT Kirk M. Fechter
LTC Richard Gillingham, Ret.
Mr. Jesse W. Glance
Mr. Fernando P. Gomez
Mr. Sammy R. Johnson
WO1 James A. Marcantel
MAJ Rno P. Reinemer, II
CW2 Lawrence L. Smith
Ms. Ann Marie Thomas

Please Send in your Chapter Minutes and accompanying photos for "Chapter News"

MAJ Mark S. Wentlent

CW4 Robert J. Monette

MG Story Stevens, Ret., AAAA President, congratulates the AAAA National Cadets of the Year. From the left are 2LT Kenneth S. Prygoski, U.S. Military Academy Cadet of the Year; MG Stevens, and 2LT Pedro G. Almeida, ROTC Cadet of the Year.

Co-winners Named For "Trainer of the Year"

The Army Aviation Association of America (AAAA) and Fort Rucker honored individual soldiers and worthy units during a ceremony Thursday, December 9 at Fort Rucker, AL.

The AAAA-sponsored awards honor those individuals and units who were deemed "tops" in the Army-wide competitions.

Two Army aviators shared the award as AAAA National Trainer of the Year. This award is presented yearly to the military or civilian trainer who has made an outstanding individual contribution to Army Aviation during the previous calendar year.

The winners are MAJ Mark S. Wentlent, operations and training officer, Task Force 118, 18th Aviation Brigade, Fort Bragg, N.C., and Chief Warrant Officer, CW4 Robert J. Monette, gunnery instructor, Company D, 1st Battalion, 14th Aviation Regiment, Aviation Training Brigade at Rucker.

Wentlent was selected as operations officer of the armed CH-58D Kiowa task force in October, 1987. He immediately faced the task of training a newly-formed unit to combat standards in less than 120 days. TF 118 was formed with personnel and equipment from multiple U.S. locations, with the first aircraft being delivered directly from the factory less than 90 days prior to actual deployment. The task force mission was to field and operate in support of U.S. Navy operations in the Persian Gulf.

Chief Warrant Officer Monette's exceptional efforts produced a highly successful worldwide training program initiated in 1985 with the acceptance of the first AH-64 APACHE combat mission simulator (CMS) at Fort Rucker. Since the first CMS was accepted, Monette has traveled worldwide to accept four additional CMS devices and trained and qualified more than 50 instructor/operators.

He designed and authorized all course material required to support this training. His outstanding training package has been exported and is now the only accepted AH-64 CMS instructor/operator course in worldwide use.

Two AAAA National Cadet of the Year Awards were also presented.

2LT Kenneth S. Prygoski received the first-ever U.S. Military Academy Cadet of the Year Award. He was selected from a field of 92 cadets from within his West Point class. A nuclear physics major, Prygoski received the Top Performance rating in his West Point Class of 1988. He is currently assigned to Company E, 1st Battalion, 145th Aviation Regiment, 1st Aviation Brigade (Air Assault) at Rucker, attending the Initial Entry Rotary Wing Aviator Course.

2LT Pedro G. Almeida is the recipient of the 1988 AAAA ROTC Cadet of the Year Award. Selected from a field of 7,415 individuals, he is a graduate of the Massachusetts Institute of Technology majoring in material science. He is a recent graduate of the Aviation Officer Basic Course. He is currently assigned to Company E, 1-145 Aviation, awaiting the Initial Entry Rotary Wing Aviator Course.

A number of AAAA Aviation Center Chapter nominees for national recognition were also honored.

Included were the chapter nominee for Outstanding Department of the Army Civilian of the Year, James S. Rutland of Enterprise, AL, assigned to 1st Battalion, 212th Aviation Regiment, Aviation Training Brigade and the nominee for the James H. McClellan Aviation Safety Award, Chief Warrant Officer, CW3 Roy E. Daughtry of Headquarters and Headquarters Company, Aviation Training Brigade.

Also nominated were SGT Van T. Ezell of 1st Battalion, 14th Aviation Regiment, Aviation Training Brigade, for the Aviation Soldier of the Year Award and CW3 Terry Jones of the U.S. Army Development Test Activity, for the Army Aviator of the Year Award.

Nominated for the Outstanding Aviation Unit Award were 1st Battalion, 212th Aviation Regiment and 1st Battalion, 14th Aviation Regiment, both in Aviation Training Brigade.

AAAA Calendar

A listing of recent past AAAA Chapter Events and upcoming National dates

December, 1988

■ ■ **Dec. 1.** Fort Bragg Chapter. Professional Luncheon Meeting, Ft. Bragg Main Officer's Club. Guest Speaker, COL(P) Marvin E. Mitchiner, Jr.

■ ■ **Dec. 2.** Wings of the Marne Chapter. Business Social Meeting Giebelstadt Officer's and Senior NCO Club.

■ ■ **Dec. 6.** Monmouth Chapter. Professional Luncheon Meeting Squire's Pub, W. Long Branch. Guest Speaker, BG David L. Funk.

■ ■ **Dec. 7.** Mount Rainier Chapter. General Membership Meeting and Elections. Nelson Recreation Center.

■ ■ **Dec. 8.** Army Aviation Center Chapter. Professional Dinner Meeting Ft. Rucker Officer's Club. Guest Speaker: Joseph P. Cribbins. Presentation of the 1988 Aviation Trainer of the Year Award and Top ROTC Cadet Award.

■ ■ **Dec. 9.** AAAA National Exec Board Meeting, Ft. Rucker, AL.

■ ■ **Dec. 9.** Arizona Chapter. Professional Social Meeting Falcon Field Park, Mesa.

■ ■ **Dec. 13.** Phantom Corps Chapter. Professional Social Meeting Patton's Inn, Ft. Hood. Speakers, COL Paul Marie Yvon Bonnet, MAJ Howard Floyd, and CPT Gary Fleming.

■ ■ **Dec. 15.** North Texas Chapter. Professional Social Meeting. Petroleum Club, Ft. Worth.

■ ■ **Dec. 15.** Lindbergh Chapter. Christmas Gala Get Together. Hanon's (Midway Motor Lodge I-270 at Dorset).

■ ■ **Dec. 15.** Air Assault Chapter. General Membership Meeting Hangar 4, Campbell Army Airfield. Guest Speaker, COL John N. Dailey.

■ ■ **Dec. 16.** Hanau Chapter. Prof. Social Meeting/Holiday Social Gathering. Hanau Officer's Club.

■ ■ **Dec. 16.** Corpus Christi Chapter. General Membership Meeting and Christmas Social. BOQ.

■ ■ **Dec. 17.** Morning Calm Chapter. AAAA Christmas Formal Ball 1988. Seoul Inter-Continental Ballroom. Guest Speaker, MG Gerald P. Stadler.

■ ■ **Dec. 20.** Taunus Chapter. General Membership Meeting Wiesbaden Airbase Club.

■ ■ **Dec. 21.** Pikes Peak Chapter, Professional Social Meeting Fort Carson Officer's Club. Guest Speaker, BG Sam W. Westbrook III.

■ ■ **Dec. 21.** Checkpoint Charlie Chapter. Christmas Dinner Meeting and Social Get-Together. Checkpoint NCO Club.

February, 1989

■ ■ **Feb. 3-4.** AAAA National Awards Committee Meetings to select CY88 National Award Winners and CY89 National Scholarship Award Winners.

■ ■ **Feb. 14-16.** 15th Annual Joseph P. Cribbins Product Support Symposium sponsored by the Lindbergh Chapter. Stouffer Concourse Hotel, St. Louis, MO.

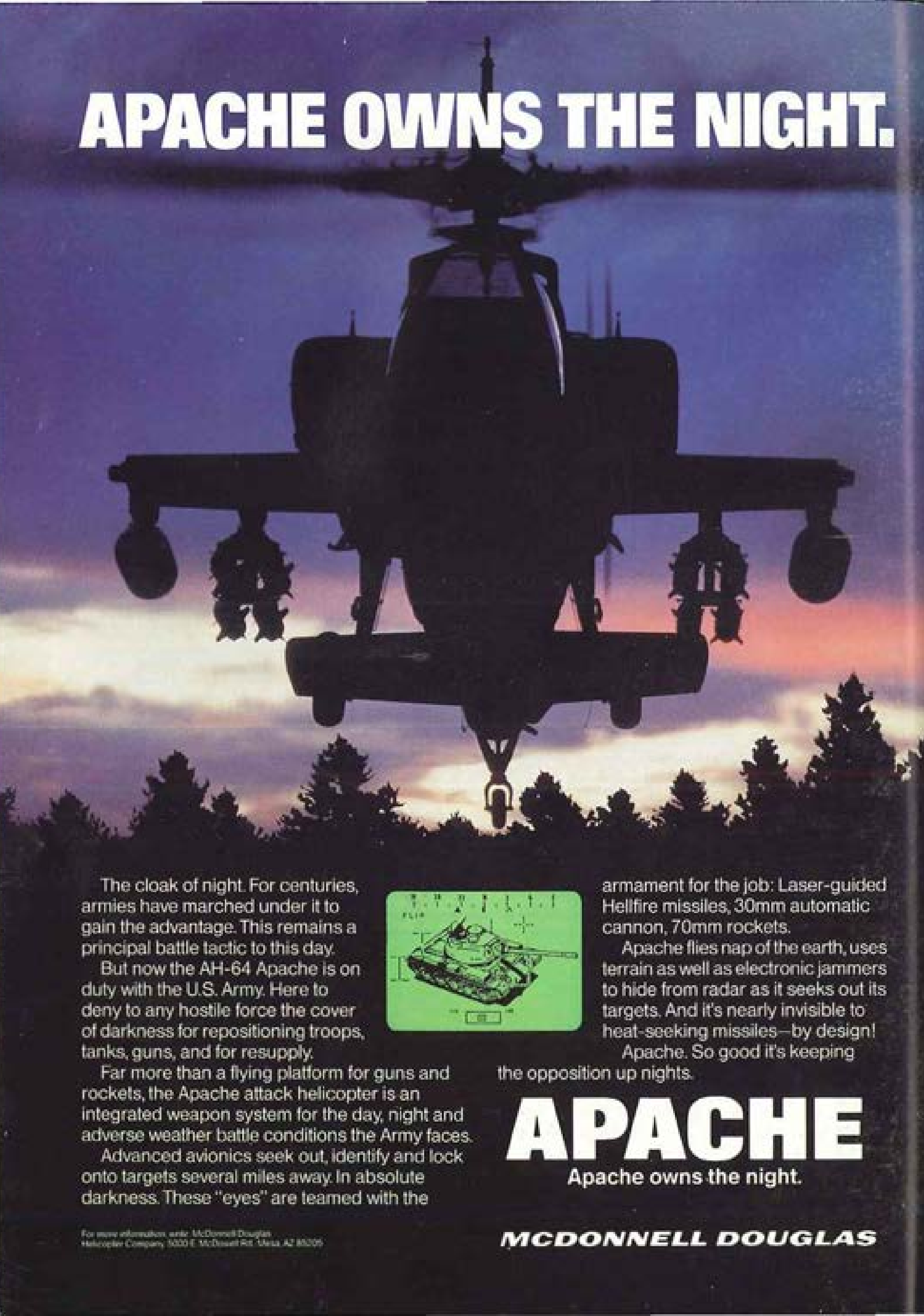
■ ■ **Feb. 15.** Outstanding Avn Logistics Support Unit of the Year Award Presentation and Industry Award Presentations, Stouffer Concourse Hotel, St. Louis, MO.

March, 1989

■ ■ **Mar. 11-18.** AAAA Ski Week in Garmisch hosted by the 12th Aviation Brigade.

April, 1989

■ ■ **Apr. 5-9.** AAAA National Convention, Georgia World Congress Center, Atlanta.


APACHE OWNS THE NIGHT.
The cloak of night. For centuries, armies have marched under it to gain the advantage. This remains a principal battle tactic to this day.
But now the AH-64 Apache is on duty with the U.S. Army. Here to deny to any hostile force the cover of darkness for repositioning troops, tanks, guns, and for resupply.
Far more than a flying platform for guns and rockets, the Apache attack helicopter is an integrated weapon system for the day, night and adverse weather battle conditions the Army faces.
Advanced avionics seek out, identify and lock onto targets several miles away. In absolute darkness. These "eyes" are teamed with the armament for the job: Laser-guided Hellfire missiles, 30mm automatic cannon, 70mm rockets.
Apache flies nap of the earth, uses terrain as well as electronic jammers to hide from radar as it seeks out its targets. And it's nearly invisible to heat-seeking missiles—by design!
Apache. So good it's keeping the opposition up nights.
APACHE
Apache owns the night.
MCDONNELL DOUGLAS