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ARMY AVIATION

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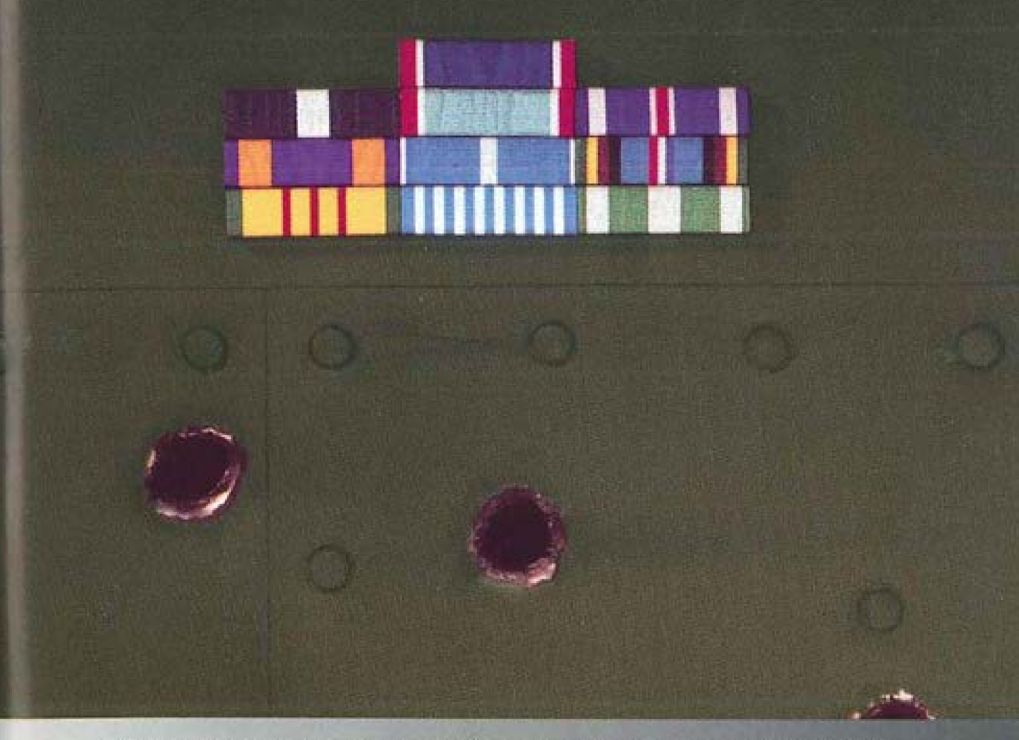
LHX-SCAT Mission (Artist conception)
McDonnell Douglas/Bell Helicopter Textron



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ARMYAVIATION

VOLUME 36 NUMBER 11

Editorial Material

Safety — A Key Concern for all of Forces Command

by CG Joseph T. Palastra, Jr.
Commanding General, Forces Command, Ft. McPherson, GA

IN Forces Command we pride ourselves on "training as we will fight." Within this philosophy, safe peacetime training and combat readiness are not conflicting goals. In combat, accidents can be more insidious than the enemy, inflicting casualties and destroying equipment when least expected. When we must fight, we cannot afford to aid the enemy by depleting our own assets through accidental losses. Safety, properly integrated into training, will enhance readiness.

Hard-learned Lesson

This was a hard-learned lesson. During the Vietnam conflict the U.S. Army experienced more than 5,700 deaths and 106,000 soldiers disabled due to accidents. These were not losses inflicted by the enemy but rather self-inflicted casualties, resulting from our own mistakes. The results of such losses from a humanitarian standpoint are immeasurable and from a military perspective they are devastating. Even with the Vietnam conflict's relatively inexhaustible chain of supplies and personnel, such accidental losses significantly impaired our operations in the field. Neither from a moral perspective, nor from a rational security point of view, can we repeat these types of mistakes.

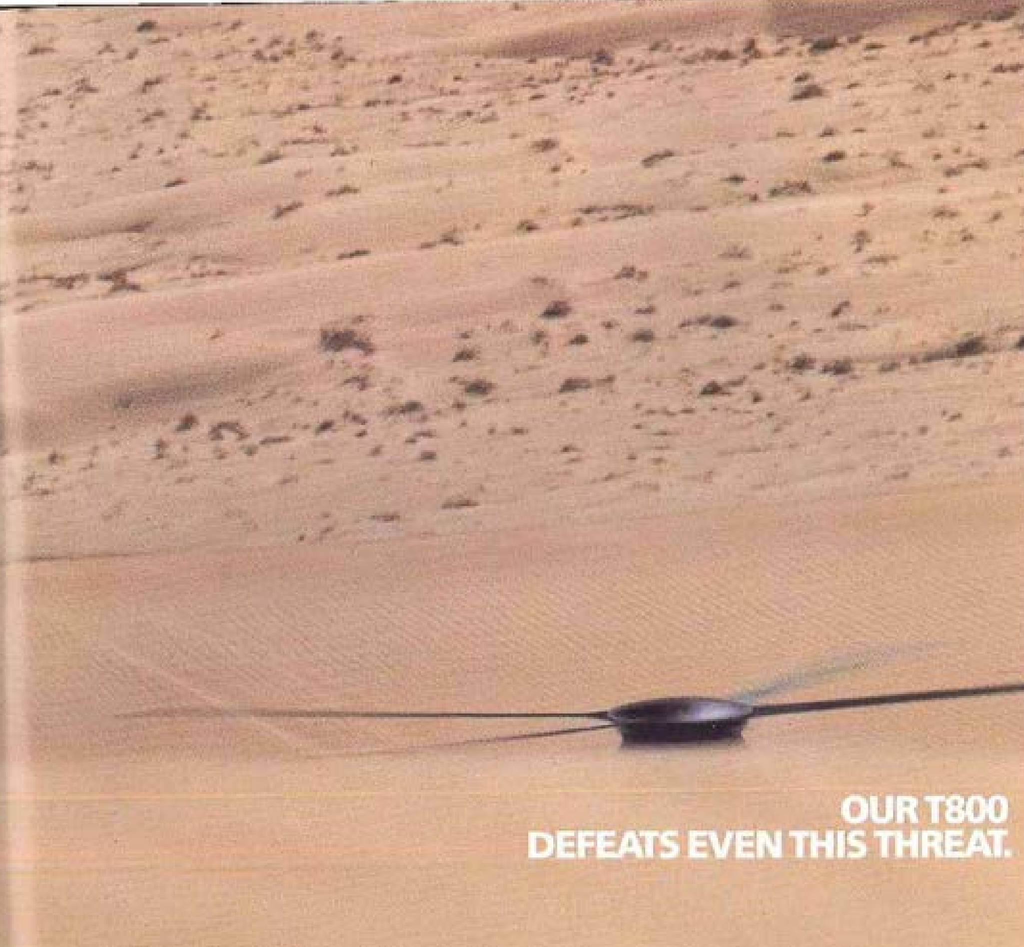
The next war is expected to be a "come as you are" conflict, with the manpower and equipment we deploy being those with which we must fight. There will be no time to train new crews in the advanced technology of our modern weapon systems, to produce new equipment, nor to replace people and equipment accidentally lost. In combat, accidental losses will be intolerable. That is why our peacetime training must be realistic, with inherent risks that must be managed effectively to ensure both readiness and safety.

Despite this awareness, costly training accidents continue to occur. Each year in Forces Command we lose the equivalent of a battalion of soldiers due to fatal accidents and experience enough dollar losses to field 150 COBRA helicopters. Aviation accidents contribute significantly to these totals. By its very nature Army aviation is a high-risk business, and its sophisticated equipment is among the Army's most expensive.

Realistic Safety Measures

We have both the opportunity and responsibility to make training safer. Ninety-eight percent of all training accidents can, and should be avoid-

(Safety — continued on page 12)



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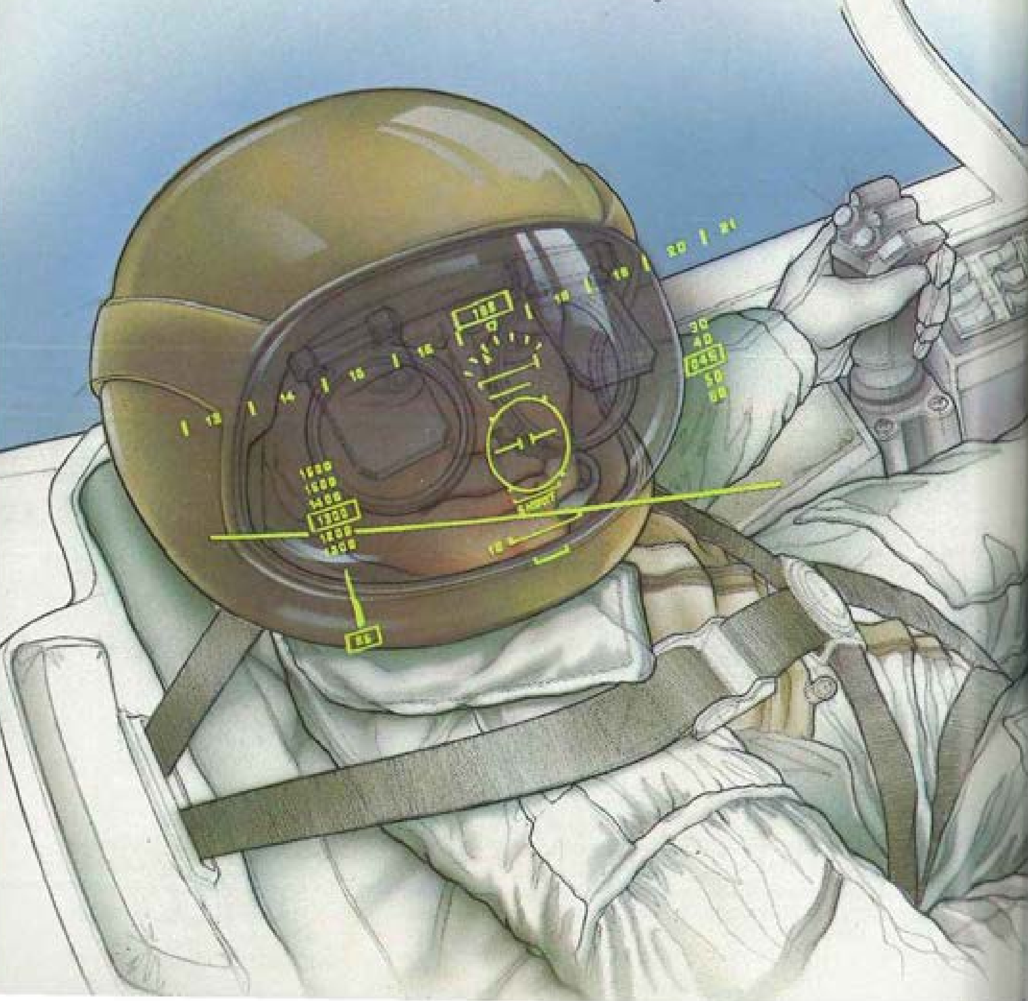
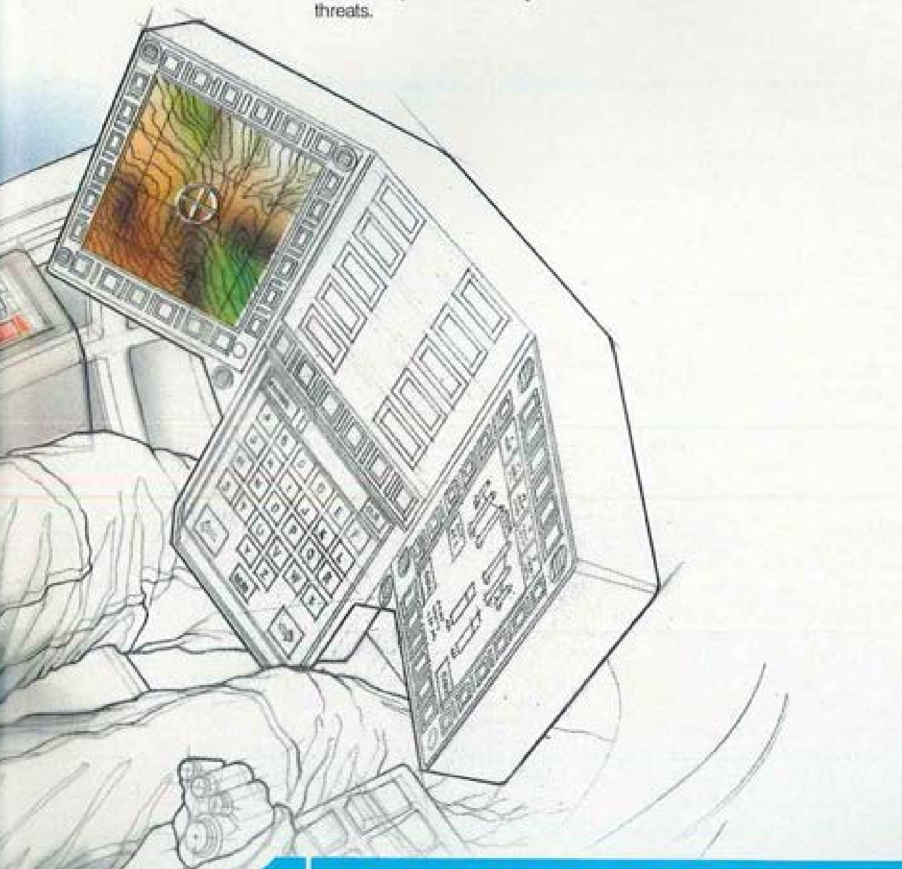


maneuverable and agile design which will allow the LHX to win in the nap-of-the-earth and air-to-air combat environments. The foundation of this Boeing Sikorsky weapons system is the optimum mix of signature reduction and aircraft survivability equipment (ASE) technologies. These technologies will ensure that the LHX will survive and win on the battlefield.

First Team members have accepted the LHX challenge and are designing a fully integrated weapons system. A key element of the Mission Equipment Package is the helmet-mounted display (HMD). The HMD uses advanced electronics and fiber optics to superimpose critical flight, sensor and weapons data on the pilot's view of the real world, enabling him to detect, acquire and destroy threats.

It's these technologies that will enable the Boeing Sikorsky LHX to fight, win and survive to fight again.



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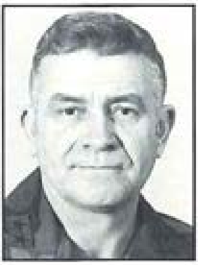


Update: Army Aviation Museum

by Major General Ellis D. Parker, Commanding General, U.S. Army Aviation Center and Ft. Rucker, Alabama

THIS month I want to give you an update on our Army Aviation Museum fund drive. We are proud of the support given to us by the local communities, the men and women of our branch, and friends of Army Aviation. It looks now as if we will be able to break ground for our new museum sometime early next year.

Thanks to the efforts of Congressman Bill Dickinson, we have been able to obtain $2.5 million dollars from Congress. This money is being matched by a like amount of donated funds.

The Army Aviation Museum Foundation, Inc., chaired by LTG (Ret) John J. Tolson III, has also worked long and hard to secure the interest and support of our friends in industry. We must have the entire amount of $5 million before the Corps of Engineers can issue a solicitation for bids, and we are extremely close to meeting this goal.

Why a New Museum?

People have asked why a new museum is needed. The primary reason is the protection a climatologically controlled facility will afford our valuable displays. Too, it will offer our approximately 110,000 visitors a year — a number I fully expect will increase with the new building — an opportunity to better appreciate the display and historical significance of our aircraft. There will be the aircraft display areas, a library and a gift shop, and a multipurpose room that can be converted into a theater. There will also be large, well lighted parking areas and ramps for handicapped visitors.

As our present museum has done, the new one will attest to our rich heritage and serve to make our motto, "Above the Best," even more significant.

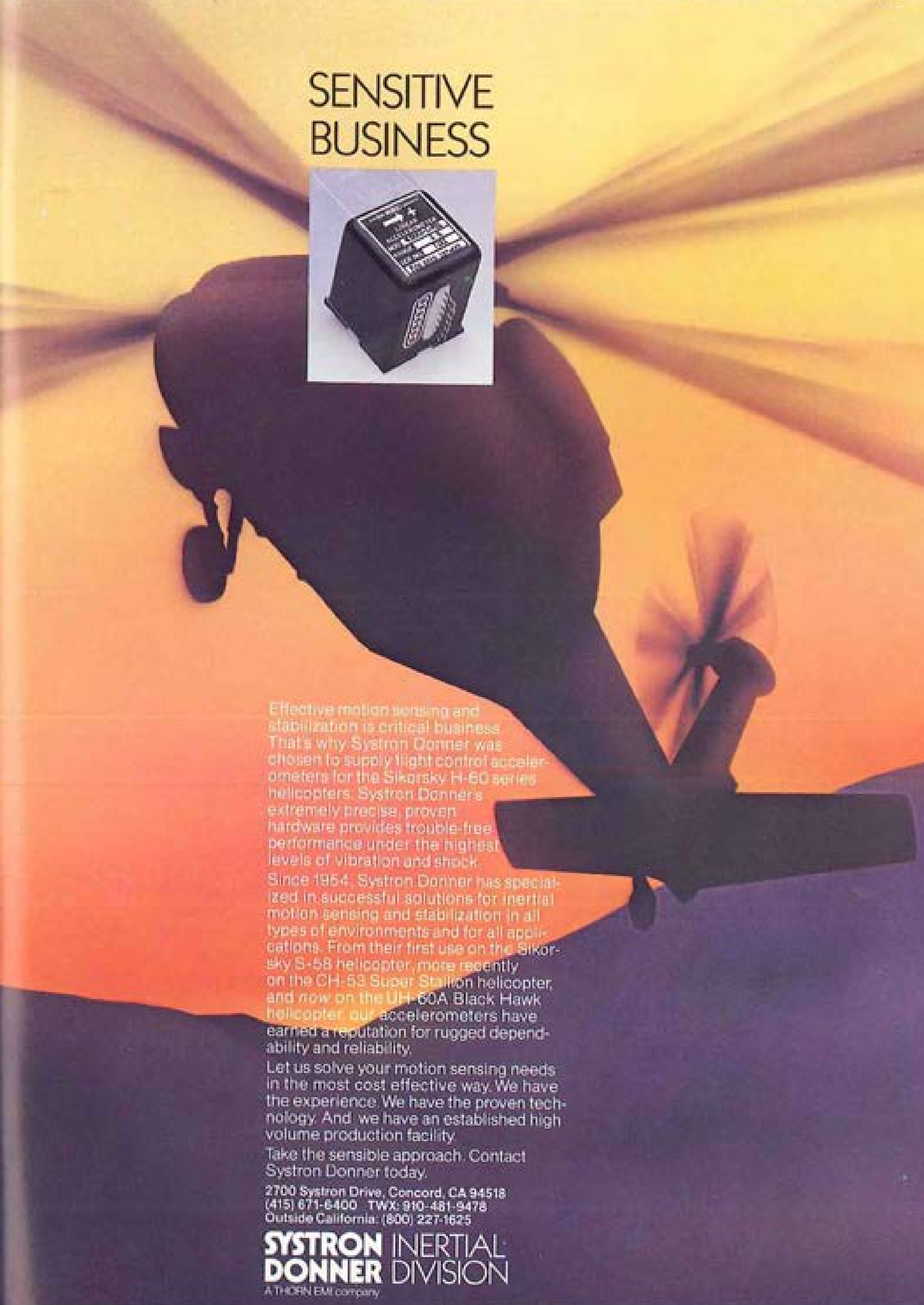
There are two upcoming events which warrant your attention. They are the first Aviation NCO Symposium and the 1987 Aviation Brigade Commanders Conference at Ft. Rucker. The symposium will be held at the Lake Lodge from November 16-19; and the conference, also at the Lake Lodge, will be from November 30 to December 5.

We are proud to host the first Aviation NCO Symposium because it will bring aviation Command Sergeants Major and Sergeants Major together to discuss matters relative to aviation soldiers and Army Aviation. This is an appreciated opportunity for us at Ft. Rucker to share information with these leaders.

"Near Term Focus"

Upon completion of the symposium, it will be only a short time until the annual conference of brigade commanders and aviation officers convenes to address issues facing the Aviation Branch. This year's theme is "Near Term Focus" and will have briefings given by the USAAVNC, AVSCOM and USAALS to the attendees. I am looking forward to the exchange of ideas, opinions and experiences. This is one time I have our Army Aviation leaders "home" so they can let me know what they and their units are doing. In turn, I will have the opportunity to discuss our doctrine, equipment and training, and how all of the above will affect them, their units and our mission. In the personnel area, the Directorate of Aviation Proponency hopes to have copies of its personnel action plan known as A^2P^2 to give those in attendance. In the next few months you will hear more about results of the

(Museum — continued on page 70)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Safety (continued from page 6)

ed. To maximize conservation of our valuable human and materiel resources, we must build safety into all aspects of planning for and executing training. Training incorporating realistic safety measures will ensure that, in both today's peacetime training and tomorrow's potential combat, we do not accidentally destroy ourselves.

At Forces Command we stress accident prevention through:

- Discipline — A strong chain of command that constantly reviews and enforces adherence to established policies and procedures. Our theory is that well-disciplined soldiers will not be tempted to take dangerous shortcuts.
- Good Planning — A dedicated effort by commanders to consider accident prevention in every phase of setting up an operation and through daily practice.
- Hard Training — Realistic training that hinges on safety in every aspect of execution. This pays dividends now, during peacetime, and later, on the battlefield.

Every leader must play a dominant role in enforcing these principles. A leader at any level who fails to live up to and enforce the established standards of safe performance is not fulfilling his commitment to his troops nor to his mission. Tough decisions about safety are just as much the mark of a successful commander as tough decisions about battlefield tactics; either can cost lives, cause suffering, and lose equipment.

National Training Center

A good example of the fact that a sound accident prevention philosophy can result in safer training while enhancing performance and readiness is the National Training Center (NTC) at Ft. Irwin, CA. For the past two years commanders have taken units to the NTC and conducted training exercises under "near combat" conditions with a minimal number of accidents.

Operational success and safety are synonymous. The units most operationally successful at the NTC are those which also have solid accident prevention programs and efficient maintenance programs. Thus, not only can safe training be linked to superior operational performance, it also can be shown to be the result of good pre-mission planning, early identification of potential problems, and development of measures to counter those problems. These are the same farsighted leadership skills that produce successful results in other areas. Poor preparation leads to hasty reactions, which breed failure and accidents.

Heavy emphasis on the implementation of this "safety philosophy" in Forces Command has produced results. Safety throughout Forces Command generally improved in 1986. Overall accident rates decreased in every category, including aviation, where the more than one-quarter million flight hours now being logged annually by our units represent over one-fourth of the Armywide total.

Class A Accidents

Historically, the average annual number of Class A aviation accidents (those causing damages greater than a half million dollars or resulting in a fatality) in Forces Command has been twenty-five. During the 1986 training year we had only thirteen Class A accidents, the fewest in the past twelve years. This trend is continuing in 1987. With only one month until the end of the 1987 training year, there have been only twelve Class A accidents in Forces Command.

The news is good. We are making progress. This year's aviation accident damages (all reportable categories) total approximately eighteen million dollars, compared to last year's thirty-one million dollars or the forty million from the year before. Yet they still resulted in the deaths of seventeen highly-skilled soldiers — a loss we cannot afford.

The ultimate impact of these accidents goes beyond even these terrible costs in lives and dollars. Their families suffer for years, and our ability to carry out our mission of national defense has also been affected. It is readily apparent why we at Forces Command extend such great efforts toward accident prevention programs.

Our concern regarding safety extends to all areas — military combat and motor vehicles, POVs, personal injuries, and aviation. Accident prevention programs are underway in all these areas. Within aviation there are several specific programs that can be highlighted.

One of these is the Aviation Commanders Safety Symposium, which proved so successful

(Safety — continued on page 70)

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SHORTS

Training:

Ditching — Where is the 9D5?

by CPT Thomas C. Johnson, DO MC FS

FT. BRAGG, NC — As long as aircraft have been in the air, they have also been ditching into the water. Under these wet circumstances many military aviators have drowned despite their swimming ability.

The Army doesn't fly over water you say? Between 1972 and 1983, 16 of 30 or 54 percent of Army deep water (water deep enough to allow submersion of aircraft) related crash fatalities were due to drowning! How much did these deaths cost the Army, and their families? (It costs $150,000 today to grade a W.O.C.). Your guess is as good as mine.

It won't happen to me, you say? The UH-1, OH-6, AH-1, and the UH-60, all were responsible for at least one drowning, and as many as 12 from the same type of aircraft between 1972 and 1983. And if you flew a "Huey" during that same time period you had a three times greater chance of becoming a fatality due to drowning than injuries resulting from impact if you ditched in deep water.

What do you fly now? The Army says that the AH-64, the UH-60, and the CH-47 are now world wide self deployable with modifications. That means you aviators will be flying many hours at one time over oceans. Every one of the previously mentioned drownings were preventable!

Do I have your attention now? The Army has never given much thought to the idea of ditching. The various operators' manuals mention ditching briefly. An obscure 1968 publication from the Safety Center has some recommendations, and a training film (TF(VT) 46-6074/SAVP) IN30362DA) has a couple of ideas. Imagine having to do your first autorotation alone in a real engine failure situation after only having read how to do one months or years before.

In flight school you practiced that SURVIVAL technique over and over. The best way to learn how to survive a ditching is to practice a (simulated) ditching — and more than once!

This is where the 9D5 comes into help. First a little history lesson:

In the early 1970's the U.S. Navy observed that there were an exceedingly high number of drownings associated with helicopter ditchings.

Between July 1963 and February 1975, the Navy experienced 234 helicopter ditchings involving 1,093 occupants with 897 survivors. Four hundred and thirty-seven (49%) egressed under water; 196 lives were lost (130 listed as lost/unknown, 37 drowned, and 29 suffered fatal injuries).

This sparked a project team of fleet representatives to determine what type of training could or would increase the survival rate. It was discovered that between January 1969 and February 1975 designated naval aviators whom had undergone "Dilbert Dunker" training, had a 91.5 percent survival rate during those ditchings. The success rate for those untrained was 66 percent. (These designated naval aviators were being ferried around the fleet at the time of ditching).

The Dilbert Dunker trainer was a fuselage of a fixed wing aircraft into which the preflight trainee was placed. It would slip down a track into a swimming pool and invert. The trainee then had to

(Ditching — cont. on p. 65)

CPT Johnson is a Flight Surgeon in the 7th Special Forces Group Airborne, Ft. Bragg, N.C.

Drowning vs. Nondrowning Fatalities by Aircraft Type, 1972-1983

	UH-1	OH-58	OH-6	CH-47	AH-1	UH-60
# drowned	12	0	1	0	1	2 (missing)
# nondrowned	4	5	0	5	0	0
TOTALS (30)	16	5	1	5	1	2


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Maintenance:

70th Transportation Battalion (AVIM)

by Lt. Colonel Jake W. Wyatt

APO, NY — So far, 1987 has been a year of significant achievement for the 70th Transportation Battalion (AVIM), in the performance of its threefold aviation support mission. Blending together tactics, logistics and airfield operations in one battalion with two aviation companies, one aviation logistics company and the requirement to operate three army airfields at Mannheim (Coleman AAF), Heidelberg, and Karlsruhe, created many challenges that were successfully met by the 70th Transportation Battalion (AVIM).

Aviation Support

The tactical command mobility mission of placing senior army commanders in a position to best influence the outcome of a battle is conducted daily by the battalion's 56th and 207th Aviation support companies. The five different types of aircraft within these units include the UH-1H, UH-60, OH-58, U-21 and C-21 which combine to provide flexibility in support of four major commands and twelve separate commands above corps level throughout USAREUR.

The battalion's 61 aircraft comprises only 4% of the USAREUR fleet yet we require nearly 10% of the theater's mission support flying hours. The 56th Aviation Company pilots, for example, can be in any one of 18 European and Middle East countries on a given day, providing VIP support, while other crews are conducting low-level tactical support of a given unit during REFORGER and ARTEP exercises.

Intuitively, the complexity of planning and executing international flights one day and then tactical, low level night flights the next, creates unique training, standardization and safety requirements for the battalion.

56th Avn Company

In fact, the 56th Aviation Company with its 39 organic aircraft has often been noted as the most active aviation company in USAREUR. The 56th flying hour program is currently at 9,000 hours for FY87 most of which is allotted for echelon above corps support for 12 major commands in theater. The Karlsruhe Army airfield is operated by members of the 56th Aviation Company yet, due to distance from headquarters, the detachment is headed by a captain who must function in many ways as a commander and who is responsible for the airfield, three aircraft and all related personnel. The Karlsruhe Army Airfield also supports C-130 aircraft during REFORGER.

207th Avn Company

The 207th Aviation Company, located in Heidelberg, is the distinguished aviation support element for the Commander in Chief, USAREUR. With their C-12, UH-60A and UH-1H aircraft, the 207th Aviation Company plays a key role within the Battalion by flying in excess of 8,000 flight hours. Yet like the Karlsruhe detachment, the 207th is located some distance from Headquarters and therefore critical teamwork functions between Battalion staff and company staff provide young leaders (and old alike) with opportunities for interoperability training toward the overall goal — mission accomplishment.

AMF(L) Flight Detachment

A unique unit to the Battalion is the AMF(L) Flight Detachment. AMF(L) stands for Allied Command Europe Mobile Force (LAND), which in plain terms is NATO. The United States Aviation Flight Detachment is responsible for aviation support to Headquarters AMF(L) and consists of approximately 30 individuals (flight and ground crew), 4 aircraft (UH-1H) and vehicles. AMF(L) exercises are held three times yearly and locations range from Eastern Turkey to Northern Norway and also include other locations such as Italy, Denmark, and Germany. When deployed, AMF(L) is under the direct command of Commander, SHAPE.

Logistics

B company, the Battalion's aviation logistics company, has long been noted for its outstanding maintenance support. Providing direct support to 23 customer units for maintenance requirements and 32 customer units for supply support, together with the mission as the backup

(70th — cont. on p. 68)

LTC Wyatt is Commander 70th Transportation Battalion (AVIM) APO NY.

Operations:

Cavalry Brigade of the Motorized Division

by Colonel Joe D. Carothers

FT. LEWIS, WA — The organizational title, "Cavalry Brigade," implies an historical uniqueness in design and war fighting concepts. This fact, coupled with assignment to the Army's only Motorized Division, earmarks the 9th Cavalry Brigade (Air Attack) at Fort Lewis, Washington as the Army's frontrunner in aviation force structure.

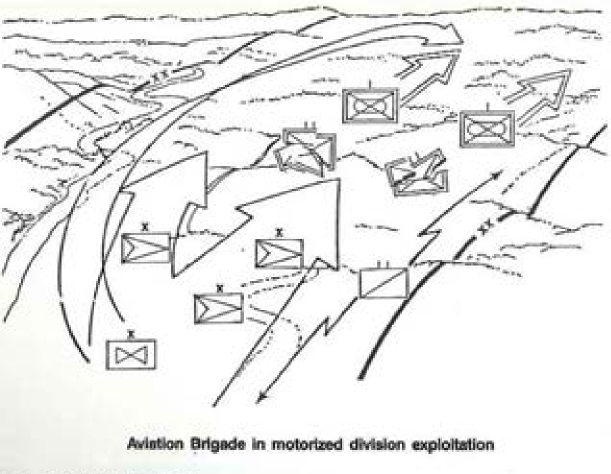
Organized on December 18, 1980, as part of the Army's High Tech Light Division, the 9th Cavalry Brigade was heralded as the newest and largest project in Army Aviation since the Air Assault Division. At that time, the Brigade consisted of a Headquarters and Headquarters Troop, a Combat Support Aviation Battalion, two Attack Helicopter Battalions and a Division Cavalry Squadron. In 1985, the unit's combat capabilities were enhanced with the exchange of an Attack Helicopter Battalion for an Infantry Battalion, Combined Arms — Heavy. This new integrated force structure is unique to the 9th Cavalry Brigade since it is the only Divisional Aviation Brigade in the Army with an assigned Infantry Battalion and Forward Support Battalion.

COL Carothers is Brigade Commander, 9th Cavalry Brigade (AA) 9th Infantry Division, Ft. Lewis, WA.

Infantry Battalion

The Infantry Battalion itself is unique and highly modern in comparison to traditional Light Infantry Battalions. Equipped with HMMWVs, the Infantry Battalion can move rapidly over difficult terrain to attack and secure assigned objectives using some of the most modern weaponry on today's battlefield. The advanced speed and mobility of the battalion allows the Combat Support Aviation Battalion the flexibility to conduct concurrent missions with other elements of the Combat Team.

The new Cavalry Brigade's capabilities are ideally suited to enhance the Division's mission to rapidly deploy, expand a lodgement and defeat enemy light infantry, tank and motorized forces.



Aviation Brigade in motorized division exploitation

The Mission

The Brigade's specific mission is to find, fix and destroy enemy armor and mechanized forces using fire and maneuver as an integrated member of the combined arms team. Additionally, the Cavalry Brigade is able to conduct reconnaissance operations, air assault and aerial logistic resupply operations, provide liaison assets to the Division and provide aerial artillery observation assets to the Division Artillery.

Innovative Design

It is important to discuss the innovative design of the Cavalry Brigade Combat Team as it is organized for combat operations.

Unlike other Divisional Aviation Brigades, the Cavalry Brigade is considered a viable fourth maneuver brigade of the Division to which it is assigned. When the Cavalry Brigade Combat Team deploys, it deploys with habitually attached Support Battalion, ADA, Artillery, Engineer, MI and other support assets. The Brigade Combat Team can spearhead an attack along the Division front or perform the role of Division reserve. It is a self-contained, highly maneuverable, fighting force with unprecedented lethality.

Application

The Cavalry Brigade's structure, mobility and austere requirements for external support make it ideally suited to fight on an integrated, non-linear battlefield characterized by extended frontages and multi-varied operational considerations. A brief synopsis on Cavalry Brigade employment is as follows:

- During offensive operations, such as a movement to contact, the Cavalry Brigade and its habitual slice support units will move forward as the Division covering force. The Cavalry Squadron will screen forward of the Division, locating and bypassing enemy units. The Cavalry Brigade's Infantry Battalion will follow behind the Cavalry Squadron screen to engage small unit enemy ground forces.
- Frequently during attack, the Cavalry Squadron will be used to screen the flanks. The Combat Support Battalion will move equipment, personnel and supplies; the Attack Helicopter Battalion provides highly maneuverable, flexible firepower.
- The Cavalry Brigade would expect to employ considerable artillery and Air Force assets to augment its organic capabilities during such operations.
- Once the enemy can no longer maintain the continuity of his defenses, the Cavalry Brigade maintains constant pressure through exploitation and pursuit operations. The Attack Helicopter Battalion is used as the encircling force, while the Infantry Battalion is airlifted forward to attack enemy targets of opportunity.

Deep Attacks

Deep attacks are offensive operations which have received considerable attention. The deep attack process is complicated and requires very detailed planning to minimize the high risk involved. It can be accomplished with attack helicopters alone or with a complete assault force.

Support required for deep attacks or any other aviation mission has been the Achilles heel of Aviation Commanders for many years. The O&O plan for the Cavalry Brigade has corrected the problem with the attachment of an entire Support Battalion totally dedicated to support of the Brigade. Mission priorities, tactical employment and general defense of the Support Battalion is the responsibility of the Cavalry Brigade Commander.

Rear Area Defense

Defense of rear area assets is a mission for which the Cavalry Brigade is well suited. The level of rear area threat and stage of execution to which the threat has progressed will dictate the type of Cavalry Brigade forces committed to the rear battle. Advance warning may suggest air movement of reinforcing ground troops to the identified objective area with Combat Support Aviation Battalion lift assets. Enemy forces on the ground in the rear area would require scout helicopters to conduct reconnaissance operations to isolate the threat prior to commitment of assault troops. Of course, in rear battle operations, the more favorable concept is to engage heliborne threat forces prior to reaching their objective.

ATAC

Air-to-air combat (ATAC) is a war-fighting skill which is receiving considerable attention. The Cavalry Brigade, as a function of its unique organization, recently participated in ATAC maneuver testing with AH-1H and OH-58C type aircraft. A second phase, ATAC II, will involve AH-64 and OH-58D type aircraft once fielded and will test night as well as daytime tactics. The experience gained during such tests should prove invaluable to the Cavalry Brigade in future conflict situations.

Recent Developments

Other recent activities within the Brigade include testing of the Volcano mine dispensing system and the fielding of HACJAM, a UH-1H mounted electronic warfare jamming system. Each will be incorporated into the Cavalry Brigade's standard mission profile.

Testing, evaluation and fielding of new systems and concepts has been the hallmark of the 9th Cavalry Brigade (Air Attack) since its inception in 1980 — a prideful distinction.

Training in this advanced environment is not without risk. Therefore, it is noteworthy to mention the safety record which the Cavalry Brigade has accumulated. The Brigade has trained over 850 days without a single Class A mishap.

This record is without precedence in Army Aviation; a lasting tribute to the personnel and equipment which constitute the Cavalry Brigade (Air Attack) MISSION FIRST! IIIII

Hardware:

Testing Everybody's Interest: T&E of LHX

by Lt. Colonel Arnold E. (Sandy) Weand

ST. LOUIS, MO — How will the LHX Program Manager ensure that the LHX Scout/Attack (SCAT) and Assault aircraft systems meet the technical and operational requirements that the Army desires? The obvious answer is: a complete and comprehensive test program. But with that answer come several obvious difficulties such as cost and scheduling, and perhaps more importantly, verification that the results and conclusions drawn from the test data are indeed correct.

Tests and Evaluation (T&E), like any other Army activity, is covered by a multitude of regulations. AR 70-10, Test and Evaluation, basically mirrors the requirements and guidance imposed by Department of Defense Directive 5000.3, titled the same.

LTC Weand is Logistics Staff Officer, LHX Project Manager's Office, U.S. Army Aviation Systems Command, St. Louis, MO.

Direct Contributor

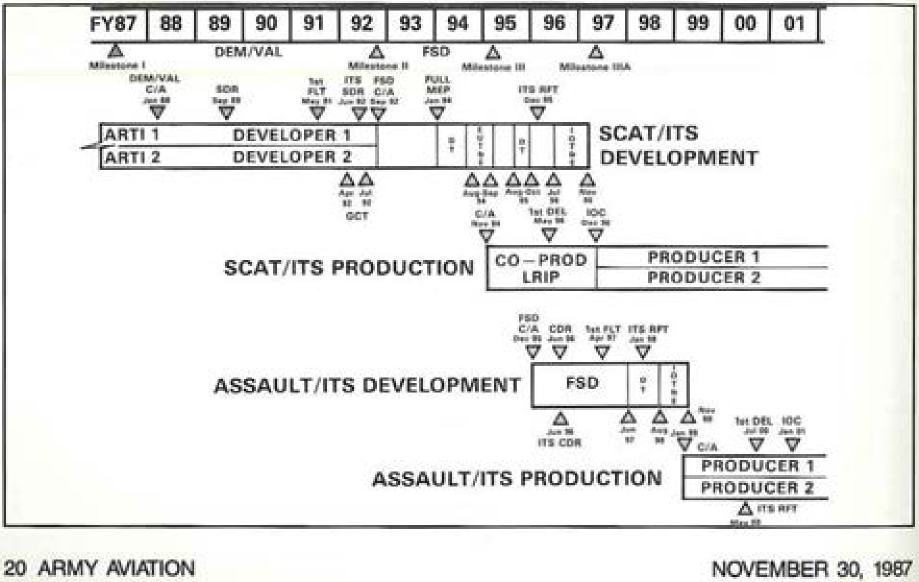
These documents establish the T&E as a direct contributor to the timely development, production, and fielding of a system that meets the user's needs, is operationally effective and supportable on the battlefield. Demonstration of a system's effectiveness and suitability is a key ingredient for any decision process necessary to commit additional resources for further development or production of the weapon system. Another noteworthy tenet is that the T&E will begin as early as possible in the system acquisition process.

For the LHX program, this includes early involvement of the user, such as including Army maintenance personnel in the T800 Engine Maintainability Demonstrations. Early T&E reduces program risk and provides a data base for determining the capability of the system to meet its technical and operational requirements. The Program Manager is able to identify and track test issues and requirements through the use of the TEMP, which is a short title for Test and Evaluation Master Plan.

LHX Temp

The LHX TEMP, approved by the Under Secretary of Defense for Research (Test and Evaluation), is the basis of authority for all LHX tests and evaluation.

(T&E — cont. on p. 66)



Hardware:

UH-60A Update

by Colonel William E. Turner

ST. LOUIS, MO — The UH-60A BLACK HAWK is one of the Army's finest success stories. Now in its 10th year of deployment with 880 aircraft fielded to date, and total flight hours on the fleet exceeding 610,000, the BLACK HAWK continues to serve with distinction.

From its inception, the UH-60A had built in growth potential. The Army's first true squad-carrying assault helicopter, the BLACK HAWK has accommodated new roles and missions through the addition of special equipment as demonstrated by the EH-60 Quick Fix variant which provides us a vital electronic warfare capability.

COL Turner is Project Manager, BLACK HAWK, AVSCOM, St. Louis, MO.

The BLACK HAWK's versatility is further demonstrated by its ability to serve as a firing platform for Hellfire Missiles and Volcano Mines. Additional operational capabilities can be obtained by mounting the External Stores Support System (ESSS).

Range

The ESSS and various auxiliary tank configurations provide flexibility in extended range and payload capability. Two 230 gallon fuel tanks mounted with the ESSS will double the tactical range of the BLACK HAWK; by further adding two 450 gallon tanks, it acquires a self-deployment capability to Europe.

Recently, successful technical testing was accomplished in Alaska on a BLACK HAWK equipped with snow skis and an auxiliary heater mission flexibility kit. These systems promise to provide for increased operational capabilities in cold weather environments.

After further airworthiness, reliability, and environmental qualification testing, the heater kits will be purchased for BLACK HAWK air ambulance units specified by the Office of the Surgeon General. Snow skis are currently in production for Alaska National Guard, with an expressed TRADOC requirement for 60 sets.

Weight

While the BLACK HAWK's adaptability has made the aircraft very successful, improvements for safety, increased reliability and technical advancements have added approximately 800 lbs. to the aircraft's initial production weight. The wire strike protection system, Night Vision Goggle compatible lighting, and the hover infrared suppression

system to name just a few, are improvements contributing to an increase in the basic aircraft weight.

Plans

Planning for the future requires an assessment of the BLACK HAWK today. As good as the BLACK HAWK is, an improved "B" model, more capable, more reliable, safer, and less expensive to operate and support is required to address current battlefield missions.

The Army Aviation Modernization Plan has documented a need for additional UH-60s beyond the current production objective of 1107, and has noted the necessity for increased BLACK HAWK performance in the demanding Nap of the Earth (NOE), night, and Special Operational Forces (SOF) scenarios. The MH-60K program, now underway, is designed to specifically address the SOF requirements.

Recognizing the need for additional UH-60 aircraft, the Army has initiated "B" model development plans. The Army issued a competitive Request for Proposed (RFP) for uprated engines in June of this year with expected selection and contract award in March 1988. The RFP for an all composite rotor system (both main and tail rotors) with advanced airfoils and planforms is scheduled for release in October 1987; contract award is projected for May 1988.

Avionics

A competitively selected integrated cockpit with improved flight controls, multifunction displays, integrated avionics, and greater visibility, will be used in the "B" model. The winning team of IBM-Bendix will become a directed subcontractor to Sikorsky for the cockpit integration. Further improvements and features planned for the UH-60B model are:

- 3,400 SHP gear box, improved main shafts, bearings and debris monitoring.
- Improved cockpit visibility.
- RAM enhancements.
- Improved EMI and NBC protection.
- Improved weapons, including Stinger Missile and 50 Cal guns.
- Greater fuel capacity, lighter tanks.

I think you can see why we are excited about the future. The continued outstanding team efforts of government agencies and defense industry contractors assure ultimate program success/mission accomplishment by field commanders and crews.

The planned BLACK HAWK improvements will make an already great aircraft even better, enhancing safety and supportability, reducing cost of ownership, and restoring lost performance margins — all important elements in modernizing the Army of Excellence.

Operations:

Redcatchers: "Toujours Pret"

by Lt. Colonel Robert JH Anderson

APO, NY — "Train to Fight and Conduct Border Surveillance," are the watchwords for the Redcatcher Squadron. They provide a focal point for all mission planning. One hundred and fifty-one years of honored Regimental tradition and the mission to be the "Tripwire of NATO" along 651 kilometers of border with the Warsaw Pact are constant reminders of the high standards that must be maintained by every officer, NCO, and trooper.

4th Squadron, 2d Armored Cavalry Regiment is a fully integrated maneuver force in the longest continuous serving Cavalry Regiment, the 2ACR. The Redcatchers have had their "METL" tested over the last several months with a series of demanding CPX/FTXs in sector, ARTEPS, Regimental gunneries, a VII Corps unannounced Operational Readiness Evaluation, and the daily pressures of integrating a continuous ground and aerial surveillance screen along the East German and Czechoslovakian Border.

AOE

This fast moving steed will be moving faster and carrying more as the transition is made to the Army of Excellence TOE. The first UH-60 and EH-60 shipments arrive in November. The force modernization ramp-up program continues to ensure these new systems are fully supportable when they arrive in the Squadron.

These tests and internal and external evaluations, coupled with the force modernization efforts have shown the Squadron lives up to the Regimental motto, "Toujours Pret" — Always Ready.

Training to fight focuses on the Regimental General Defense Plan (GDP) area and the mission essential task list (METL). The Redcatchers have spent over 60 days on FTXs, primarily in sector, over the last six months. GDP terrain walks down to platoon leader/sergeant level have proven invaluable for junior leader training and for improving the overall combat readiness of the Squadron.

"These tests and internal and external evaluations, coupled with the force modernization efforts have shown the Squadron lives up to the Regimental motto, "Toujours Pret" — Always Ready.

Counter Threat

The Squadron is doing some innovative training on fighting the counter recon and counter battery battle and on conducting trap operations and cross Forward Line of Troops probes to disrupt threat operations. The air-to-air threat, a daily reality for our border pilots, has received a lot of attention. A very energetic ongoing training program is designed to counter anyone who unwisely decides to aggress against a Redcatcher.

The Squadron routinely serves as a Regimental maneuver headquarters receiving a squadron sector with attached ground cavalry and tank troops and the full compliment of combat support forces to structure the battlefield to fight our fight. The Redcatchers are honing the edge of the Regimental sabre.

Gunnery

Current aerial gunnery programs are not standard when compared with the tank gunnery tables the ground squadrons must execute. This inability to quantify aerial gunnery standards makes resourcing of ammunition and dedicated aerial gunnery designed ranges difficult if not impossible.

The aviation community is the net loser when it's time to decide who gets training ammunition and range time density at the major training areas. We need to clearly identify the requirement **(Redcatcher — cont. on p. 67)**

LTC Anderson is Commander, 4th Squadron, 2d Armored Cavalry Regiment, VII Corps, APO, NY.

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The lightweight, compact KNS 660 is the same system used by Voyager on its recent record-breaking flight around the world. After an uninterrupted 25,012 miles in the air and nine days of continuous operation, Voyager's KNS 660 was still delivering precision navigation.

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Test and Evaluation:

AVNDTA: "Boresighting"

by Colonel Lawrence Karjala

FT. RUCKER, AL — It's been a busy summer for AVNDTA with many significant development tests covering the spectrum of Army aviation materiel. Here, however, I want to "boresight" on several recent aviation armament tests.

C-Nite

We concluded the System Integration Prototype Qualification Test of C-NITE in August. Incorporating a thermal-imaging system (forward-looking infrared or FLIR) into the standard AH-1 TOW sight, with or without laser rangefinder augmentation, C-NITE provides the COBRA a night, obscured battlefield and electro-optical countermeasure capability for the first time.

The normal operating mode provides standard direct-view optical missile guidance to control acquisition, launch, and guidance as long as tracking conditions are within acceptable parameters. Loss of the xenon tracker signals or perceived jamming automatically transfers missile tracking to the FLIR. When battlefield obscurants, weather, or darkness preclude employment of direct-view optics, the target can be acquired and attacked solely with TOW using the FLIR system.

During this test a total of 24 TOW missiles (including 2 TOW-IIA) were fired under day, night, obscured conditions, and with various countermeasures operating. Missiles were fired from COBRA hovering and in forward flight, at both stationary and moving targets. A limited Human Factors Evaluation was conducted, and a number of HFE-recommended improvements are being incorporated in the final design. The system is scheduled to go to ADEA in October for operational testing.

COL Karjala is Commander, U.S. Army Aviation Development Test Activity, Ft. Rucker, AL.

Volcano on UH-60

In June 1987, AVNDTA completed a Development Test II and Prototype Qualification Test-Government of the Multiple Delivery Mine System (VOLCANO) Air System installed on the BLACK HAWK helicopter.

VOLCANO can dispense 960 antitank and/or anti-personnel GATOR mines from 160 mine canisters in launching racks mounted along both sides of the helicopter. During this test, AVNDTA flew 14 missions and 21 flight-hours to evaluate system compatibility, operational effectiveness, handling qualities, human factors, safety, and adequacy of the M-60 machinegun pintle stop limiters. AVNDTA recommended a safety release for operational testing which was conducted by the U.S. Army Aviation Board at Ft. Lewis, WA.

20mm Cannon Error Source

The 20mm cannon on the AH-1 was designed to counter ground threats which are stationary or moving at a slow, constant velocity. AirLand Battle doctrine requires attack aircraft to perform effectively against fast-moving, accelerating targets in an air-to-air engagement environment.

To improve the 20mm cannon's effectiveness in this role, the Applied Aviation Technology Directorate in conjunction with Bell Helicopter Textron, Inc., developed a program designed to identify the error sources in the 20mm automatic cannon system. By isolating the sources of error, R&D projects can focus on those components offering the greatest potential for decreasing the error and improving weapon system effectiveness in the air-to-air mode.

AVNDTA is conducting this test

"We have 'boresighted' our considerable expertise...to assist the developer in fielding the most effective, reliable, and maintainable armament systems possible."

on a highly instrumented AH-1S using sophisticated ranges at Yuma Proving Ground. Firing and non-firing flight profiles are designed to push the 20mm cannon system to its maximum limits.

These profiles include climbing and diving fire, hover fire, and firing during slalom course runs. During these maneuvers, tracking and firing are done at maximum slew rates of the TSU and turret, at the extremes of turret travel, at minimum laser range return, and while receiving multiple or no laser range returns. To date 60 flight-hours have been flown completing 160 profile runs out of 369 planned.

HELLFIRE on BLACK HAWK

We have completed the firing portion of the Development Test II (Prototype Qualification Test-Government) of the HELLFIRE missile system on the BLACK HAWK helicopter. The system is designed as a strap-on kit using the External Stores Support System and a minimum of fixed provisions.

The BLACK HAWK can be configured with four launchers (16 HELLFIRE missiles) or two 230-gallon external fuel tanks and two launchers (eight HELLFIRE missiles).

The heart of the system is a pallet that mounts overhead between the gunners' stations containing the remote HELLFIRE electronics and the Airborne Target Hand-over system (ATHS). It is a non-autonomous system requiring a separate designator to illuminate the target. Mission data are transmitted in data bursts over FM, UHF, or VHF radio to the ATHS where the firing solution is computed.

To date, 316 simulated missions and three live-fire missions have been completed. Human factors and safety evaluations as well as system integration evaluations are completed. Presently an IPR is scheduled in April 1988 with the first fielding following in 1989.

Near Term

More aviation armament development tests are on the horizon. AVNDTA will be evaluating the Hydra-70 rocket with the red phosphorous smoke screen warhead for use as a battlefield obscurant; 20mm cannon and fleshette rockets as an air-to-air weapons system; an airborne adverse weather system for the AH-64; airborne target hand-over system/AH-64 integration; fire control computer improvements for the AH-1; and Stinger integration on the AH-64 and other aircraft.

At the Aviation Development Test Activity, we are dedicated to the mission of testing and assessing the total spectrum of Army aviation materiel. "Trial Before Combat" is our motto.

In keeping with that watchword, we have "boresighted" our considerable expertise as TECOM's aviation tester to assist the developer in fielding the most effective, reliable, and maintainable armament systems possible. Teaming with the testing expertise at Yuma Proving Ground, we will continue to play our part in providing soldiers the decisive edge in aviation armament.▮

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Special Report

US ARMY
AVIATION
SYSTEMS COMMAND

AVIONICS R&D ACTIVITY

The U.S. Army's Avionics Research and Development Activity

"The final change was focusing AVRADA toward customer support, while strengthening our tech base."

Director's Overview

by David V. Gaggin

This year has been an active one for the Avionics Research and Development Activity (AVRADA). Many of the thrusts that we have worked so hard for, during the last several years, have finally been institutionalized.

To begin with, a Director's position was established to replace the Commander as the head of the activity, which complies with the Army Science Advisory Board recommendation of 1985. A Deputy position was also established and I feel extremely fortunate to have filled the position with an individual with as much program management experience, technical expertise, and "can do" enthusiasm as Mr. Charlie Marotta.

CG AVSCOM

Secondly, MG Richard E. Stephenson approved the establishment of the Aviation Electronics Management Office (AEMO) on the recommendation of an Army Aviation Systems Command (AVSCOM) study team. The AEMO, located in St. Louis, MO and reporting directly to the Deputy Commanding General, AVSCOM, is chartered to look across all elements of AVSCOM and coordinate the total electronics requirements, not just AVRADA's communications, navigation and integration equipment.

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

AEMO

AEMO functions include: program planning, in the form of directive policies for electronics life cycle management; direction on issues that cross PEO responsibilities; budget management, to allow for more economical buys through better coordination; establishing standardization policies; and providing an AVSCOM management role for the Communications-Electronics Command (CECOM) avionics readiness effort.

LCSEC

The third major change was the elevation of the Life Cycle Software Engineering Center (LCSEC) from an office within AVRADA to an office reporting to the Director of the Research Development and Engineering Center.

The objective is to expand AVSCOM's software capabilities in the St. Louis area. LCSEC's primary responsibilities include: establishing initial software procurement requirements to include both development and support; contractor monitoring during development; Government verification and validation; software configuration control after fielding; and management of the software support activity. The LCSEC Avionics Division will remain at Ft. Monmouth and the LCSEC Headquarters and Aircraft Division have been established in St. Louis.

Refocus

The final change was focusing AVRADA toward customer support, while still strengthening our tech base. Although customer support has long been an important function in AVRADA, its elevation to our primary function was in recognition that: • emphasis has changed at Army Materiel Command (AMC) and AVSCOM from research and development to readiness; • the pipeline from the tech base to the field has changed due to the shift from Government Furnished Equipment (GFE) to Contractor Furnished Equipment (CFE); • avionics technology has shifted from "discrete black boxes" to integrated systems.

AVRADA responded by redistributing the resources in the Systems Management Division, which was responsible for black box development, to the Systems Integration, Communications and Navigation Divisions. The Systems Integration Division was significantly expanded and its Branches organized to mirror the Program Executive Officer (PEO) organizations; Combat Aviation, Combat Support Aviation and Future Aircraft, Light Helicopter Experimental (LHX) are the three branches dedicated to suporting the AVSCOM PMs. Within each branch is at least one engineer dedicated to supporting each PM.

The Communication and Navigation Divisions were pulled out from under the Advanced Technology Directorate in recognition that their primary mission is to support the customer programs. Several technology programs were left in these divisions to consolidate the expertise in one area and to help keep the engineers technically current.

ATD

The Advanced Technology Directorate, although reduced in size on the organization chart, better reflects the actual number of personnel working on tech base programs. We were able to substantially reduce the administrative burden on the engineers and insulate them from the day-to-day "panics" associated with customer programs.

Also, the number of tech base programs was significantly reduced to allow us to concentrate on the Army Aviation Command and Control problem which is the primary objective of the Automated Battle Management Concept Demo. This is a four-phase program that revolves around four Concept Evaluation Programs (CEPs) at Ft. Rucker. This joint user/developer effort is designed to help the user establish better ways to employ technology on the battlefield.

These changes have already resulted in significant accomplishments, which are reported in this edition. We are poised for an aggressive future — now we have to make it happen. IIIII

AVRADA Preview

by Bobbi C. Campbell

The Avionics Research and Development Activity (AVRADA), an activity of the Aviation Systems Command (AVSCOM), St. Louis, MO, is located at Ft. Monmouth, NJ.

Ft. Monmouth is situated in rural Monmouth County, famous for its warm beaches, rolling hills, inland waterways, historic, recreational and scenic attractions.

As AVRADA's engineers continue to develop and test avionicsin this attractive environment, the design criteria for architectures and integration is providing aircraft and aircrews with the capability to operate successfully in severe battlefield environments.

ATD

The Avionics Technology Directorate consists of the Joint Research Programs Office (JRPO), the Flight Information Systems Division, and the Tactical Information System Division.

JRPO

Army research engineers in the Joint Research Programs Office at Langley are performing avionics research with NASA at the Langley Research Center facilities.

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

In the Avionics Integration Research Laboratory (AIRLAB), Army engineers are participating in two joint research projects. One project is development of design guidelines and performance assessment methodologies for advanced fault-tolerant system architectures.

The other is investigating methods for estimating software reliability for ultra-reliable systems.

Additional research continues with NASA in developing codes for predicting antenna performance on composite rotorcraft structures and in the investigation of advanced cockpit display technology. The results of this joint avionics research program will provide significant input to the AVRADA technology base and developmental efforts at Ft. Monmouth.

ADAS

The design and verification of the Army Digital Avionics System (ADAS) flight software for the System Test Bed for Avionics Research (STAR) aircraft was completed and an air-worthiness release was approved. The installation and successful flight testing of the ADAS formed the basis required for further work in automating high workload tasks in modern cockpits.

In 1988, AVRADA will initiate an effort to automate control of the STAR subsystems with an Expert Subsystem Status Monitor (ESSM) which will provide the pilot, aircrew and maintenance crew with advisories to aid in critical and emergency conditions.

Flight Planning Stations

A software package is being developed for units to use in their Personal Computers called Flight Planning Stations. The Flight Planning Stations will provide an automated premission planning capability to Army pilots at a minimal cost and are producible for any aircraft in the fleet.

During the summer of 1987 AVRADA provided an integrated aircraft system for use in a Voice Interactive Avionics Concept Evaluation Program which was held at Ft. Rucker, AL.

AVRADA plans to expand the program in phases until eventually all the cockpit command and control functions are assisted by voice.

The Communication Division, Navigation Division, and Aviation Electronics Integration and Installation Divisions are also working on significant programs.

The addition of the modified Control/Display Subsystem (CDS) for use in the OV-1 MOHAWK and other subsystems

(AVRADA — cont. on p. 67)

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These inverters are *less sensitive to power input modulations,* and experience *fewer momentary output droops and overshoots* under full load applications. And because they're solid state, they're quieter and more reliable than comparable rotaries. Full Mil electronic components plus an extended burn-in program assure quality in actual field applications.

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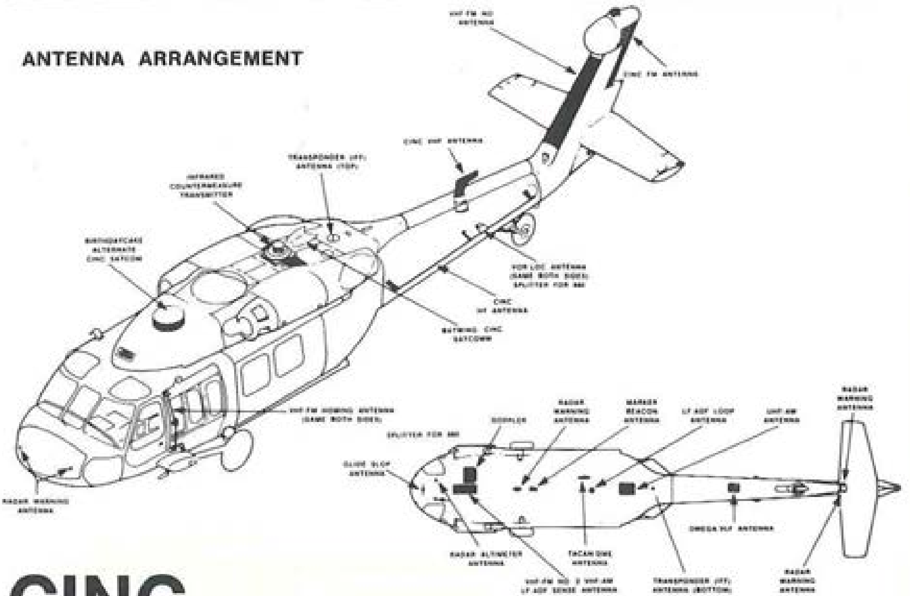


CINC UH-60 Aircraft

by J. Wellington (Tinker) Crane

Based on a Vice Chief of Staff of the Army directive, the PM-BLACK HAWK, requested the Aviation Electronics Integration and Installation Division of AVRADA to develop and implement the CINC aircraft program. Eight UH-60A helicopters were equipped with an expanded communications and navigation mission package. This enhancement provides CINCEUR, CINCUSAREUR, Commander in Chief South (CINCSO) and CDR Eighth US Army (EUSA) a capability to precisely navigate within their geographic areas of responsibility while maintaining secure communications with upper and lower headquarters.

"The overall schedule required completion of all eight aircraft by August 1987"

Additional Equipment

In addition to the avionic equipment on board the standard BLACK HAWK, the following functions were required: Distance Measuring Equipment (DME), Omega with Area Navigation (RNAV) and true airspeed, Stormscope, second VHF-AM communications, second VHF-FM communications, SATCOM, HF communications and a private intercom capability.

(CINC — cont. on p. 51)

"The CEP was structured to answer two operational issues: Can the current voice technology be operationally effective in the helicopter environment; What benefits to mission effectiveness can be expected from the interactive voice technology?"

Voice Command/Response: Operational Evaluation

by Robert F. Swieder

The U.S. Army Avionics Research and Development Activity (AVRADA) has been a leader in developing interactive voice technology for use in high noise environments for many years. We have evaluated many products and sponsored the development of those which have looked promising for our applications.

Early in 1986 at AVRADA, a laboratory demonstration of the technology's capabilities was presented to Mr. Ambrose, the Under Secretary of the Army. In May of 1986, MG Ellis D. Parker, the Commanding General of the Aviation Center, Ft. Rucker, AL, urged us to increase our efforts in pursuing interactive voice technology as a step toward demonstrating single pilot missions, as proposed under the evolving LHX concept.

By December of 1986, the Directorate of Combat Developments of the U.S. Army Aviation Center had tasked us to provide an integrated aircraft system for use in a Voice Interactive Avionics Concept Evaluation Program (VIA CEP) to be conducted during the summer of 1987. The purposes of this CEP were to assess the effectiveness of using voice interactive technology as the control/display interface for communication systems in U.S. Army helicopters, to determine the adequacy of this technology for assisting single pilot operations, and to assess the advisability of further R&D in this area.

Robert F. Swieder is chief of Computer Systems Branch, Tactical Information Systems Division, AVRADA.

With the short timeframe imposed, we decided to integrate a demonstration system, using in-house capabilities and off-the-shelf technologies. We were fortunate to acquire an R&D helicopter (JOH-58) which already had an integrated avionic suite using a Collins Cockpit Management System-80 (CMS-80) system.

The CMS-80 is a MIL-STD-1553, bus oriented system consisting of two Cockpit Control Display Units (CCD) and two System Computer Coupler Units (SCC). The SCCs provide the unique interfaces to the radios and avionics. The system also provides for radio and preset channel selection via cyclic stick switches. Channel selection, however, can only be done by first selecting the radio and then "bumping" the channel up or down one number at a time. This gave us a meaningful baseline for assessing the efficiency of voice control.

SANDAC IV

Using this system as a base, we integrated a connected work, speaker dependent, voice recognizer/synthesis system from ITT Defense Communications Division through a Sandia Airborne Computer IV (SANDAC IV) integration/mission computer. The recognizer/synthesizer was housed in a Voice Technology Testbed (VTT) chassis which provided local control of the unit and translated recognizer data to node and word numbers. This data was then passed, via the 1553 data bus, to the SANDAC

(Voice — cont. on p. 59)

Software Support

by Edmund Tognola

"The only way to truly support software is to design in a logistically supportable manner at the beginning of the system life cycle."

Computers have been a part of the Army's systems since the early 1960s. However, at that time there were relatively few of them and when problems occurred they were usually system unique and could be resolved individually.

During the late 1970's significantly more of the weapon systems were computer based, resulting in a proliferation of processors and programming languages. Consequently the U.S. Army Materiel Development and Readiness Command (DARCOM) initiated a study to develop a concept for supporting these software intensive systems.

PDSS

This study resulted in a report, entitled "Post Deployment Software Support (PDSS) Concept Plan for Battlefield Automated Systems," dated May 1980. One of the main features of the plan was a recommendation that eleven PDSS Centers be established according to battlefield functional areas throughout the Army. The aviation PDSS Center was established within the Aviation Systems Command (AVSCOM) and assigned to the Avionics R&D Activity (AVRADA) at Ft. Monmouth. AVRADA established a small "team" to suport its development programs and interface with DARCOM and the other Centers.

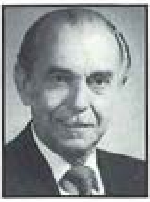
Mr. Tognola is Chief of Life Cycle Support, Engineering Center, Avionics Division, AVRADA.

As the volume of work increased, it became evident that a small "team" could not accomplish the required tasks and AVSCOM restructured the support group into the Post-Deployment Software Support (PDSS) Office with a staff of 18, supported by several contractors. AVSCOM's aircraft subsystems, such as the Integrated Inertial Navigation System, AN/ASN-132; Lightweight Doppler Navigation System, AN/ASN-128; and the Automatic Target Handoff System (ATHS), CP-1516 being developed by AVRADA, were among the first systems included in the software support program.

Early Involvement

The rationale for creating centralized "repair shops" for the Battlefield Automated System's software was to provide an expertise that would solve fielded software problems. The Army soon realized that the PDSS Centers would not be in a posture to perform their mission without early program involvement. The only way to truly support software is to design in a

(Software — cont. on p. 54)



Aircraft SINCGARS

by Otto Schoenberger

SINCGARS is a new family of very high frequency FM radios designed to provide the primary means of command and control for the lower Army echelons, down to the platoon level. Development and production of the radio system is being conducted and managed by the PM SINCGARS located at Ft. Monmouth, NJ. AVRADA provides technical management support for the Aircraft radio to the PM SINCGARS, and interfaces with the AVSCOM and the A/C PMs.

SINCGARS is considered the major system in the combat net radio portion of the Army communications architecture. As such, the SINCGARS radios will be used by combat, combat support, and combat service support units in the Army, and will support a major portion of the voice and data transmission requirements of US Army tactical forces.

SINCGARS Family of Radios

Model	Configuration	Replaces
AN/PRC-119	MANPACK	AN/PRC-25/77
AN/VRC-87	Vehicular Short Range	AN/VRC-53/64
AN/VRC-88	Vehicular Short Range Dismountable	AN/GRC-125/160
AN/VRC-89	Vehicular Short Range-Long Range	AN/VRC-12/47
AN/VRC-90	Vehicular Long Range	AN/VRC-43/46
AN/VRC-91	Vehicular Long Range Dismountable Short Range	AN/GRC-160/125 Plus AN/VRC-46
AN/VRC-92	Vehicular Dual Long Range Retransmit	AN/VRC-45/49
AN/ARC-201	Airborne Transceiver	AN/ARC-54/131 AN/ARC-114 AN/ARC-186(FM)

EC-COM

Current ground and airborne combat net radios are susceptible to present jamming techniques and are designed primarily for voice operation in 50 kHzchannels. SINCGARS radios channels. SINCGARS radios were developed to offset this threat and employ frequency hopping as an electronics counter-countermeasures EC-COM technique. The radio is also designed to handle data and uses the standard NATO compatible 25 kHz channel operation. Increased channel capability is provided by both the 25 kHz channel spacing and the extension of frequency coverage to 88 MHz (30 to 88 MHz).

Mr. Schoenberger is an electronics engineer, Communications Division, Communications Systems Division, AVRADA, FT. Monmouth, NJ.

AN/ARC-201

The AN/ARC-201 has been designed to accommodate installation in all types of Army aircraft. There are basically three types of AN/ARC-201(V) configurations. The design of all three airborne receiver-transmitters (RT-1476, RT-1477, and RT-1478) are identical except for the front panel (A1) module. The panel mounted RT-1476 uses the Local Control Panel in the A1 position of the radio; the remote-mounted RT-1477 uses the Dedicated Remote Interface panel in the A1 position of the radio; and the MIL-STD-1553B Data Bus-Controlled RT-1478 uses the 1553B Remote Inter-

(SINCGARS — cont. on p.55)

MOHAWK Avionics Upgrade Program

by Captain Jeryl S. (Jill) Cornell and Stanley Tylecki

Since the late 1950's the OV-1/RV-1 MOHAWK has been a versatile part of the Army's aircraft fleet. The Special Electronics Mission Aircraft Product Management Office (SEMA-PMO) is ensuring that the MOHAWK aircraft remains a supportable, reliable, mission effective asset into the next century by undertaking the MOHAWK Block Improvement Program.

AVRADA's Aviation Electronics Integration and Installation Division is supporting the SEMA-PM by developing the systems integration architecture and managing the development and subsequent acquisition of selected avionics subsystems for both the current MOHAWK prototype aircraft and the eventual follow-on production aircraft. The program has been structured to capitalize on previous Army AHIP avionics investments by modifying the OH-58D AHIP Control Display Subsystem (CDS) for use in the Block Improvement Program; providing an Integrated Flight Control System (IFCS); and developing an Aircraft Survivability Equipment (ASE) Remote Terminal Unit (RTU).

Captain Cornell is an AVRADA Project Leader. Mr. Tylecki is Project Leader, OV-1 MOHAWK, AVRADA.

Supportability

The avionics upgrade was undertaken for several reasons, with supportability beyond the year 2000 being a key factor. Many of the avionics subsystems presently on board the current MOHAWK are becoming marginally supportable and will be virtually non-supportable by the year 2000.

The Block Improvement Program will dramatically increase aircraft readiness and mission effectiveness by incorporating modern avionic subsystems that use advanced technology, resulting in increased reliability and better performance. Also, the addition of the modified AHIP CDS, the IFCS and ASE-RTU will enhance aircraft operational performance and provide system flexibility and growth potential.

One of the major Block Improvement Program objectives was to transfer as much hardware and software as possible from the OH-58D AHIP to the MOHAWK. By using common equipment, the Army not only capitalizes on AHIP's extensive Research and Development effort, but also realizes substantial savings in logistics and maintenance costs.

Control Display Subsystem

The heart of the technology transferred from the AHIP effort is the Control Display Subsystem (CDS). The CDS consists of two Master Controller Processor Units (MCPUs) two Multifunction Displays (MFDs), one Keyboard Unit (KU), and one Remote Frequency Display (RFD).

The CDS is a redundant, integrated avionics system which uses digital processors and dual MIL-STD-1553B multiplex data busses to provide primary interface and control of the MOHAWK's avionics and ASE suite. It controls, displays and processes navigation data, provides centralized communication management, generates and displays vertical and horizontal situation information, monitors aircraft systems and displays caution/warning advisories. The CDS does this by collecting data from aircraft transducers and subsystems, and then encoding the data into digital format. The data is then processed and displayed to the aircrew.

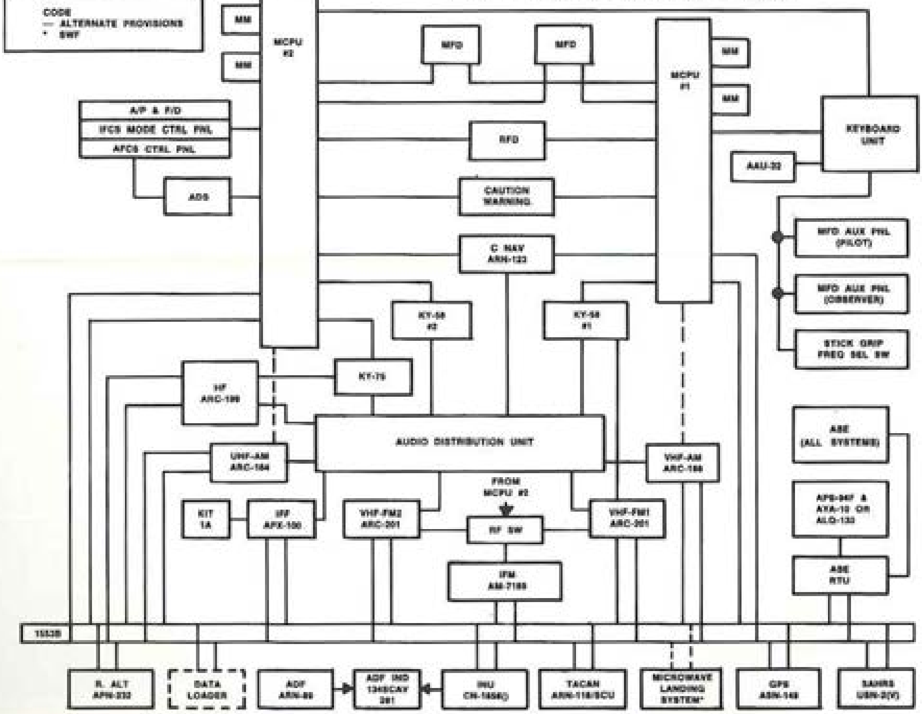
The CDS provides the primary man/machine interface for most of the MOHAWK avionics and ASE subsystems. Presently, the flight crew enters data manually using the alphanumeric Keyboard Unit, the line select keys positioned around the face of the MFD, and various cockpit mounted switches.

Program plans currently call for a data loader subsystem that could be preprogrammed with necessary mission information during preflight operations and then automatically transferred into the aircraft CDS. The data loader will reduce pilot workload and save valuable preflight planning time.

Communications

Once data is entered, it is displayed on the two MFDs in functional groups such that all information required for a particular mission function is displayed simultaneously. Communications information **(MOHAWK — cont. on p. 58)**

OV-1 CONFIGURATION



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Expert Subsystem Status Monitor

by Bruce Davis

AVRADA has created a unique capability for performing follow-on research and development in cockpit automation with the integration of the Army Digital Avionic System (ADAS) in the NUH-60A System Testbed for Avionics Research (STAR) aircraft. The installation and successful flight testing of the ADAS digital avionic architecture (including multi-function controls and displays, redundant system processors interfaced to aircraft subsystems using MIL-STD-1553 data busses and remote terminal units, and remote electrical power controllers for aircraft subsystems) form the basis required for further work in automating high workload tasks in today's cockpits.

Mr. Davis is Chief of Communications Division, AVRADA.

The initial phase of the ADAS/STAR program mapped existing UH-60A functions (i.e. controls and displays, emergency procedures, power control, etc.) into an all electronic cockpit. When a caution or warning is acknowledged, emergency procedures are displayed on a CRT

(Monitor — cont. on p. 58)

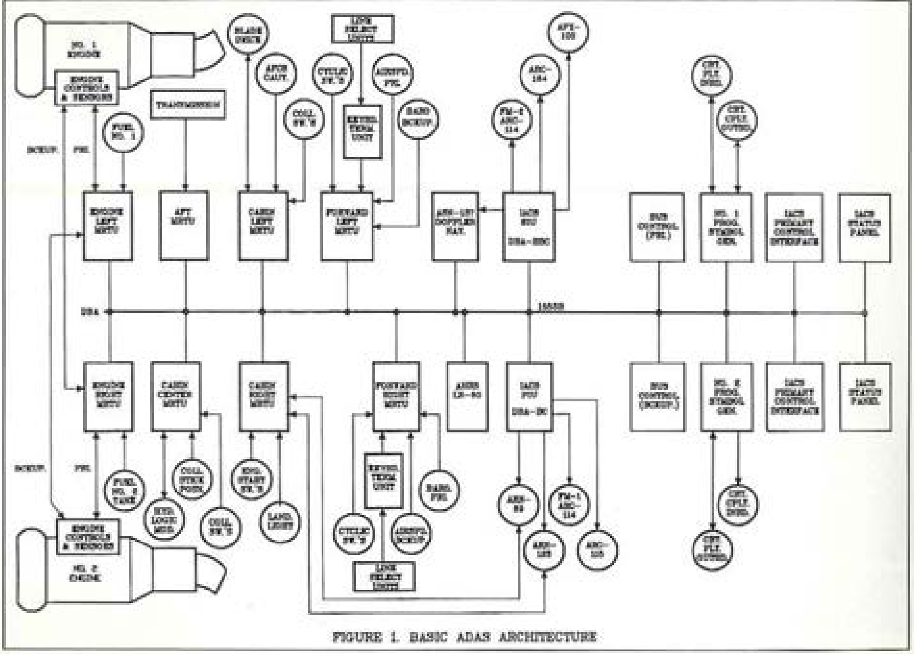
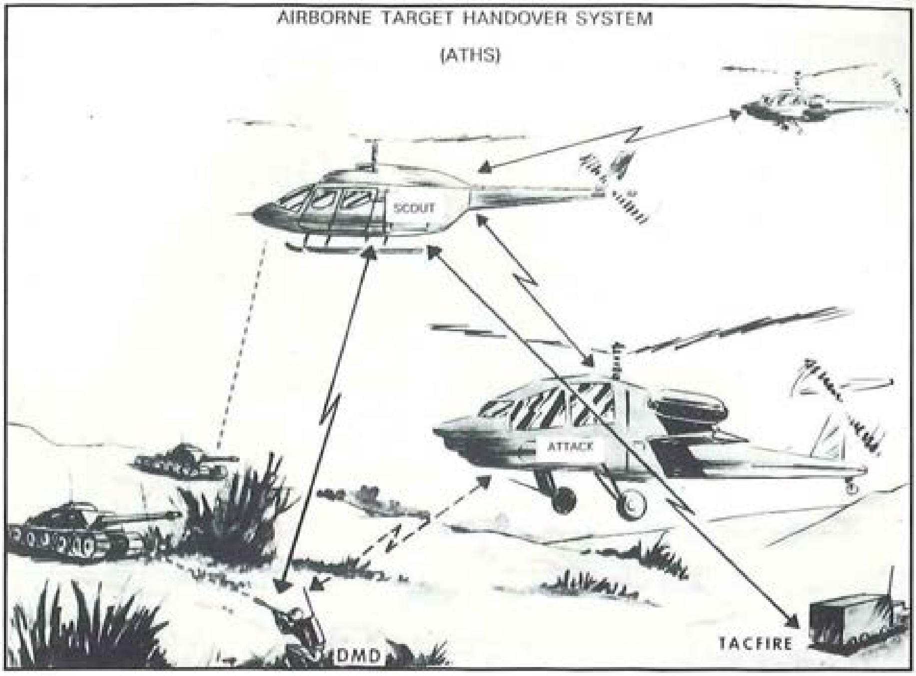


FIGURE 1. BASIC ADAS ARCHITECTURE



Airborne Target Handover System

by Frank LaVerda

An important objective of Army Aviation is to improve helicopter survivability which depends on the ability to avoid observation by an enemy. Development of the Mast Mounted Sight (MMS) missile indirect fire mode and Nap-of-the-Earth (NOE) tactics, aid in reducing aircraft exposure; however, little has been done with the current tactical radios to reduce radio transmission time required to send accurate information.

Mr. LaVerda is an electronics engineer, Communications Division, Communications Systems Division, AVRADA.

Various tests performed under controlled conditions have shown that the current methods of obtaining data, handing it off, and coordinating a mission, significantly increase the crews workload at NOE and requires long RF transmission times. Based on these tests, the ATHS, an integrated information processor compatible with current and planned tactical communications systems, was developed by AVRADA with the support of TRADOC.

The ATHS, a Line Replaceable Unit (LRU), receives target

(ATHS — cont. on page 56)

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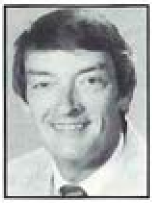

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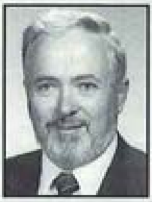

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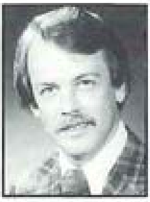
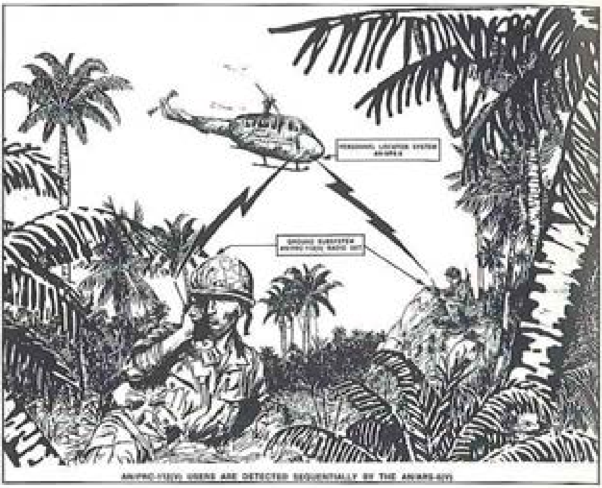
AN/PRC-112(V): Survival Radio

by Tim Ryder





The most critical item among the contents of an aircrew member's survival vest will take a bold step into the future late next year with the introduction of Survival Radio/Transponder AN/PRC-112(V). A crash victim's survival frequently depends on his ability to transmit a detectable distress signal, and his chances are greatly improved as the time required for his recovery is reduced.

One Watt Power

AN/PRC-112(V) will benefit the user in both aspects; it transmits a healthy 1 watt peak output power (compared to 100 milliwatts transmitted by the present day AN/PRC-90 radio) and when operated in transponder mode, it offers both steering and ranging information to a rescue aircraft using the companion avionics [Personnel Locator System AN/ARS-6(V)]. (See article in February 28, 1987 issue). The ranging information allows the rescue aircraft to determine survivor location within one percent of range, dramatically improving recovery time.

While these improvements represent sensational progress, other significant features are also contained in the new radio.

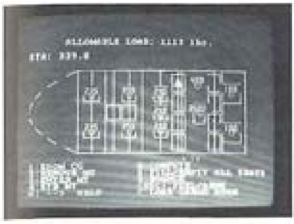
The most obvious departure from AN/PRC-90 technology is the ability to operate in a hostile EW environment. No longer will it be necessary for the user to transmit voice or beacon in "plain text" announcing his position to friend and foe alike and jeopardizing both his own rescue and the safety of the rescue aircraft. With AN/PRC-112(V) operating in transponder mode on a preprogrammed frequency, the transmitter will remain silent until interrogated by an aircrew using AN/ARS-6(V), programmed with the same frequency and the transponder code.

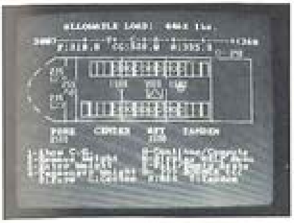
Mr. Ryder is an electronics engineer, Communications Div., Communication Systems Branch, AVRADA.

NASA Interest

This capability to provide range and bearing to virtually any terrestrial location offers tactical benefits beyond the search and rescue requirement. Operated by a medical evacuation crew, it could be useful for both voice communication and for location. It has also sparked

(Survival - cont. on p. 55)





Pilot's Flight Planning Station

by Captain Michael R. Skaggs

The computer world is finding its way down to the company level in Aviation units today. The Army is purchasing 30,000 IBM compatible Personal Computers to add to the many computers that units already have purchased locally. AVSCOM is developing computer programs to help units automate their flight records, maintenance records, and other areas to ease the workload at that level.

Flight planning is one area in which a computer can save time for pilots. Current technology can easily be utilized to automate the three tasks that make up a pilot's premission planning: weight and balance calculations, the Performance Planning Card (PPC), and navigation computations for the flight plan. AVRADA is developing such a software package, called the Flight Planning Station, for pilots to use in their unit's PCs.

Weight and Balance

Weight and balance calculations are easily handled by the computer and the available graphics make data input quick and easy. An aircraft floor plan is displayed on the screen to the pilot who moves the cursor to place weights on the diagram the way he would on the aircraft.

The program reads the location from the diagram and computes the moment. Input from the pilot is asked for in an easy-to-follow menu driven format. There is no need to memorize commands because the menu list is displayed on screen while the program is being used. The pilot uses a single key to enter weights, remove weights, or fill all the seats with a combat equipped soldier.

CPT Skaggs is an Electronics Engineer and Avionics Test Pilot in the Flight Information Systems Division, AVRADA.

Available Load

The program remembers commonly used information such as the basic weight and moment of the unit's aircraft, frequently carried load configurations, or a listing of the equipment that is often carried by sling load. The user can tailor the information in the program memory to suit the specific needs of the unit. As the pilot adds weight to the aircraft diagram, the available load capacity is updated and appears on the screen. Anytime the center of gravity gets within one inch of the forward or aft limit, the pilot is warned so the load can be adjusted. When this is finished, the pilot is given a printed copy of the load in the same format as the Weight and Balance Form.

PPC

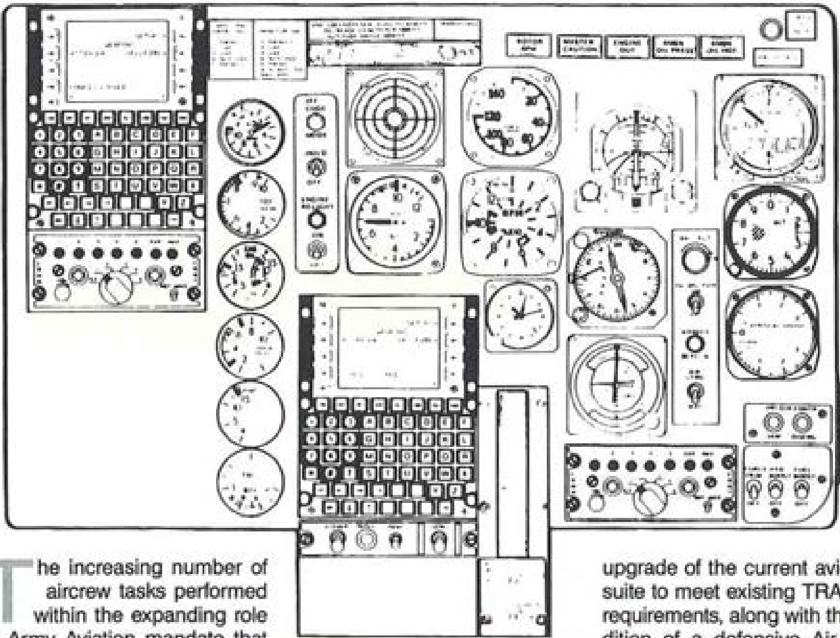
Next the pilot enters the PPC part of the program. The takeoff weight, landing weight, and amount of fuel expended is carried forward from the weight and balance calculations. The program also remembers if a sling load is to be carried — the 10 foot predicted hover power is computed without the sling load weight; the Out-of-Ground-Effect (OGE) hover power is calculated with the sling load weight.

The PPC phase progresses in the same order and format as the original PPC. The program asks for the takeoff temperature,

(Station — cont. on p. 56)

Avionics System Upgrade

by Captain Jeryl S. (Jill) Cornell



The increasing number of aircrew tasks performed within the expanding role of Army Aviation mandate that aircraft in the field today be modernized for tomorrow's mission. AVRADA's Aviation Electronics Integration and Installation Division is pursuing several programs to upgrade avionic systems on the UH-1H, UH-60A and OH-58A/C aircraft to meet communication, navigation and weapons systems requirements of the 1990's and beyond.

Representative of AVRADA's efforts is the OH-58C Avionics Product Improvement Program (PIP) Consolidation, in support of AVSCOM's Scout/Observation Weapons Systems Management Office. The two proposed levels of integration include a PIP upgrade of the current avionics suite to meet existing TRADOC requirements, along with the addition of a defensive Air-to-Air Stinger capability.

CPT Cornell is Project Leader, OH-58 PIP Consolidation Program.

DARTS

The second level will posture the OH-58C for a future offensive capability by evaluating the Digital Automatic Rapid Targeting System (DARTS) concept, and demonstrating both Improved Navigation Processing and Night Vision Goggle (NVG) display enhancements. DARTS is a "real-time" command and control link for target information passed between ground based radar sensors and the aircraft. These improvements will sustain the effectiveness of the OH-58C **(Upgrade — cont. on p. 50)**

Upgrade – cont. from p. 48

and provide a viable Scout aircraft for the next century.

Upgrading the avionics suite currently in place in the OH-58A/C will see an increased number of communication and navigation systems required to perform the ever expanding Scout role. To improve the utilization of existing limited cockpit space, develop common communication and navigation control/display formats, and stay within the existing constraints of aircraft weight and center of gravity, AVRADA proposed an Integrated Mission Avionic System.

Mission Avionic System

This system centers around two on-board processors which control the operation of all communication, navigation, and weapon systems. The on-board processors are contained within the proposed Army Standard Control Display Unit (CDU), the IP-1552/G.

The CDU encompasses an alphanumeric keyboard and special function keys, which the crew uses to enter mission information (frequencies, call signs, targets) either manually or through an automatic data loader. Two CDU's are planned, one for the pilot and one for the copilot/observer. Either crew station has the ability to "call-up" mission information as well as control radio frequency selection through cyclic mounted switches.

The Mission Avionics System provides centralized communications management to include VHF-FM SINCGARS (ARC-201), VHF-AM/FM (ARC-186), UHF-AM (ARC-164), HF (ARC-199), ATHS (Airborne Target Handoff System), and all COMSEC (Communication Security) equipment. Navigation systems to be included on the OH-58 are a form, fit and function (F3) Doppler Navigation System and ADF (Automatic Direction Finder), with provisions to add Global Positioning System (GPS) avionics when fielded. The system will manage the APX-100 IFF Transponder, and provide consolidated weapons control to include the Air-to-Air Stinger.

MIL-STD-1553B

The key to the Integrated Mission Avionics System architecture is the use of the MIL-STD-1553B Digital Data Bus. Think of a data bus as field wire in a tactical telephone system. Basically, it serves as the communications link between the CDE processor (tactical switchboard) and the separate avionic receiver/transmitters (field phones). Digital information is sent from the CDU, over the bus, to the avionics.

Virtually all the avionic systems fielded in the next decade will have this digital "1553 compatibility". The older avionics that are not 1553 compatible will be connected to a Bus System Interface Unit (BSIU), which is designed to integrate non-1553 systems onto the data bus. The Integrated Mission Avionics System uses two identical 1553 data busses. Dual bus capability provides complete system redundancy, in the case of a bus failure or CDU battle damage.

System Upgrade

Using the digital data bus makes system upgrade an easily accomplished task. In our tactical phone system, if we want to add another terminal, we splice in wire and add another field phone. The theory behind integrating additional avionics on the data bus is quite similar. Once integrated on the bus, all systems can "share' information. Special hardwired interfaces between specific pieces of hardware are no longer required.

The benefits of integrated avionics on a data bus are numerous. First, is the reduction of cockpit real estate. In the OH-58 PIP Consolidation effort, nine dedicated cockpit panels are reduced to two CDUs. The bulk and weight of cable bundles are reduced, and most important, the need to run large wire bundles between each receiver/transmitter and corresponding control head is eliminated.

Simplification

System simplification, a major benefit of integrating avionics, has yet to be realized by many of today's Army Aviators. The radios of tomorrow are infinitely more complex than those found in the cockpit today. Instead of setting a function select switch to transmit/receive and tuning frequencies by rotating control knobs; systems like the AN/ARC-201 SINCGARS, ATHS and AN/ARC-199 HF require entry on separate CDU keyboards for loading and retrieving mission information.

All these CDUs contain their own microprocessors, which means they are separate computers with their own unique programming requirements. The crew must memorize programming procedures for each system and spend valuable time loading mission information into the avionics systems. By using a software programmable CDU, such as the one selected for the OH-58 upgrade, all avionics can be controlled by a single

(Upgrade — cont. on p. 54)

CINC — cont. from p. 34

After careful technical and economic evaluation by both the user and developer, the following systems were selected:

Flight Management Systems

Function	Item
Omega w RNAV&TAS	KNS-660
VOR/ILS(second)	KTU-709
TACAN/DME	KNR-634
Stormscope	WX-11

Communications

Function	Item
Second VHF-FM	AN/ARC-186- Radio added to existing #3 AN/ARC-186 (2d FM) provisions; modified to provide AM also
Second VHF-AM	AN/ARC-186- Modified existing #2 AN/ARC-186 FM (Primary FM) to provide AM also
CINC VHF-FM	AN/ARC-186-existing #1 AN-ARC-186 AM converted to FM
SATCOM Radio	AN/URC-102
HF Radio	AN/ARC-199

A preliminary design plan and mock up of the communications console were prepared and a review was held with user representatives regarding the communications console and aircraft configuration. The overall schedule required completion of all eight aircraft by August 1987. To accomplish this ambitious goal, resources from the BLACK HAWK PM, Technology Application Program Office (TAPO), Airborne Electronics Research Activity (AERA), DOSS, American Electronics Laboratory (AEL), and Corpus Christy Army Depot (CCAD) were required. AVRADA's role included Program Management, Engineering Design, Prototype Testing, Production Installation and Test assistance, Maintenance Concept formulation, and Fielding assistance.

Flight Management System

The Flight Management System (FMS) course and bearing information is displayed on the existing Horizontal Situation Indicators (HSI's). The FMS shares all readouts of the HSI's except the number one bearing needle which is dedicated to the AN/ASN-128 Doppler. A logic switching unit accomplishes the necessary switching by means of an added FMS/NAV switch as well as the existing VOR/ILS and Automatic Direction Finder (ADF)/VOR switches on the existing mode select panel which have been renomenclatured to read NAV/ILS and ADF/NAV respectively. Selection of NAV or ILS on the existing mode select panel allows selection of either the FMS or the existing VOR/ARN-123 on the new mode select panel.

In addition to the FMS/VOR switch on the new mode select panel, four annunciator lights are presented to indicate "message" alert, "waypoint" alert, "crosstrack" and "dead reckoning". Other changes on the instrument panel include the addition of the Stormscope display and two KDI-573 DME displays to display range and Ground Speed. Since the existing HSI does not provide for automatic course slewing, the course adjust knob must be rotated manually to extinguish the message light when it comes on. The KCU-567 control display unit is located in the top center row of the center console.

The added antennas for the navigation system include the AT-741 for the Tactical Air Navigation (TACAN) on the fuselage bottom at station 353 and the KA-679 H field antenna for the Omega on the bottom of the tail boom just aft of the transition section. The new VOR, GS, and MB share the existing antenna.

KNC-667

The heart of the navigation system, the KNC-667 computer, is located in the nose electronics compartment. The KTU-709 TACAN R/T, KNR-634 VOR receiver and the KA-167 rubidium frequency standard are located on a shelf behind the KNC-667, above the AFCS accelerometers. To the right of the KNC-667 is the WX-11 Stormscope processor. The KDC-281 Air Data Computer is located on the right side of the electronics compartment bulkhead. This configuration resulted in minimal impact on the existing systems in the nose.

The VHF-FM, SATCOM and HF radios for the CINCs are contained in a communications console which is mounted in place of the middle seat of row 2 in the cargo compartment, at station 282.0. It is attached to the four 5,000 pound seat tie down fasteners using Aero Equip fittings. These fittings

(CINC — cont. on p. 59)

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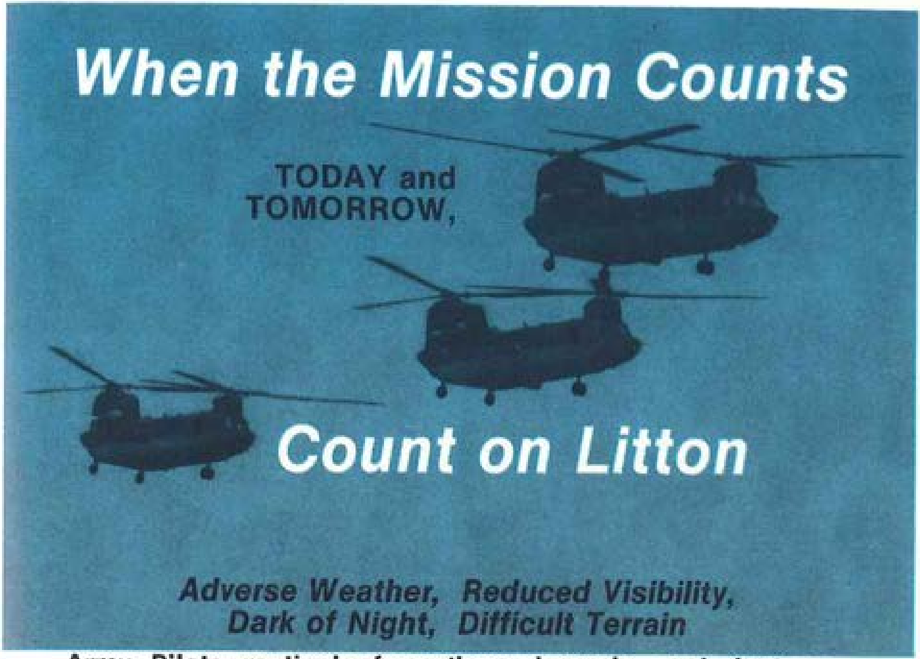

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Aero Products

Upgrade – cont. from p. 50

processor. Only one simple, consistent programming procedure is used for all avionics.

Data Loaders

Another benefit still to be realized is the ease which centralized avionics management and bussing lends itself to automatic data loading of mission information. Data loaders will be a necessity in coming years.

To demonstrate the point, say we're on a mission in the 1990's. We want to communicate on our UHF (ARC-164 HAVEQUICK II) radio, our FM (ARC-201 SINCGARS) radio and navigate using our GPS user equipment. Before we leave the field site, we must load 36 six-digit code entries in the proper sequence to prepare our UHF radio to operate in the frequency hopping mode. We'll have to program our SINCGARS with our various FM single channel frequencies and frequency hopping codes. We'll also have to program our GPS with our present position and intended waypoints. Entries must be accurate, or we might end up in the wrong Landing Zone (LZ) unable to communicate.

An automatic data loader can be programmed using a personal computer in operations during actual mission planning. It can be walked down the flight line, with its information dumped into each aircraft. The microprocessor in the CDU sends the mission planning information over the 1553 bus to the microprocessors in the avionics. Frequencies, navigation waypoints and target information are now loaded into the various systems. Crew preflight workload has just decreased dramatically while accuracy of data input to the aircraft has increased.

System Integration

Well-planned system integration will provide a structured approach for future aircraft enhancements. The requirements for communications, navigation, weapons and aircraft survivability systems to be installed on Army aircraft are known several years before the avionics systems are ready for fielding. With integration, we no longer have to find space in the already crowded cockpit for yet another control display unit. When fielded, the new system is hooked into the data bus, and we're in business. The OH-58 PIP Consolidation includes preparing for the provision of growth systems like GPS and HAVEQUICK IIA.

Integration is not a new approach. The APACHE and AHIP have earlier versions of this technology, as do Special Operations Forces BLACK HAWKs and CHINOOKs. A similar data bus insertion is also planned for a UH-1 belonging to the US Army Human Engineering laboratory.

Integration technology reduces future demands on the aircrew by simplifying avionics operations in an age where systems are increasing in complexity. It also provides a structured approach for the modernization of avionics, which must take place in order to meet and defeat the threat on tomorrow's battlefield. We at AVRADA remain committed to developing new capabilities that will further simplify the operation and maintenance of avionics systems. ▮▮▮▮▮

Software – cont. from p. 36

logistically supportable manner at the beginning of the system life cycle. Documentation, software support environments, software development tools, test tools, and configuration management tools are necessary for the Centers to perform their mission. These resources must be planned for early in the development cycle.

Thus the PDSS Centers are active in the development of systems, lending software expertise to system developers. To more accurately define the role of the PDSS Center in development activities, Post-Deployment Software Support (PDSS) Centers were re-designated Life Cycle Software Engineering Centers.

Integrated Aircraft

Within AVSCOM, among the many aircraft avionics configurations, the proliferation of computers — and their attendant software languages — spread from the communication and navigation "black boxes" to other aircraft functional areas. It became commonplace to find processors in flight controls, engine controls etc. and eventually they evolved to the integrated aircraft being developed today.

It became evident that, with computers becoming such an inherent part of aircraft operation, a presence had to be established near the aircraft Project Managers to impact and support the development of systems' software. AVSCOM created that presence by expanding the LCSE Center to St. Louis and establishing a Life Cycle Software Engineering Office. The Office is presently established into two Divisions, the Avionics Division at Ft. Monmouth, collocated with the Avionics R&D Activity, and the Aircraft Division located at Headquarters, AVSCOM, in St. Louis. ▮▮▮▮▮

Survival – cont. from p. 46

NASA interest for use in the astronauts' escape system for future space shuttle missions.

Significant improvements over previous survival radios include low temperature operation to -40 degrees Celcius, greatly improved antenna durability, watertight case integrity to depths as great as 50 feet, and greatly increased battery life, due in part to transponder operation, which drastically reduces transmitter on-time. All of these advantages greatly improve a survivor's chance of rescue, and the radio's utility to a tactical user.

Modifications

Modifications to the basic radio for special purpose users are also under consideration. A VOX capability would be especially useful to medical evacuation crews, as the radio could be used for "hands free" communication with a MEDEVAC aviator or other medical personnel. The VOX-equipped user could simultaneously be located by an aircraft equipped with AN/ARS-6(V).

Programming of the radio for transponder identification with preselected frequencies is accomplished by either of two support equipments. A handheld programmer under development for special operations may be used at organizational level or on the flight line. The programmer plugs into the radio's battery jack and the radio battery, in turn, plugs into the programmer, powering both for programming. No other power source is necessary. A more sophisticated Test Set TS-4175/PRC-112(V) may be used at either organizational or intermediate level. TS-4175 will also perform a complete GO-NO-GO radio check-out and may be powered with 28 VDC or 120 VAC at either 60 or 400 Hz.

Procurement

The initial procurement contract for the radio was awarded in September 1987 to Motorola Inc., Scottsdale, AZ, for a basic quantity of 1500 radios, with options for up to 3,700 additional radios. The radios will be delivered with a manufacturer's warranty covering all repairs necessary until 1992. The warranty includes incentives for rapid turn-around time in the repair facility, resulting in maximum availability to the user. It will also provide repair data establishing provisioning and manpower levels for organic support, allowing a smooth transition to in-house maintenance.

When the radio is released to the field late in 1988, aircrews will see the immediate benefit of improved survival radio availability even before the 1989 fielding of AN/ARS-6(V). Additional buys scheduled through the mid '90s will fully equip authorized users with survival radios — either AN/PRC90/90-2 or AN/PRC-112. With a gradual phase-out of AN/PRC-90 in future years, AN/PRC-112 will be fielded in increasing quantities until it is available for all tactical applications. IIIII

SINCGARS – cont. from p. 37

face Panel in the A1 position of the radio.

Specific Installation

The specific AN/ARC-201(V) configuration and interface requirements in an aircraft platform are dictated by the operational communications mission requirements of the aircraft.

Receiver-Transmitter RT-1477/ARC-201(V): The RT-1477 mounts on a separate mounting base in the avionics equipment bay of the aircraft (or where ever convenient). A separate Control Unit, C-11466/ARC-201(V), mounted in the cockpit of the aircraft, provides the necessary control signals to the RT-1477 for radio operation. The RT-1477 is the intended replacement for the RT-348/ARC-54, RT-823/ARC-131, and RT-1300/ARC-186(V) (when used as an FM radio) Receiver-Transmitter.

The Receiver/Transmitter RT-1478/ARC-201(V): The RT-1478 mounts in the avionics equipment bay of the aircraft on a separate mounting base. Control signals are provided to the RT-1478 over a MIL-STD-1553B multiplexed data bus. The RT-1478 is the intended replacement for the FM function of the RT-1300B/ARC-186(V) Receiver-Transmitter.

Receiver-Transmitter RT-1476/ARC-201(V): The RT-1476 mounts in the cockpit of the aircraft in the footprint of the AN/ARC-114 Radio Set. The RT-1476 also replaces the FM function of the RT-1354/ARC-186(V) Radio Set. Operating controls for the RT-1476 are provided on the front panel of the unit.

The AN/ARC-201(V) configuration varies from platform to platform but has been designed to interface with the following equipments: power amplifier Improved Frequency Modulation (FM) (AM-7189A/ARC); homing anten-

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ATHS — cont. from p. 43

information over the MIL-STD-1553 Data Bus from a MMS, Copilot Multifunction Display (MFD) and Auxiliary Panel, Multifunction Keyboard (MFK), Doppler, and other sensors.

The processed information such as artillery fire request, target type and strength, target location, movement reports, battle damage/casualty reports is displayed on the co-pilot MFD.

This information can be transmitted to and received from other ATHS equipped aircraft, vehicles, and the Artillery TACFIRE/FIST System using available onboard radios. ATHS supplies a signal to key the proper radio and send digital data as though it were voice. Data can also be passed to and from hand-held Data Message Devices (DMD).

Rapid Format

The system has the ability to rapidly format complex messages such as Aerial and Artillery fire requests, reports (status, spot, situation, battle damage assessment, casualty), emergency broadcasts, movement commands and general free text messages with automatic or manual authentication.

ATHS provides the capability to maintain current mission status for eight active airborne fire missions, two active artillery fire missions, and two preplan artillery fire missions. All mission essential data is retained in non-volatile storage and stores for recall up to 12 previously received messages.

Scout Info

The ATHS gives the Scout Aircrew the capability to request and execute airborne fire missions specifying either Hellfire or standard ordnance and it enhances the coordination required to execute remote Hellfire mission and displays firing/launch constraints (separation angle, time-of-flight, range, firing angle), based upon target position, attack position, and Scout's present position.

Efficiency

With this system, the Team Leader is able to receive and hand over fire requests to the best weapons systems for execution of the mission. The system provides a command team/unit movement, presetting capability for preplanned battle positions and Forward Arming and Refueling Point (FARP) locations, etc., for later review or transmission. The system also maintains current position, armament status, and aircraft status of all team/unit members.

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Station — cont. from p. 47

pressure altitude, and the cruise altitude, and then makes all the necessary calculations. The pilot is warned whenever a limitation is exceeded, and is even told how much weight needs to be removed to stay within limits. The program will also calculate the effects of the heater, anti-ice, Hover Infrared Suppression Systems, or other features that affect aircraft performance.

Cruise Calculation

The cruise calculations provide indicated airspeed, true airspeed, fuel flow, and torque required; the pilot can enter any one of the parameters and the program computes the other three. The increased torque required in forward flight from the aerodynamic drag of sling loads is also computed based on the type of sling load selected. As with the weight and balance, the printed copy is in the same familiar PPC format.

The last phase of flight planning is the navigation computations for the flight plan. But how can a computer read map coordinates, measure distances, figure headings, and account for the effects of wind? It can with a piece of equipment called a Map Digitizer.

Map Digitizer

Despite the formidable name, the Map Digitizer is really quite simple. It has a 2 ft. by 2 ft. surface with a hinged Plexiglas top that covers a paper map and is interfaced with a computer. The map must be lined up with vertical index lines and the coordinates of a single initialization point entered along with the map scale so the computer knows where it is.

By touching a light pen to any point on the map, the computer will give the coordinates of that point. By entering a series of points, the magnetic variation, intended airspeed, and the predicted winds, the program can provide magnetic heading corrected for winds, distance, ground speed, and time required for each leg of the flight, all in a matter of seconds.

The output from the program can be presented in flight log or stick map format, whatever the pilot wants.

The Map Digitizer is not an experimental device. It is already in use today by the Marines and is in their supply system. The program will also accept map coordinates entered manually if a digitizer is not available.

(Station — cont. on p. 62)

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Lightweight ECM Systems from ITT Avionics provide heavyweight protection for helicopters and aircraft.

Now you see it, now you don't—thanks to ITT Avionics' family of ALQ-136 Electronic Countermeasure Systems. They're automatic, power managed, microprocessor controlled and highly reliable. They're working effectively to enhance aircraft survivability in anti-tank and other tactical missions.

One version is in high volume production with systems now operational in front line Army helicopters. Another will soon be entering production for protection of small fixed wing aircraft.

The ALQ-136 family of ECM is another example of ITT's leadership in Electronic Countermeasures protection. ALQ-136 bears the unique stamp of ITT, where technical excellence, sophisticated production technology and a commitment to superior product support go hand in hand to maintain a strong defense for America.

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DEFENSE

MOHAWK – cont. from p. 39

for all aircraft radios is continuously displayed on the five line Remote Frequency Display. The RFD shows the current frequency tuned on each radio, communications security status and the radio transmitter selected by each crew member.

Updated communications subsystems in the MOHAWK Block Improvement Program include Jam resistant ARC-201 SINCGARS VHF-FM and ARC-164 HAVEQUICK UHF-AM radios, ARC-186 VHF-AM/FM, and ARC-199 HF radios with associated Communications Security Equipment.

Navigation systems included in the upgrade are a CN-1656()/ASN Ring Laser Gyro Inertial Navigation Unit, ASN-149 Global Positioning System (GPS), USN-2 Standard Attitude Heading Reference System (SAHRS), ARN-123 VOR/ILS, and ARN-118 TACAN. Also integrated into the CDS is the APX-100 Identification Friend or Foe (IFF) transponder.

AHIP CDS Mods

Hardware and software modifications to the AHIP CDS were necessary for operation in the MOHAWK. The MFD was repackaged in order to fit in the allocated space behind the cockpit instrument panel. MCPU hardware was modified by the addition of four Memory Modules (two per MCPU) to accommodate the addition of the MOHAWK Operational Flight Program (OFP). These modules are external memory cartridges that contain OFPs tailored to the MOHAWK.

Although the hardware modifications were limited, software redesign for the MOHAWK was extensive. Software modifications were necessary to provide the MOHAWK an IFR (Instrument Flight Rules) capability beyond AHIP's VFR (Visual Flight Rules) requirement. This was accomplished by changing the presentation of the Vertical Situation Display (VSD) for use by a fixed-wing aircraft, increasing the amount of data displayed on the VSD to support instrument flight operations, and integrating inertial navigation, GPS and other navigation/landing systems not found on the AHIP.

IFCS

Another major Block Improvement Program initiative was to provide the MOHAWK with an Integrated Flight Control System (IFCS). In doing so, the Mohawk's current flight director and auto pilot are replaced with new systems that were integrated into the CDS. Flight director commands are shown on the Multifunction Display. Two mode control panels, an Integrated Flight Control Panel (IFCP) and an Automatic Flight Control Panel (AFCP), were added to provide for pilot mode selection and presentation of status data.

The IFCS provides the functions of Flight Director (FD), Automatic Flight Control (AFC), Yaw Damper (YD), and Pilot Electric Trim (PET) for the MOHAWK. The FD function provides the appropriate pitch and roll steering commands to the pilot via the MFD. The AFC function provides the capabilities of a three-axis automatic aircraft stabilizationsystem with automatic elevator trim.

In addition, the AFC is capable of being coupled to the FD, where the aircraft automatically responds to pitch and roll steering commands. The YD function alleviates inherent aircraft yaw oscillations and provides a turn coordination function. The PET function allows the pilot to adjust aircraft pitch trim. The processing of all IFCS functions is performed by the MPCU.

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Monitor – cont. from p. 42

just as they are shown in the flight manual.

Beginning in FY88, AVRADA will initiate an effort to automate control of the STAR subsystems by applying expert system concepts to the interpretation of aircraft subsystem status. The Expert Subsystem Status Monitor (ESSM) will provide the pilot with advisories to aid in critical decision making during emergency conditions and alert both the aircrew and maintenance crew of adverse trends or impending failure.

Cockpit designs as we know them today require that the crew integrate information from many sources to determine aircraft performance. There is little time to do this function while flying demanding missions. The ESSM will be capable of monitoring the condition of key aircraft subsystems (such as: engine, rotor, transmission, electrical, hydraulics, and fuel) for the purpose of:

- predicting imminent failure;
- predicting impending maintenance actions, and
- providing crew advisories based on current aircraft conditions.

Studies have shown that less than 10 percent of the pilot's time can be devoted to monitoring the

(Monitor — cont. on p. 63)

CINC — cont. from p. 51

and the RF and electrical control cable disconnects provide for rapid installation and removal of the console. NVG lights, a writing surface and a microphone keying foot switch are provided on the console.

The two AN/ARC-186 aircraft communications radios, which originally provided only one VHF-FM and one VHF-AM function were both expanded to provide dual AM/FM capability. A new AM antenna (AS-3204/ARC) was installed on the top front of the tail boom to provide the additional VHF-AM capability. The third ARC-186 radio (FM only) in the Commander's Console, uses the troop commanders antenna on the trailing edge of the tail pylon, and a KY-58 was added for this radio.

An AN/ARC-199 was added in the transition area, on a shelf above the UHF antenna with the control head located on the commander's console. Voice security for this system is accomplished by means of a console mounted KY-65. The antenna is a towel bar antenna located on the left side of the tail boom.

SATCOM

Satellite communication is provided by means of a modified version of the AN/URC-102. The heart of this system is the AN/ARC-164 V-12 R/T coupled to the Chelton antenna mounted on the right hand auxiliary power unit compartment door and secured by means of the KY-58. This system was selected as an interim system because existing assets were available and will provide adequate communications until a 5KHz voice secure system is available. The antenna look angle is selectable for either high or low angle depending on global aircraft location relative to the satellite being used.

Deliveries

Prototype installation started in January 1987 and testing was completed on this aircraft in June 1987. The first production aircraft was inducted into the production program was flown to CCAD in March 1987. The first three production aircraft were completed in early August 1987 and the last four later that month.

Under the maintenance concept developed, spare communications and navigation equipment were delivered along with the aircraft to the using units. A technical manual was written to include operation/maintenance instructions and parts list, and was furnished with the aircraft as well. LTC Pohlmann provided for CINCSO personnel at CCAD and for personnel assistance on site at CINCEUR, CINCUSAREUR and CDR EUSA. The success of the entire program relied on the specialized skills of the avionics engineers who were able to translate military needs into flyable systems at minimum cost and schedule. IIIII

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Voice — cont. from p. 35

IV for further processing.

In the other direction, the SANDAC IV passed voice feedback word codes to the VTT which translated the data into specific codes for the phonetic synthesizer on the ITT board. The SANDAC IV processed the input node and word numbers, determined what functions were to be performed and passed the appropriate control messages to the CMS-80 via the data bus.

AHRS

In addition, we provided a daytime heads-up one line feedback panel and a night time display feedback mounted on the pilot's night vision goggles. A noise cancelling microphone was used to assist in reducing background helicopter noise. Ancillary to the voice portion of this test, the SANDAC IV used a doppler, Attitude Heading Reference System (AHRS), radar altimeter and an air data system to perform a navigation and data logging function. This system provided the Aviation Center with the capability to evaluate voice input relative to manual entry, and voice output relative to visual display capabilities.

As part of the system support package, ITT provided a voice training capability consisting of a Compaq portable computer, headset/microphone, and a VTT system. Training was performed in a quiet room with the subject pilot repeating words, or phrases, that were displayed on the CRT terminal. After the subject completed the voice template training, a micro-

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Voice – cont. from p. 59

floppy disk was made of the various patterns required by the airborne hardware.

Three Phases

The VIA CEP test was conducted at Ft. Rucker, AL during the summer months of 1987. The test consisted of three phases:

- system familiarization and training,
- impact of voice on aircraft control, and
- impact of voice on mission scenarios.

The first phase consisted of voice imprinting/training for the recognizer and system familiarization of both manual and voice capabilities under flight conditions. The intent was to have each subject reach the knee on the system learning curve.

The second phase assessed the pilot's ability to control airspeed, altitude, and heading while transversing a slalom course under a heavy communication workload in both day and night conditions.

The third phase assessed the pilot's ability to manage the communication task while flying and visually searching for tactically significant actions external to the aircraft.

Nine player pilots and three instructor/safety pilots participated in the test. The instructor pilots were thoroughly trained in the system operation but were not part of the test. They flew in the copilot's seat as data collectors, test conduct managers, and if needed, safety pilots. The player participants were a mixture of officers and warrant officers from an active unit colocated at Ft. Rucker. Each had many hours of experience in observation helicopter flight and tactics.

Two Issues

The CEP was structured to answer two operational issues: Can the current voice technology be operationally effective in the helicopter environment, and what benefits to mission effectiveness can be expected from the application of the interactive voice technology?

Of interest in the first issue was how tolerant the system was to aircraft noise (rotor system, cockpit audio from other systems) and speaker variations (different speakers, individual voice changes due to stress or physical conditions).

To address the first issue, the number of errors using manual input (wrong keys) was compared to the number of errors using voice input (missed recognition, invalid recognition, wrong commands). To address the second issue an attempt was made to determine the time to complete functions (time to set up communications and number of communications per time period) and the change in the quality of aircraft control under various system input and output conditions.

Trends

Thus far all the data has not been analyzed; however, enough has been reduced to show the following trends. The pilot's ability to control the aircraft through the slalom course, while handling the radio communications task, was increased. Pilots repeatedly ran the course in less time and controlled the aircraft more accurately when voice was used than when they were constrained to using the baseline control display unit.

During the mission scenario phase, the pilot's reaction time to events in the environment was greatly enhanced when using voice. In some cases, tactically significant events were missed entirely when only the CMS-80 was used because the pilot's interest was in the cockpit attending to the communications task. The Aviation Test Board believes that voice input will enhance pilot effectiveness because it allows the pilot to concentrate his attention outside the aircraft.

Feedback

Regarding visual versus voice feedback, it was found that visual feedback, in the form of the heads-up display, was more useful than the voice. This finding is attributed to the pilot being able to verify the output with a quick glance; whereas, the voice output was a one shot feedback and took longer to obtain the full string.

It was also noted that heads-down visual feedback alone caused more workload since the pilot had to focus his attention inside the cockpit. Further, it was noted that feedback of either kind was important to the pilot until he gained confidence in the system, or if an error was made and the pilot had to determine what had occurred. Once confidence was achieved, most pilots entered commands, assumed the system executed the commands and continued their tasks. As an example, the pilot would request a particular radio be turned to a specific call sign, and almost immediately start communication with that individual.

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MOHAWK – cont. from p. 58

AVRADA's Block Improvement efforts also included the development of a Mil-STD-1553B compatible ASE RTU. This Processor permits full integration of the MOHAWK ASE and Mission Equipment with the other aircraft avionics control and display systems.

The ASE and Mission Equipment are interfaced to the aircraft MIL-STD-1553B data bus through the ASE-RTU. This interface eliminates the requirement for individual ASE control heads and a separate display, and permits their functions to be controlled through the CDS. The ASE RTU also performs the task of controlling data between the Side Looking Airborne Radar subsystem and the CDS.

Man/Machine Interface

The CDS, in turn, provides the man/machine interface between the ASE subsystems and the crew. The ASE processor utilizes a MIL-STD-1750 architecture that will allow for memory and growth expansion to handle embedded training, automated threat processing and reconfigurability to accommodate new requirements.

Reprogramability is paramount to the entire MOHAWK CDS system in that software configuration and support is being established within the AVSCOM Life Cycle Software Engineering Office (Avionics Division) in parallel with ongoing software development at Honeywell.

This major commitment to Government Control of Avionics Software from the ground up will enable the Army to adapt the CDS as needed to meet new requirements.

Next Step

The MOHAWK CDS program is now moving from the Systems Integration laboratory at Honeywell into a prototype aircraft at Grumman Aerospace Corporation, Stuart, FL.

One year of extensive ground and airborne testing is planned using the prototype aircraft. Block Improvement modifications to production aircraft will commence in FY89, with the remainder of the fleet scheduled for completion by FY95.

AVRADA's avionics commitment to the MOHAWK Block Improvement Program is helping the SEMA-PM achieve his goal, ensuring that the MOHAWK remains a supportable, reliable, mission effective asset into the next century.IIIII

Station – cont. from p. 56

The Flight Planning Station will provide an automated premission planning capability to Army pilots at minimal cost, and can be produced for any aircraft in the fleet. At last, a high tech development that the Huey drivers can use!

But the system is also flexible for future growth and can be modified to suit the more technical aircraft in the fleet. For the AH-64 and OH-58D, the output from the program could be down loaded into a bulk data loader which is carried out to the aircraft.

The information can then be presented on the CRT displays in the cockpit. The program would also be expanded to include frequencies, call signs, authentication codes for ATHS, Hellfire, and other similar types of information.

AVRADA is constantly trying to modify today's technological developments into usable equipment to help Aviation do its job better both today and in the future. Through the Flight Planning Station we hope to harness the capabilities of computers and give pilots a useful tool to take some of the load off their already overburdened shoulders. IIIII

Pilot uses a map digitizer to input Flight Plan Information to the program.

Monitor – cont. from p. 58

status of the aircraft subsystems. As missions become more and more demanding, and the aircrew is reduced in size, more time will be required for high priority flight control and mission tasks leaving less time available for determining system operating status. The less time that is devoted to monitoring aircraft systems, the more likely it becomes that adverse trends may not be noticed until an emergency condition exists and a warning is issued. Early warning of an adverse trend or impending failure is important to provide time for the pilot to react to the situation so that the aircraft can be returned to a safe condition.

Emergency

Once an emergency occurs, cognitive workload is high, particularly if multiple failures have occurred. The crew must first assess the criticality of the failure to determine if it warrants diverting attention from the intended mission. If action has to be taken, the crew must recall system characteristics, evaluate failure modes and alternatives, and decide on the appropriate action to take.

Rapid, accurate analysis of the situation is critical both to flight safety and to mission accomplishment. Reaction times and actions taken may vary from pilot to pilot based on previous experience in handling in-flight emergencies, flight hours accrued in the aircraft, and level of training. A more experienced pilot will probably make the correct decision faster than a relatively inexperienced pilot.

Successful development of the ESSM will greatly assist both inexperienced and senior pilots with making the correct decision in less time.

Data Base

As is the case in the development of most expert systems, the first phase of the program will be to gather information from human experts to build a data base of knowledge. This data base will then be used to develop heuristics, or general rules, that are followed to reach a conclusion regarding the state of the aircraft. In the case of the ESSM, information will be required regarding technical characteristics of major components from their suppliers, and information regarding appropriate actions taken by experienced UH-60A pilots.

The ESSM will then be prototyped in AVRADA's Tactical Avionics System Integration Facility. Following laboratory prototyping, the system will be integrated and flight tested in the STAR aircraft by modifying the basic ADAS architecture shown in the diagram. (For a more detailed description of the ADAS architecture see the July-August 1984 issue of ARMY AVIATION MAGAZINE). The basic ADAS architecture will be modified by adding a VME based ESSM processor and Programmable Symbol Generator (PSG) to drive a full color display.

Primary Functions

The two primary functions of the ESSM processor will be to provide an interface to the ADAS MIL-STD-1553 data bus and to provide the required processing for the ESSM system. The MIL-STD-1553 interface will monitor the digital messages on the data bus to determine the operational status of the aircraft subsystem of interest. The heuristics developed in the first phase will then be applied to reach a decision regarding system status and to determine the appropriate message to be displayed. A message will be sent to the PSG where the appropriate symbology will be selected and the video drive generated.

A fifth color display will be added to the current ADAS architecture which currently consists of four monochromatic displays. Initially, the ESSM will function as a parallel system with the basic ADAS system. As test data is compiled, and pilots become more confident in its operation, the ESSM will be absorbed into the STAR architecture.

Benefits

The benefits of developing the ESSM system include: increased flight safety, improved mission effectiveness, reduced pilot workload, and improved aircraft availability. By providing early warning of impending failure or an adverse trend, the ESSM will provide the crew with additional time to react to a situation thereby increasing the likelihood that proper actions are taken to safely complete or terminate the mission.

In addition, since the actions recommended by the ESSM are based on the knowledge of senior Army aviators, all aircrews, regardless of level of experience, will potentially react like senior aviators.

Mission effectiveness will be improved by reducing the time spent monitoring the aircraft systems. The crew will be able to devote more time to critical mission tasks such as flight control, targeting, etc.

(Monitor — cont. on p. 64)

Voice – cont. from p. 60

Having shown that voice control can be operationally effective, we plan to expand the program in phases until eventually all the cockpit command and control functions are assisted by voice. The next phase, which will run approximately one year, will consist of adding voice control to the Airborne Target Handover System (ATHS). This is a mission data transfer system which is very user interactive, requiring a large amount of keyboard entry.

Two Channels

For this integration, we will retain the pilot's capability to control communications by voice while adding the capability for the other crewmember to control the ATHS by voice; thus, we will use two independent recognizer/synthesizer channels to allow for simultaneous operation by both the pilot and copilot.

Following this integration, a third phase will add voice control of a digital map display system and result in a demonstration of full-up voice cockpit operating in a battle captain role. The Battle Captain Demonstration is expected to be conducted in 1990. IIIII

Monitor – cont. from p. 63

By providing relevant expert prompts, the ESSM will reduce pilot workload during emergency or out-of-tolerance conditions. The pilot will no longer have to mentally recall system operation, system parameters, emergency procedures, etc., before deciding what action to take.

Aircraft maintainability and availability will be improved by the recording of subsystem parameters for maintenance analysis and failure prediction. Early warning of adverse trends requiring maintenance actions will insure that required parts will be available and that maintenance actions are taken prior to an actual failure.

Following development and flight testing of the ESSM, AVRADA will upgrade the basic ADAS system to absorb the ESSM function. The next step in exploiting expert system technology will be the development of an expert system which automatically reconfigures the aircraft under crew surveillance during emergency situations. IIIII

ATHS – cont. from p. 56

The system gives the Attack Aircrew the capability to receive fire requests originating from other ATHS-equipped or DMD-equipped scouts/observers.

It enables the aircrew to execute the fire missions involving standard Hellfire ordnance, display firing/launch constraints (separation angle, time-of-flight, range, firing angle), based upon target position, Scout position and present position and without operator intervention, select launch mode and set Ground Laser Location Designator (GLLD) code of next Hellfire launch based upon received Scout fire request.

Production

Since award of the ATHS production contract in September 1984, 447 units have been placed on order with 150 units delivered to date. The last procurement option under the present contract is scheduled for award in January 1988.

The ATHS is presently being utilized on the OH-58D, the AH-64A, the CH-47, the UH-60, the F-16 for operational tests, and various ground systems.

Voice CEP

In addition, the ATHS is being utilized as a key component in several AVRADA Tech base efforts. A first phase voice Concept Evaluation Program (CEP) was performed at Ft. Rucker during the summer of 1987. During these tests it was shown that voice interactive technology can be a valuable asset in controlling radios.

Because of the success of the first CEP, a second CEP is scheduled for 1988 in which the control of the ATHS data entry will be accomplished by voice. The goal of the second CEP is to reduce the amount of manual data entry and increase ATHS operator efficiency.

A third follow-on CEP will be performed utilizing the ATHS to transmit and receive tactical information for overlay on a digital map. The goal of this effort is to improve the efficiency of tactical information transfer for the aviation Battle Captain.

The Future

The existing ATHS will be upgraded to incorporate those recommended improvements resulting from recent testing. These improvements incorporate both software and minor hardware changes. Further enhanced capabilities such as simultaneous operation over four radios, decreased "on-the-air" time and 16 kbps capabilities, are being considered as improvements for an enhanced unit. These modifications will require extensive software and hardware changes to the present system configuration. IIIII

SINCGARS - cont. from p. 55

nas; Communications Antennas; Homing Indicator (ID-1351A or equivalent); COMSEC VINSON (KY-58); COMSEC Applique Z-AHQ; COMSEC Remote Control 2-AHP; A/C Intercom (C-6533, C-10414, C-1611, C-11746); Airborne Target Handoff System (ATHS), and Digital Message Device (AN/PSG-2), TACFIRE.

In preparation of the 1988 fielding start of the AN/ARC-201, aircraft prototyping and A-Kit development is presently in progress at AVRADA, Ft. Monmouth, NJ with AEL and with aircraft prime contractors. Simultaneous fielding of ground and A/C radios will be conducted by geographic area and should be completed in the early 1990's. IIIII

Ditching – cont. from p. 14

egress the cockpit underwater after the bubbles cleared. This trainer had been used for pilots since WWII.

This significantly increased survival rate associated with the Dilbert Dunker provoked research into a second type of trainer, a "helo dunker". It was learned that the British had been doing "helo dunker" training since 1959.

The British Navy learned that aviation crews that had undergone "dunker" training had an "almost nil fatality rate due to drowning" after helicopter ditching. The Royal Navy then required initial qualification in the helo dunker as well as requalification every two years for ALL aviation personnel. In addition, all British civilian personnel who work on off shore oil rigs now attend a survival center in Aberdeen, Scotland to experience under water helicopter escape training.

Further investigation lead to the U.S. Navy procurement in the mid 1970's, of the (American made of course) 9D5 Multiplace Universal Underwater Egress Trainer.

Today all U.S. Navy aviators go through 9D5 under water egress training while in flight school. It takes one day at NAS Pensacola. First the students are given a one hour block of instruction on the simple principles to be remembered while egressing a submerged inverted helicopter.

Next flight suits and boots are issued to each student. The students are given a short swim test in the above issued uniform in an indoor swimming pool. Then flight helmets are issued, and the students are introduced to the 9D5.

Its shape is similar to a 55 gallon oil drum but much larger — maybe 20 times larger. Take that huge oil drum, turn it on its side, cut six or seven windows in it, place two seats up front in a simulated cockpit and six seats in the back. The two front seats have seat belts with shoulder harnesses while the rear seats have lap belts only. Suspend the drum from a contraption that lowers it and its strapped-in occupants into a pool with a splash.

Once in the pool, water rushes into the drum and then the whole gizmo turns upside down. (Just the same way Army helos drown people). The occupants count to about 10, grab a reference point hand hold and unstrap. Finally they pull (not swim) themselves out of the dunker and swim to the surface. This is done four times from four different seat positions in the dunker. The last two times are done with blacked out goggles! It sounds a little hairy but there is a diver present the whole time to assist the occupants as well as to grade their efforts after each egress.

Recently, U.S. Navy Rear Admiral Joseph Donnell was the flag officer aboard an SH-2F (helicopter) the morning it went down. He attributes his escape that day to the "valuable" egress training he attended to qualify himself as a passenger/crew member in tactical aircraft.

Back to history: About the time the Navy got their first helo dunker on line, the three armed services had a meeting. It was 1976, at Ft. Rucker, during the 15th Joint Services Safety Conference ...

Agenda Item 15.14: Universal Helicopter Underwater Escape Trainer (Device 9D5).

Submitted By: United States Navy.

Discussion: The meeting agreed that there was a need for such realistic training as this device provided for "pipeline pilots" and for continuation training.

Conclusion: Each Service

(Ditching — cont. on p. 66)

T&E – cont. from p. 20

The LHX TEMP is a living document, addressing critical issues and acquisition strategy, as the program matures. The TEMP is updated at least annually (more often if required), to reflect changes due to any program modifications affecting scope or schedule and any completed test effort. The LHX TEMP contains the complete test program, including both development and operational T & E requirements.

Milestones

The chart below, extracted from the LHX TEMP, indicates some of the major milestones for the current program acquisition strategy. This strategy depicts a systematic progression or the necessary test accomplishments leading up to a successful Initial Operational Capability.

It starts with past and current risk reduction efforts accomplished under the Advanced Rotorcraft Technology Integration (ARTI). Necessary contractor and Government development testing culminate in a Government Competitive Test (GCT) at the end of the Demonstration/Validation phase of the program. Testing is an important ingredient of the LHX program.

During the Full Scale Development Phase, additional contractor and Government development tests, Early User Test and Evaluation (EUTE), and Initial Operational Test and Evaluation (IOTE) requirements will be accomplished.

Beyond a doubt, the LHX represents one of the most significant test efforts ever undertaken by Army Aviation.

The scope of these tests, designed to answer specific technical or operations issues, will be examined in greater detail in my next LHX report for ARMY AVIATION Magazine.

Ditching – cont. from p. 65

(Army and Air Force) should conduct an in-depth review of their respective training requirements for this device. Direct contact of training commands will be necessary to accomplish interservice training.

Recommendation: The Army and Air Force will consider sending to the Naval training facility those pilots who will require this training because of their operational commitments.

So far, I have been unable to locate any information regarding an "in-depth review of their respective training requirements". It has been 10 years now and everyone is still shrugging his shoulders at Ft. Rucker about an Army 9D5. Further, the Army still doesn't send their initial entry Aviators, Crew Chiefs, or Observers routinely to dunker training. Only Army Flight Surgeon, and flight medic students routinely get to experience the 9D5 in Pensacola.

How many lakes, rivers, inlets, etc. Have you flown over in your flying career — without dunker training? Do you fly a BLACK HAWK, APACHE, or CHINOOK? Are you ready to fly over an open ocean to deploy in the next war without under water egress training?

I urge the Army to MOVE on the following:

- Make 9D5 training at NAS Pensacola, FL mandatory for all initial entry aviation personnel immediately.
- Purchase a 9D5 or similar trainer for Ft. Rucker.
- Consider placing 9D5 trainers at its various national flight simulator locations.
- Make 9D5 retraining mandatory every two years for all aviation personnel.

If you ditch, your chance of survival will be around 66 percent unless you get your safety officer to "transition" you into the 9D5.

We are all safety officers. Let's prevent the next drowning now. IIIII

Advertiser's Index

Redcatcher - from p. 24

(need) before we can reasonably expect the Army leadership to ally themselves with us as we fight for those limited training dollars. Dedicated range facilities are needed if we truly want to quantify the combat readiness of our attack helicopter units and get a larger share of the budget dollars in this budgetary belt tightening period.

Gunnery Program

The Redcatchers have developed a gunnery program that follows the guidelines of FM1-140 but is more in line with the standardized objective scoring procedures followed by our fellow cavalryman on the tank and cavalry fighting vehicle ranges.

There is no doubt in the mind of the individual tanker, troop commander, or squadron commander where they stack up after the AAR.

Scoring

The Squadron aerial gunnery program, developed by CW3(P) Larry Case, is also based on a task, condition, and standard with a time component for crew and team engagements followed by a comprehensive AAR. We have used Range 118 at Grafenwoehr twice in the last six months. It is a fully computerized range that leaves little subjectivity except for the rocket engagements.

All crew and team engagements will be video recorded at our December gunnery to provide improved immediate feedback during the AAR. This is the beginning of a quantification process for training ammunition allocation plus-ups versus cutbacks and for increasing range density to ensure combat ready crews rather than the "fit it in when they have time for you" syndrome that seems to prevail when talking aerial gunnery today.

Quicklook

Training to fight and conducting border surveillance with the best possible troopers and equipment is not possible without the support of the senior leadership in our government.

The Redcatchers provide a first hand look at what it's like to live and work in "Cav Country" by supporting the SECARMY's Quicklook Program.

Two to three weekends a month are spent flying distinguished visitors to the border camps and to key vantage points along the border "Trace" supporting the VII Corps and Regimental program.

"Never a Complaint"

None of the training challenges could be met without the support of the NCOs and troopers of the 2d ACR who selflessly make it happen every day with "Never a Complaint."

The cooks, mechanics, POL handlers and ammo humpers are the unsung heroes of the Squadron. They earn their spurs. The Redcatcher Squadron AAAA membership has more than doubled in the past six months primarily because of our NCOs and troopers. It just doesn't get any better than this! IIIII

AVRADA — cont. from p. 32

will enhance performance, improve threat survivability, provide system flexibility and allow for future growth.

Improvements and upgrades are being made to the present day AN/PRC-90 Survival radios. The addition of the AN/PRC-112(V) Radio/Transponder to an aircrew member's survival vest will greatly improve a survivor's chance of rescue.

Several programs to upgrade the avionics systems on the UH-1H, UH-60A and OH-58A/C aircraft are being pursued to meet communication, navigation and weapons systems requirements of the 1990's and beyond.

Other Progress

We are supporting the AH-64 PMO in an effort to integrate the ATHS into the AH-64A. The existing ATHS will be upgraded to incorporate those recommended improvements resulting from recent testing.

We are also in the process of aircraft prototyping and A-Kit development for preparation of the 1988 fielding start of an AN/ARC-201 SINCGARS.

Another key accomplishment was a quick reaction program to install an expanded communication and navigation package in UH-60s.

AVRADA continues to be a part of the dramatic electronics technology explosion through the prudent and timely application of high technology to provide Army aviation the capability to prevail against the threats of a numerically superior enemy. IIIII

70th – cont. from p. 16

AVIM support for V and VII Corps, puts B Company in the unique position of providing some type of AVIM support to all army aviation assets in USAREUR with over 23,000 items completed to include a record setting 1,400 aircraft.

Realizing the importance of keeping critical aviation assets in theater, B Company set out and completed a total upgrade of the only two existing Modular Engine Test Stands (METS) in USAREUR. This project included the building of new shelters, relocating the stands and having two teams from Corpus Christi Army Depot (CCAD) assist B Company in upgrading, calibrating and repairing these critical assets. The net result is an improved engine analysis system capable of testing all types of engines in theater.

Supply Support

Repairing customer aircraft is only one part of the logistics support formula. The other, equally critical factor, is supply support. Here again, B Company's Supply Support Activity (SSA) has set the pace within USAREUR. B Company's SSA has always met or exceeded Department of the Army standards established for an SSA.

The figures speak for themselves: 99 percent inventory accuracy for over 5,000 lines ASL, 4 percent ASL zero balance rate, 88 percent demand accommodation and demand satisfaction rates.

CH-47 Support

Being the only support for CH-47's in theater, B company requested and received a maintenance contract to further ensure the proper support of these theater-critical assets. B Company has monitored and directed this contract to realize an average full phase turn-around time of only 35 days. This represents an average reduction of 50 percent phase time turn-around.

Last year the contract completed over 70,536 manhours of sheet metal repairs alone for the CH-47 fleet. The bottom line here is that USAREUR has a safer aircraft available more often when called upon to complete its mission.

B Company also maintains the vital links between CONUS and USAREUR and various aircraft modernization programs by operating the theater's only aircraft Processing Detachment located at Ramstein Air Base. This closed-loop facility processed over 100 aircraft into and out of theater last year via U.S. Air Force transport aircraft. Additionally B Company plans, coordinates and operates sea port of entries and exits and aircraft marshalling areas for REFORGER exercises.

New Deliveries

As aircraft modernization plans begin to be realized throughout USAREUR, B Company is once again at the heart of the operation — during test fielding of AH-64 APACHEs and CH-47D CHINOOKs to theater. The experimental program, coordinated by the Battalion through B Company, consisted of floating airframes down the Rhine River by barge, off loading, and providing assembly and operational services which resulted in the four year plan that will process all AH-64's and CH-47D's through B Company and Coleman Army Airfield. The importance of this mission need not be stated.

Soldiers and Civilians

The Battalion is extremely pleased to work closely with the German people; 216 Local National employees make up a great deal of the expertise within our maintenance hangars. Many of these LN's have been in their field for 20 years or more. The benefits which a young soldier may acquire from working closely with such individuals in a given field are obvious.

Summary

The 70th Aviation Battalion (AVIM) is quite a unique organization with a complex three-fold aviation mission. Considering its Headquarters Detachment, 56th Aviation Company, B Company, 207th Aviation Company and AMF(L) Flight Detachment and their respective missions, elements of the Battalion are literally spread all over Europe. Since 1984 with over 50,000 hours accident free flying flown, no other aviation support unit can match the challenges and mission of the 70th Aviation Battalion (AVIM) of maintaining, flying and supporting aviation resources — while doing it safely. IIIII

BRIEFINGS

Major General Teddy G. Allen (below, right) tells of planning involved in his role in the emergency evacuation of the former president of the Republic of the Phillipines out of that country. Listening to what duties they may receive in their future military careers are the Distinguished Graduates of flight classes who completed the Army flight training program at Ft. Rucker, AL, October 8. They are, from the left, **2nd Lieutenant Russell E. Stinger** and Warrant Officer, W-1, Clinton T. Zimmer. Allen, the speaker at the graduation, is Commanding General of the 101st Airborne Division (Air Assault), Ft. Campbell, KY.

A new exhibit entitled **"Women in Helicopter Aviation"** opened to the public on November 11, 1987, at the **Smithsonian Institution's National Air and Space Museum**. Installed in the Museum's Vertical Flight Gallery, the exhibit honors the pioneering achievements and the present activities of women in rotary-wing aviation.

The **U.S. Army School of Aviation Medicine (USASAM)** will be hosting the Ninth Annual Operational Aeromedical Problems Course at Ft. Rucker, AL from March 21, 1988 through March 25, 1988. For information, contact the Dean, U.S. Army School of Aviation Medicine, Ft. Rucker, AL 36362-5377 or call (205) 255-7408/7460.

The fifth U.S. Army AH-64A APACHE attack helicopter unit to be fielded is nearing completion of its operational training. The sixth unit, the first APACHE battalion from a post other than Ft. Hood, starts training in November. The Army's single-station unit training program is "working as well or better than we envisioned," said **Lt. General Crosbie Saint**, commander III Corps and Ft. Hood. All AH-64 battalions are being equipped and trained at the Texas post.

AWARDS AND HONORS

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

Warrant Officer Senior Course Class 87-6 (10/2/87): CW3 Raymond H. Swartz, Distinguished Grad; CW3 Martin J. Hussey, CW3 Steven W. Knight, CW3 Leo C. Gibson, CW3 Thomas N. Lloyd, Honor Grads.

Officer Rotary Wing Aviator Course Class 87-14 (10/8/87): 2LT Russell E. Stinger, Distinguished Grad; 2LT Leon N. Thurgood, 2LT John T. Vogel, CPT Mark L. Dunlap, 2LT Rodney C. Neudecker, III, Honor Grads.

Warrant Officer Rotary Wing Aviato Course Class 87-13 (10/8/87): WO Clinton T. Zimmer, Distinguished Grad; WO Timothy H. Clapp, Honor Grad, Leadership Award & Class Leader.

Aviation Warrant Officer Advanced Course Class 87-11 (10/16/87): CW2 Martin C. Burnett, Distinguished Grad; CW2 Thomas J. Dittman, CW2 Gary S. Bennett, Honor Grads; CW2 Charles J. Leyden, Honor Grad & Class Leader.

Officer Rotary Wing Aviator Course Class 87-16 (10/23/87): CPT Yvette J. Augus, Distinguished Grad; 1LT Alexander Roy, III, 1LT Michael P. Cyr, 2LT Jud Hoff, Honor Grads.

Warrant Officer Rotary Wing Aviator Course Class 87-15 (10/23/87): WO Timothy W. Gross, Distinguished Grad; WO Jack C. Jones, Jr, WO Michael B. Sapp, WO Thomas R. O'Neal, Jr., WO Richard Spethmann, Honor Grads.

Museum (continued from page 10)

symposium and conference.

1987 has been significant for both our nation and our Army. As we all know, this is the bicentennial year of the signing of the Constitution of the United States, which was signed by the framers of the Constitution on September 17, 1787 at Independence Hall, Philadelphia, PA.

Of the 55 delegates to the Constitutional Convention, 23 had served with distinction in either the Continental Army or on local militias during the American Revolution. We have commemorated the bicentennial at the Army Aviation Center with displays, articles and other tributes.

On September 17, I had the distinct honor of presiding over the dedication of Constitution Park, as a living testimony to that great document. This event gave us a chance to reflect on our Constitution and the fact that we in the military are sworn to protect it and all for which it stands. Sometimes, we who have the privilege of serving in the military in the world's greatest nation do not take enough time to remember all of our freedoms, our government, and above all, the people whose lives and individual liberty we are dedicated to protect — no matter what the price. The year of the Constitution has given us an opportunity to do this. IIIII

Safety (continued from page 12)

that it has been expanded to include ground safety as well. This symposium brings together all commanders within Forces Command in the ranks of colonel and above for the express purpose of reviewing the latest safety information and discussing its implementation in the field.

Another well-received initiative, originated by our subordinate element, Sixth Army, is the Air Crew Communication Program. The aim here is to help eliminate human error as a leading cause of aviation accidents by improving cockpit communication and coordination. This program has been expanded to all of Forces Command.

The great emphasis placed on aviation safety by Forces Command is also demonstrated by the ready response by our Aviation Safety Office to requests from the field. Personal visits are made to our aviation units anywhere they may be, from the MFO in the Sinai to REFORGER in Europe, for the purpose of making a firsthand examination of aviation safety programs and problems. These trips are in addition to the annual inspection of each aviation unit by the Aviation Resource Management Team of Forces Command.

The Key

These are safety management programs; effective as they may be, the key to successful accident prevention is you — the aviator, crew member, ground support personnel, passenger, or any observer. You all have authority when it comes to safety. Remember the basic rule of thumb for the rifle range — anyone can call a "cease fire." So too must everyone call attention to safety violations. We are all responsible for safety.

Accident-free Operations

Our goal is accident-free aviation operations. Our concerns focus on the toll taken by these accidents in human lives — yours, your friends, or your fellow soldiers — as well as equipment and degraded readiness.

How are we doing? In addition to last year being the safest ever for aviation in Forces Command, through the end of the third quarter of the 1987 training year, 51 Awards of Merit (one year of accident free flying), 26 Awards of Honor (two years), and 38 Awards of Excellence (three years) have been presented. All indications are that next year will be even safer.

We must conduct our mission-essential flight operations in the safest possible manner. Accomplishment of this objective remains a constantly challenging task for all of Forces Command and for each of you. IIIII

Blue Book Correction

Several changes need to be made to the second entry on page 96 of the August-September Blue Book Directory.

The Chief's name is spelled Zorn, not Jorn. His phone numbers are C: (202) 325-8156, AV: 221-8156.

MAJ Carter is in charge of NASA, NTPS, APACHE Programs; his phone numbers are C: (202) 325-8157; AV: 221-8157.

SGM Berger's phone numbers are C: (202) 325-8156; AV: 221-8156.

Ms. Jean Arnold is in charge of Avn Career Incentive Pay. C: (202) 325-8157; AV: 221-8157.

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Oct.-Dec., 1987 Calendar of AAAA Chapter Activities

October, 1987

■ ■ Oct. 1. Corpus Christi Chapter. Professional dinner meeting. Sergei I. Sikorsky, V.P., Special Projects. Sikorsky Aircraft, guest speaker. Marriott Hotel, Corpus Christi, Tex.

■ ■ Oct. 1. Monmouth Chapter. Professional luncheon meeting. LTC Fred Zedeck, Sr Mil Advisor to the FAA, Off of Emerg Opns, guest speaker. Colts Neck Inn, Colts Neck, N.J.

■ ■ Oct. 3. Lindbergh Chapter. "Second Annual AAAA Road Rally." (Scavenger Hunt on Wheels). Starting point: West Alton, Mo.

■ ■ Oct. 9. Redcatcher Chapter. Late afternoon professional meeting (AAAA videotape). Pastorious Community Club.

■ ■ Oct. 14. Washington, D.C. Chapter. First Annual Scholarship Benefit Golf Tournament. Andrews AFB East Course.

■ ■ Oct. 15. North Texas Chapter. After dinner professional meeting. The Honorable James R. Ambrose, Under Secretary of the Army, guest speaker. Topic: "Army Aviation RDA". Sheraton Centre Park Hotel.

■ ■ Oct. 16. Lindbergh Chapter. AAAA President's Dinner Dance. Breckenridge Frontenac Hotel, St. Louis, Mo.

■ ■ Oct. 16-17. Board of Governors Meeting, AAA Scholarship Foundation, Inc. (Pay-as-you-go). Holiday Inn, Hilton Head, S.C.

■ ■ Oct. 17. AAAA National Executive Board quarterly business meeting (Pay-as-you-go). Holiday Inn, Hilton Head, S.C.

■ ■ Oct. 20. Delaware Valley Chapter. Late afternoon "Beef 'N Beer Social". Knights of Columbus Hall, Crum Lynn, Pa.

■ ■ Oct. 21. S. California Chapter. Professional dinner meeting. Norm Nelson, Lockheed Skunk Works (Ret.) "History of the Skunk Works". Hacienda Hotel, El Segundo, Calif.

■ ■ Oct. 23. Colonial Virginia Chapter. Professional luncheon meeting celebrating the 4th Anniversary of USAALS. BG Rodney D. Wolfe, Assistant Commandant, USAAVNS, guest speaker. Yorktown Naval Weapons Station Officers' Club.

■ ■ Oct. 24. Tucan Chapter (Canal Zone). Canoe Trip down the Rio Chagres followed by a "Bring your own picnic!"

■ ■ Oct. 26. Rhine Valley Chapter. Late afternoon professional-social meeting. LTG Kenneth E. Lewi, CG, 21st SUPCOM, guest speaker. Topic: "Leaders versus Managers." Coleman NCO Club.

■ ■ Oct. 27. Leavenworth Chapter. Late afternoon business-social meeting. Chapter elections; discussion of future plans. Ft. Leavenworth Officers' Club.

■ ■ Oct. 28. Wings of the Marne Chapter. General Business Meeting and Social. Giebelstadt AAF Officers' Club.

■ ■ Oct. 29. Arizona Chapter. Professional dinner meeting. BG David L. Funk, Mil Asst to the Deputy Under Secretary of Defense, guest speaker. Arizona Golf Resort and Conference Center.

■ ■ Oct. 30. Chesapeake Bay Chapter. MASH Halloween Party - Membership business meeting. The Swamp (Harford Room), Sheraton Inn, Aberdeen, Md.

■ ■ Oct. 31. Taunus Chapter's "1st Annual Skyhawk" (10 Kilometer Road Run). Finthen Army Airfield, Mainz-Finthen.

(Calendar — cont. on p. 76)

AAAA Overview

Conducting its Fall, 1987 quarterly business meeting over the Oct. 16-17 weekend at Hilton Head, S.C., the home of MG Story C. Stevens, AAAA's National President, the National Board pursued a full 32-item agenda and approved the

(1) provision of **Past Officer Pins** for outgoing Regional and Chapter Officers who have served a minimum of one year in office,

National Executive Board Completes Full 32-item Agenda

(2) **corporate sponsorship** of the "James H. McClellan Aviation Safety Award" by the General Electric Company,

(3) pursuit of a **commemorative stamp** honoring Army Aviation's first 50 years (1942-1992),

(4) provision of a **"Certificate of Achievement"** to each "Aviation Soldier of the Month" selected by the Chapters,

(5) pursuit of an annual **USMA Cadet Award** to honor the highest ranking cadet who chooses "Aviation",

(6) review of the current **objectives and purposes** of the AAAA,

(7) **disbursement of funds** in the following manner: Operating Fund ($45,000), Emergency Fund ($7,000), Hall of Fame Escrow ($5,800), AAAA President's Reception at Garmisch, '88 ($3,500), Archival Support ($2,000), Past Officer Lapel Insignia ($3,000), Museum Donation based on $1 per member ($16,000), and Scholarship Foundation ($44,000),

(8) waiver of the **AAAA By-Laws** to permit the enrollment of AAAA members outside the immediate commuting area of the North Texas Chapter,

(9) provision of "Life Memberships" on annual, quarterly and monthly **installment plans**, and the

(10) report of the AAAA Scholarship Foundation indicating that at least $44,000 and 17 **AAAA National Scholarships** will be awarded in CY88.

In addition to the above actions, the National Board welcomed the following Chapter Presidents as new members: COL Dave Carothers (Mt. Rainier), COL William F. O'Neal (Washington, D.C.), LTC John Papier (Chesapeake Bay), LTC Thomas A. Swindell (Thunderhorse), and BG Donald R. Williamson (Lindbergh). Also, LTC Ben M. Knisely, MSC, Bowie, MD., was appointed as a National Member-at-Large for the Board term ending 4/16/1988.

Contenders!

The Oct. 1 **Membership Enrollment Competition** standings have the following Chapters ahead with 12 weeks left in the contest ending Dec. 31. The rankings are based on **net membership gain.**

Master Chapters
(225 or more Members)

Rank	Net Gain
1 North Texas	30
2 Hanau Chapter	27
3 Colonial Va.	11
4 Phantom Corps	10
5 Edwin A. Link	3

(Other Master Chapters show a current net loss)

Senior Chapters
(112 to 224 Members)

Rank	Net Gain
1 Arizona	37
2 Connecticut	0

(Other Senior Chapters show a current net loss)

AAAA Chapters
(25-111 Members)

Rank	Net Gain
1 Aloha Chapter	78
2 Redcatcher	75
3 Tucan Chapter	10
4 Pikes Peak	5
5 Jack H. Dibrell	2
6 Checkpoint Chas.	0
7 Mid-America	0

(Other AAAA Chapters show a current net loss)

Photo Stories

Don't stop sending in your AAAA photo stories! A space bind this month precludes our publishing the six Chapter activity photos we have on hand, and these will appear in an expanded 'AAAA Section' in the forthcoming Dec. 31 issue.

November, 1987

■ ■ Nov. 2. Edwin A. Link Memorial Chapter. Professional dinner meeting. George Singley, PEO for Combat Support Aviation (AVSCOM), guest speaker. Topic: "PEO Organization/Structure". Morey's Restaurant, Binghamton, N.Y.

■ ■ Nov. 3-4. Fifth Aircraft Survivability Equipment (ASE) Symposium sponsored by the AAAA. Classified sessions, Award dinner. BG Rodney D. Wolfe, Asst Commandant, USAAVNS, keynote address; BG William H. Forster, PEO, Combat Aviation, dinner speaker. Host: Dalmo Victor Division, Singer Company. Presidio of San Francisco, Calif.

■ ■ Nov. 4. Ft. Bragg Chapter. Late afternoon professional-social meeting. MG Claude T. Ivey, DCG, XVIII Abn Corps, guest speaker. MILPERCEN Briefing Team. Ft. Bragg Officers' Club.

■ ■ Nov. 4. Mount Rainier Chapter. Late afternoon business-social meeting. Ski Equipment Show, Registration for 1st Annual Chapter Ski Trip to Whistler, B.C., and Raffle. Ft. Lewis Officers' Club.

■ ■ Nov. 5. Colonial Virginia Chapter. Professional luncheon meeting. SGM Walter Cole, Chief, Avn Enlisted Personnel Assignments, guest speaker. Topic: "NCO Career Development." NCO Club, Ft. Eustis, Va.

■ ■ Nov. 8. Corpus Christi Chapter. Fall Family Picnic. Chicken, hot dogs, and all the trimmings. CP & L Park.

■ ■ Nov. 10. Prof'l dinner meeting. MG Merle Freitag, Asst Dep to the Director, Research & Engineering, guest speaker. Topic: "Test and Evaluation - An Integral Part of the DOD Acquisition Process". Ft. McNair Officers' Club.

AAAA offers up to $60,000.00 in 1988 aid for college-entry Freshmen

BACKGROUND — The AAAA Scholarship Foundation, a separate non-profit educational activity created to provide scholarship aid to the sons and daughters of AAAA members and deceased members, announces the availability of up to $60,000 in assistance funds for the 1988 college-entry year.

1987 AWARDS — Twenty or more scholarships will be presented — One $8,000 four-year scholarship ($2,000 a year); and several $4,000 four-year scholarships ($1,000 a year), to include the William B. Bunker Memorial Scholarship limited to Engineering School applicants; and several $2,000 two-year scholarships ($1,000 a year).

AWARD PHILOSOPHY — Operating on the premise that ample scholarship assistance is available to those in need, the AAAA National Scholarships are awarded primarily on the basis of academic merit and personal achievement. The AAAA seeks to honor those outstanding students whose well-rounded secondary school activities indicate solid career potential.

APPLICATION PROCEDURE — Student applicants are asked to request the appropriate application forms by writing to the AAAA Scholarship Foundation at 49 Richmondville Avenue, Westport, CT 06880-2000. Requests for applications must be received on or before December 15. All forms, together with other supporting data, must be returned to the Foundation on or before January 20 to receive Awards Committee consideration. The student-prepared application should state the full name of the applicant's parent-member and address of student if different.

ELIGIBILITY CRITERIA — An AAAA applicant must be unmarried, a citizen of the United States, and a high school senior who has applied to an accredited college or university for Fall 1987 entry as a freshman. Program participation is limited to the children of members with an effective date of membership on or before March 31, 1987.

SELECTION AND NOTIFICATION — Selection of winners will be made by the 22-member AAAA National Awards Committee during the February 15-28 period with each applicant to receive a list of the winners not later than April 1.

Application Form for AAAA National Scholarships

____
APPLICANT'S NAME (PLEASE PRINT)

____
STREET

____
CITY STATE ZIP

____
PARENT'S NAME RANK/GRADE, IF APPLICABLE

____
PARENT'S ADDRESS

____
CITY STATE ZIP

Last call for CY87 AAAA National Awards: Jan. 15, 1988 suspense date set

"Award Presentations"

Up to eight AAAA National Awards for accomplishments made during Calendar Year 1987 will be presented at an Annual Awards Luncheon on April 15 and an Awards Banquet to be held on April 16 at the 1988 AAAA National Convention in St. Louis, Mo. The individual AAAA National Awards will be made on Friday; the unit AAAA National Awards will be made on Saturday. Senior members of the U.S. Army and U.S. Army Aviation will be invited to present the AAAA's top awards on both occasions.

"Outstanding Aviation Unit of the Year Award"

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

"Outstanding ARNG Aviation Unit of the Year Award"

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

"Outstanding USAR Aviation Unit of the Year Award"

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

"The Robert M. Leich Award"

Sponsored by the Army Aviation Association, this award is named in memory of Brigadier General Robert M. Leich, USAR, the AAAA's first president (1957-1959) and its Awards Committee Chairman for 23 years. It is presented periodically to a unit or an individual for Army Aviation service over an extended period.

"Army Aviator of the Year Award"

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

"Aviation Soldier of the Year Award"

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

"James H. McClellan Aviation Safety Award"

Sponsored initially by Senator John L. McClellan in memory of his son, James H. McClellan, a former Army Aviator who was killed in a civil aviation accident in 1958, this award is now presented by the AAAA to an individual who has made an outstanding individual contribution to Army Aviation safety in the previous CY. The award is NOT intended to be given for the accumulation of operational hours without accidents by any aviation unit.

"Outstanding DAC of the Year Award"

Sponsored by the Boeing Helicopter Company, this award is presented annually by AAAA "to the DAC who has made an outstanding individual contribution to Army Aviation in the awards period encompassing the previous calendar year." Membership in AAAA is not a requirement. A candidate for this award must be a current Department of the Army Civilian.

Administrative Details

ACCOMPANYING DATA FOR INDIVIDUAL AWARDS: A standardized **"Nomination Form for Submission of All AAAA National Awards"** is the sole form utilized by the Awards Committee in its selection of annual AAAA National Awards Winners. Copies may be obtained directly from any Chapter Secretary or by writing to AAAA, Attn: Awards Committee Chairman, 49 Richmondville Avenue, Westport, CT 06880-2000. The foregoing form should be accompanied by a recent photo of the nominee and the nominee's biographical sketch. Photos of both the commander and the senior NCO must accompany each unit nomination.

Suspense Date and Acknowledgment

The **"Nomination Form for Submission of All AAAA National Awards"** and the accompanying photo(s) should be mailed ON OR BEFORE the January 15 suspense date to: National Awards Committee Chairman, AAAA, 49 Richmondville Avenue, Westport, CT 06880-2000. Please use stiffeners to protect the photo(s) being submitted. While "nomination" material cannot be returned, photos may be returned on request. The receipt of each nomination will be acknowledged by the Awards Committee Chairman.