Special Focus: Aviation Electronic Combat

SPECIAL FOCUS: AVIATION ELECTRONIC COMBAT

ARMY AVIATION

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FORTHCOMING ISSUES

November 1996 — Rotary and Fixed Wing Hardware Updates.
December 1996 — Special Focus: "The War Fighters".

Briefings

On 17 September 1996, **GEN Johnnie Wilson**, CG Army Materiel Command, announced that he has approved naming the command created by merging the aviation and missile areas as the **United States Army Aviation and Missile Command (AMCOM)**. AMCOM will be headquartered at Huntsville, AL.

MG Carl H. McNair, Jr., Ret., has been appointed to the Board of Directors of **Air Methods**, the largest publicly-held provider of emergency medical transportation systems and services to hospitals throughout the U.S. MG McNair is Corporate Vice President of DynCorp and President of Enterprise Management. He also serves as the AAAA's Treasurer, and is an AAAA Charter Life Member.

Five Army aviators have been nominated for promotion to Brigadier General. They are: **COL(P) Joseph L. Bergantz**, Senior Military Assistant to the Under Secretary of Defense (Acquisition and Technology), Washington, DC; **COL(P) Richard A. Cody**, Incoming Commander, 160th SOAR(A), Ft. Campbell, KY; **COL(P) John M. Curran**, Special Assistant to CG, 1ID, USAREUR and Seventh Army, APO AE; **COL(P) Dell L. Dailey**, Outgoing Commander, 160th SOAR(A), Ft. Campbell, KY; and **COL(P) John K. Schmitt**, Special Assistant to the CG, Ft. Carson, CO.

On 27 May 1996, **CPT Shepard B. Stone, M.P.S., P.A.**, was selected by the American Academy of Physician Assistants Veterans Caucus as the Military Physician Assistant of the Year. He was selected "...for his Outstanding Service to the Nation and Profession as a Veteran and Physician Assistant." CPT Stone currently serves as an Aeromedical Physician Assistant with the 1/169th Aviation Regiment, Windsor Locks, CT.

Charles A. Vehlow has been named General Manager of Apache Programs at **McDonnell Douglas Helicopter Systems**, Mesa, AZ. Vehlow was formerly the director of AH-64D Longbow Apache and AH-64 derivative programs. In his new position, he is responsible for the management of all domestic and international Apache programs for MDHS.

The **9th Annual NCO Symposium** is in planning for January 1997 at the U.S. Army Aviation Center (USAAVNC), Ft. Rucker, AL. This symposium for the Brigade CSMs, while smaller in scale, will be combined with the Brigade Commanders Conference. Combining these events will provide the CSMs and Commanders a forum to address issues of concern to Aviation Soldiers. Contact **CSM Marvin E. Horne**, USAAVNC Command Sergeant Major at DSN 558-4549, Commercial (334) 255-4549 for more information.

VOLUME 45 ARMY AVIATION NUMBER 10

FEATURE ARTICLES

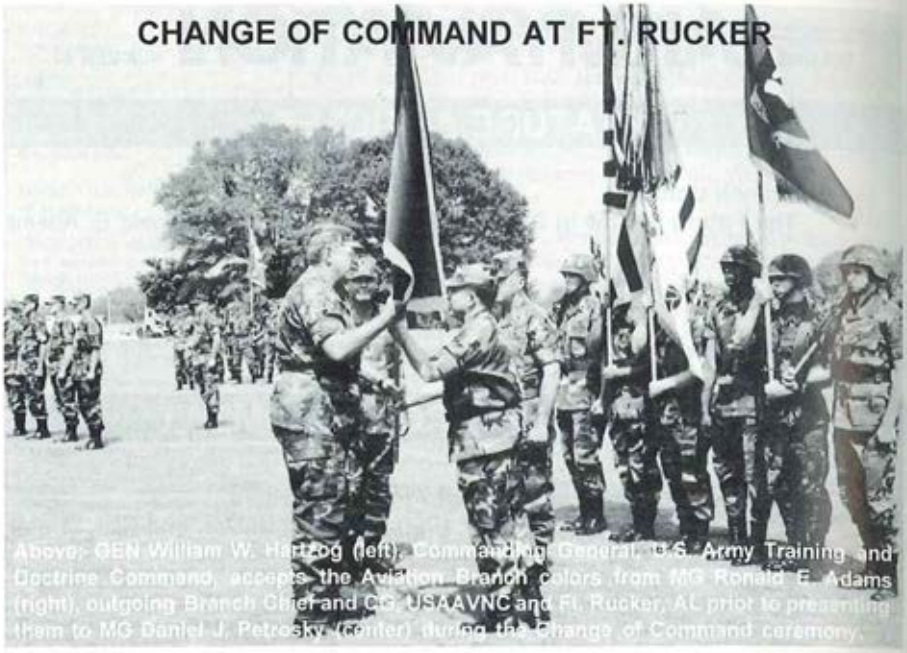
AVIATION ELECTRONIC COMBAT

DEPARTMENTS

FRONT COVER

Paid Advertisement: Rockwell Collins Avionics and Communications Division. The cover illustration is an artist's rendering produced by Rockwell's Collins Avionics & Communications Division of a US Army pilot using the new AN/ARC-220 nap-of-the-earth high frequency airborne communications system. Platforms include the AH-64, CH-47, UH-60, and OH-58. Production begins in 1997. Caption provided by Advertiser.

CHANGE OF COMMAND AT FT. RUCKER



Above: GEN William W. Hartzog (left), Commanding General, U.S. Army Training and Doctrine Command, accepts the Aviation Branch colors from MG Ronald E. Adams (right), outgoing Branch Chief and CG, USAAVNC and Ft. Rucker, AL prior to presenting them to MG Daniel J. Petrosky (center) during the Change of Command ceremony.

On 12 September 1996, MG Daniel J. Petrosky assumed command as U.S. Army Aviation Branch Chief and CG, U.S. Army Aviation Center and Ft. Rucker, AL; and Commandant, U.S. Army Aviation Logistics School from MG Ronald E. Adams.

MG Adams assumed command 28 July 1994 after moving from the position of Director of Requirements, Office of the Deputy Chief of Staff for Operations and Plans, the Army Staff. He is now the Assistant Deputy Chief of Staff for Operations and Plans for Force Development, U.S. Army Staff, Washington, DC.

MG Petrosky's immediate past assignment was Deputy Chief of Staff, Operations, Headquarters, United States Army Europe and Seventh Army, Heidelberg, Germany. He has held a series of Command and Staff positions in Vietnam, Korea, CONUS, and Europe. During his Vietnam tour, he was assigned to the 4/77th Aerial Rocket Artillery, 101st Airborne Division as a platoon leader and operations officer. He commanded the 4th Brigade, 1st Armored Division during Operations DESERT SHIELD/DESERT STORM, and served as the Assistant Division Commander, 101st Airborne Division (AASLT), Ft. Campbell, KY.

His awards and decorations include the Legion of Merit with two oak leaf clusters, Distinguished Flying Cross with one oak leaf cluster, Bronze Star with one oak leaf cluster, Defense Meritorious Service Medal, and Meritorious Service Medal with two oak leaf clusters.

MG Petrosky is married to the former Barbara Tatman from Columbus, OH. Their daughter, Amanda, attends Ohio University.

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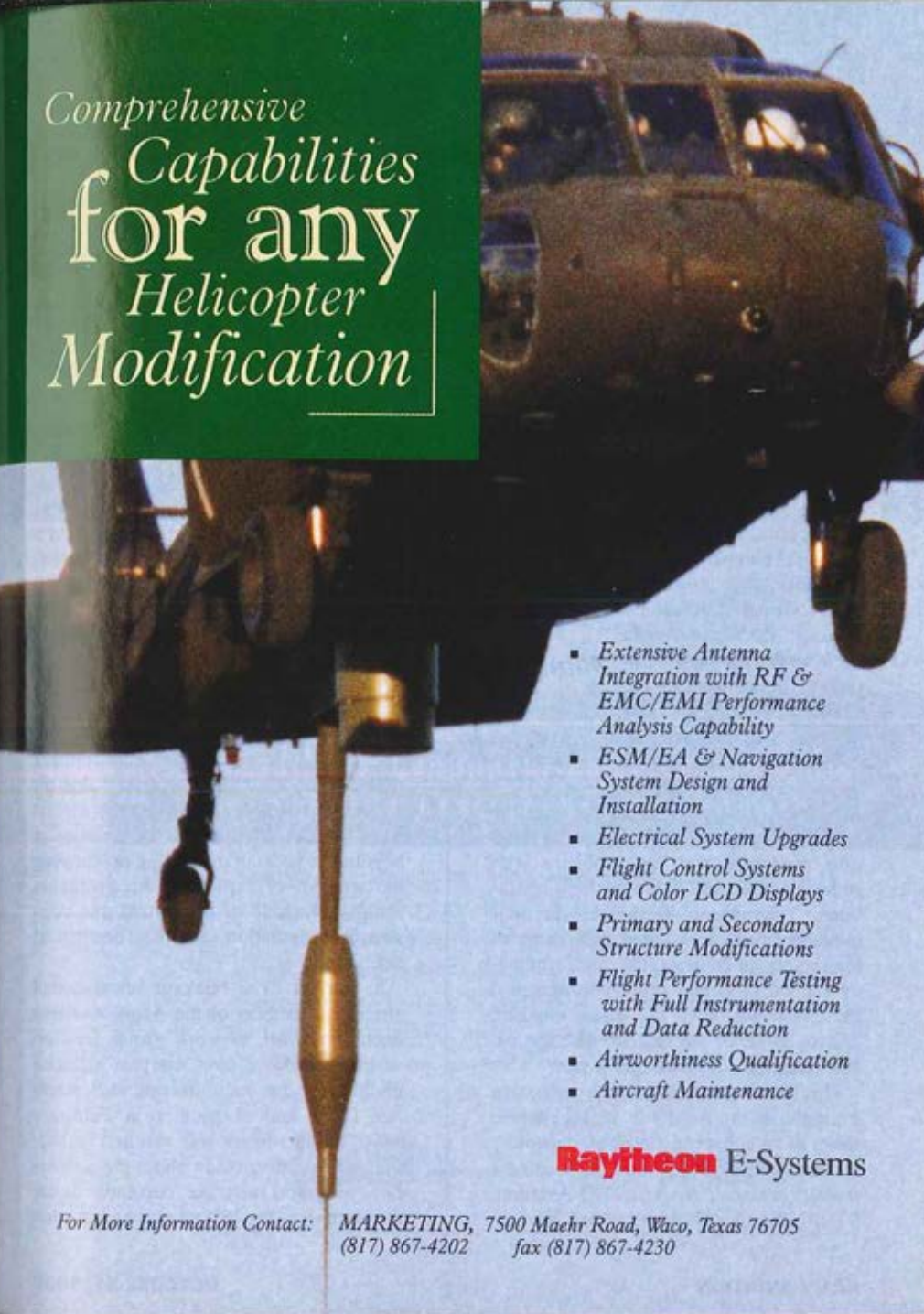
THE FUTURE IS NOW IN SIMULATION

MG Adams' presentation at the AAAA Simulation Symposium, 4 September 1996.

Live simulation training such as battalion Field Training Exercises and National Training Center rotations constitute the closest approximation to actual combat that can be practically achieved today. Most would agree that there is little doubt as to the value live simulation provides Army Aviation in preparing for war, but the costs involved in live simulation limit our opportunity to engage in it. These limited live simulation experiences are enhanced by preparing the participants through less costly and more controlled training in a virtual environment. There is clear evidence that enormous benefit accrues by using relatively inexpensive virtual simulation training to increase unit proficiency through collective task training before engaging in high cost live simulation training.

Early in 1996, we initiated a project to investigate the applicability of virtual simulation as a means for collective task pre-training, prior to live simulation training exercises. The test project battalion commander selected what he considered to be the least robust of his three attack companies to undergo collective task training prior to a battalion Field Training Exercise. That "test" company was trained in mission planning, preparation and execution by Observer/Controllers from the National Training Center (NTC) and Aviation Center subject matter experts using our Aviation Testbed SIMNET facility. During this period, the other two companies conducted their normal preparation for the Field Training Exercise with one being designated a "control" company. The performances of the pre-trained "test" company and the normally trained "robust" company were compared to determine if the pre-training had any effect, all criteria being equal.

During virtual simulation pre-training, the "test" company was presented with a tactical situation for three successive days. Orders specified three night missions of increasing complexity beginning with a deep attack, followed by a movement-to-contact and culminating in a deliberate attack combined with a hasty attack. Each aircraft crew was rated on its



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execution of collective tasks as defined in the Army Training and Evaluation Program.

Two weeks later, the battalion conducted its Field Training Exercise in which all three companies faced a similar tactical situation, for three successive days. All were given identical orders with the exception of time offsets to allow sequential execution and reconstitution of the opposing force. Performance of the "test" company and the "control" company was observed by the same Operational Controllers who participated in the prior virtual training. Collective task completion ratings were conducted as in the virtual training exercises.

The results indicated that the "test" company, which had undergone collective task virtual simulation training, scored an overall 98% collective task completion. In comparison, the "control" company averaged 65% collective task completion. After Action Review comments for the deliberate attack mission showed the "control" company lacked general situation awareness and had problems with route planning and battle position operations. They spent 40 minutes in their battle positions and killed only three of ten targets. In contrast, the "test" company trained in virtual simulation occupied its battle positions for three minutes, destroyed all of the targets, disengaged, and returned with no battle losses.

This little vignette is another persuasive example of the need for an accelerated move to an enhanced simulator capability for Army Aviation. If this is to become a reality, industry, AAAA, PEO Aviation, STRICOM, the National Guard Bureau, and the Army Aviation Center must all work together to realize our goal of creating the future now.

Using available readiness resources to provide the Training Aids, Devices, Simulations and Simulators, or TADSS, to Army Aviation units to achieve the correct balance between live simulation, virtual simulation and constructive simulation is an essential balance that must be achieved in order to maintain warfighting readiness. This is no small issue. The Army Aviation readiness resource portfolio appears to be currently over-extended with investment in live simulation, or training that requires the execution of expensive flight hours at a time when OPTEMPO dollars are at a premium. Our simulation portfolio seems to lack the high yield investments associated with the virtual and constructive sectors, where a one-time investment of one dollar can return two, three, four or maybe even five dollars worth of training value on an annualized basis for a specific investment horizon. I believe Army Aviation is beyond the point of discussing or studying the wisdom of exploiting the profitable returns available in the virtual and constructive simulation sectors. The time to act is now.

"...a return investment of two, three, four or maybe even five dollars worth of training value on an annualized basis for a specific investment horizon."

In pursuit of a relevant reinvestment strategy, members of the Army Aviation team have met in work group fora on several occasions over the past eighteen months. At one such meeting in September 1995, and at another in February 1996, an agreement was reached regarding critical information about the simulation programs that are currently under development. We looked at programs that

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must be developed and programs that should be developed—resources permitting. A number of taskings resulted from each of the working sessions, and Army Aviation now has a more comprehensive understanding of what TADSS technologies are needed and what is available.

COL Bill Powell, Director of Training, Doctrine and Simulation at the Aviation Center, working with representatives from STRICOM, PEO Aviation, Headquarters TRADOC, Forces Command and the National Guard Bureau, has done good work shaping a coherent Aviation Branch Training Strategy. That strategy is based upon the three pillars of Foundation (or institutional) Training, Sustainment Training, and Validation Training. Embedded within this training strategy is the Army Aviation Simulation Strategy. That strategy sets us on a path toward achieving the proper balance of live, virtual, and constructive simulation. The strategy seeks to shift our reliance from an 80% live, 15% virtual, and a 5% constructive simulation mix to a desired end state of around 50% live, 35% virtual, and 15% constructive simulation mix. The intent is to move the training of primary tasks into virtual simulation and use live simulation for skill validation and mission execution.

The strategy is task based. I believe the issue regarding whether simulation can replace actual live simulation is now irrelevant because simulators will have the appropriate fidelity to train selected tasks to an acceptable level of performance. The current simulation strategy is designed to train the most costly Aircrew Training Manual and Mission Essential Task List tasks with the greatest efficiency and effectiveness. For example, virtual simulation can be used to get at those tasks which are difficult to train in aircraft, or tasks that are expensive to train in terms of time or OPTEMPO cost. The goal is to field high fidelity virtual simulators for training individual tasks and gunnery tables one through four.

Training aids such as Home Station Instrumentation (HSI), along with part-task mission equipment trainers, will be fielded to support crew and team training tasks and the advanced gunnery tables nine through twelve. Medium fidelity company level virtual collective training devices, such as AVCATT, will be fielded to support collective and combined arms training tasks and mission rehearsal. AVCATT will also support limited battalion staff task training along with collective simulations provided through the WARSIM 2000 program. Finally, Army Aviation will field Tactical Engagement Simulations in support of live simulation at the combat training centers.

The Army Research Institute (ARI) at Fort Rucker offers an excellent example of positive task training in virtual simulation. ARI has been conducting research with results that support low-cost simulation, providing considerable potential for reducing the cost of primary phase flight training. For the last year or so, Chuck Gainer and his team along with the Aviation Training Brigade have done a TH-67 Transfer of Training Demonstration. This concept uses a low cost off-the-shelf simulator with a modified transfer of training design of two groups, simulator and non-simulator. We studied the effect of pre-training initial entry rotary wing students. The average simulator training time was 7.5 hours. Criterion standards were used providing training in flight maneuvers fundamental to rotary wing flight: takeoff and landing to a hover, hovering flight, hovering turns, normal takeoff, normal approach, traffic pattern flight, and hovering autorotation. The

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Now fielded to the U.S. Army the AH-64A has established the baseline from which the Kiowa Warrior has been developed and the Longbow Apache is evolving.

LOCKHEED MARTIN

results of the study indicated that the pre-trained student group outperformed non-pre-trained students in reaching critical performance milestones. The study is ongoing but it is evident that a low cost virtual trainer can enhance or supplement primary phase flight training providing "saved training time" and cost avoidance.

There are a number of key enabling investments required to accommodate the Aviation Simulation Strategy. These investments are the result of a prioritization process that took place at a simulation workgroup meeting in February of this year, combined with return on investment and tradeoff analysis done by the Aviation Center team. Some of those key enabling investments are currently funded and are under development. Portions of the key enabling investments still require funding, and are candidates for funding through readiness resource reinvestment. Each of the investments is critical to reaching the end goal of training Army Aviation units to a high state of warfighting readiness while remaining inside the current and future resource box.

"Army Aviation currently lacks the required number of AGES II sets for the AH-64A, and is funded for only eight sets of AGES II for the OH-58D through FY02."

The Validation pillar of the Aviation Training Strategy requires investments which allow aviation units to validate crew, collective and combined arms skills in an instrumented training maneuver area, such as a combat training center. These investments provide TADSS which bring aviation units into the combined arms fight, as well as provide feedback for unit commanders to enhance warfighting skills. These investments include the Multiple Integrated Laser Engagement System/Air-Ground Engagement System II (MILES/AGES II), the Combat Training Center Instrumentation System with Aviation interface—the Smart On-Board Data Interface Module (SMODIM)—and the Home Station Instrumentation.

The MILES/AGES II is a TADSS which is appended to Army Aircraft for the primary purpose of simulating force-on-force engagements through the use of eye safe lasers—it is critical for training Army Aviation units as a member of the combined arms team. AGES II is required for participation at Combat Training Centers, in the future HSI environment, and especially in Force XXI Army Warfighting Experiments where force design and doctrinal concepts are tested in live simulation. Army Aviation currently lacks the required number of AGES II sets for the AH-64A, and is funded for only eight sets of AGES II for the OH-58D through Fiscal Year 02. However, ongoing efforts at the department level to resource the minimum number of AGES II sets for interactive participation at the CTCs is encouraging. Investment in AGES II provides a return in two ways. First, AGES II is critical for implementation of the Aviation Training Strategy. Second, AGES II provides the capability for aviation units to interactively train with members of the combined arms team, reinforcing their relative value on the battlefield.

The Combat Training Center Instrumentation System with the Aviation interface—the Smart On-Board Data Interface Module—is a real success story. It provides unit commanders with real time after action data on aircrew engagements through instrumentation available at each

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of the Combat Training Centers. It is the type of tool necessary to train Army Aviators to fight their respective combat system, not just employ the weapons. Its use is being expanded to the Longbow Apache Tactical Engagement Simulation System, or TESS. In fact, this effort will successfully complete the research and development program which transitions to the future Home Station Instrumentation initiative.

Home Station Instrumentation (HSI) provides unit commanders with CTC-like instrumented maneuver space at home station. An estimated non-recurring cost of eight million dollars currently provides both ground and air maneuver elements with a 40 square kilometer "box" of maneuver space capable of simulating force-on-force and force-on-target engagements with feedback to the user. HSI is MILES/AGES II friendly and provides an after-action review capability to facilitate the learning process. It is critical for training future weapon systems in gunnery, tactics, techniques and procedures. For example, the AH-64D Longbow Apache will fight in teams and use Radio Frequency Hellfire non-line-of-sight missiles. HSI is required to provide multiship RF Hellfire targetry and to provide after action review feedback to enhance the training of team tactics for the Longbow. The Aviation Center will work with Headquarters TRADOC and the Department of the Army to field the number of HSI systems required to provide the capability for aviation units to conduct maneuver training and advanced gunnery tables ten and twelve in the HSI environment. The return on this investment should be possible reductions in training ammunition requirements.

Sustainment is our second pillar. Key enabling investments required for the Sustainment pillar of the Aviation Training Strategy have the potential to provide the most significant cost avoidance. Such investments will provide units the tools necessary to sustain and enhance the Army Aviation crew and collective skills at home station. These investments including the Aviation Combined Arms Tactical Trainer (AVCATT) and the Aerial Weapons Scoring System (AWSS) are necessary for preparing units for validation and subsequent readiness certification.

The AVCATT is the most important component of our training strategy. It is a training system which trains and sustains company level collective and combined arms skills. AVCATT is essential to support the holistic approach to Army Training. It is intended to train unit leaders to maneuver forces and prepare them for their wartime mission! It will have a battalion staff interface and selective fidelity to train company level METL tasks. Additionally, AVCATT is the Army Aviation platform for entry into the Synthetic Theater of War (STOW), where aviation units can fight in the joint environment. Although the level of training transfer achievable from AVCATT is difficult to determine, it is conceivable that the AVCATT system could be designed in such a way as to adequately train some tasks that are currently trained in the aircraft.

The potential return on investment becomes significant with some basic assumptions. Given the state of today's modeling and simulation technology, assume for a moment that Army Aviation could identify a number of collective tasks that could be adequately trained in the collective virtual environment. Assume also that Army Aviation spends 10% of our resources to train the identified collective tasks in the live simulation

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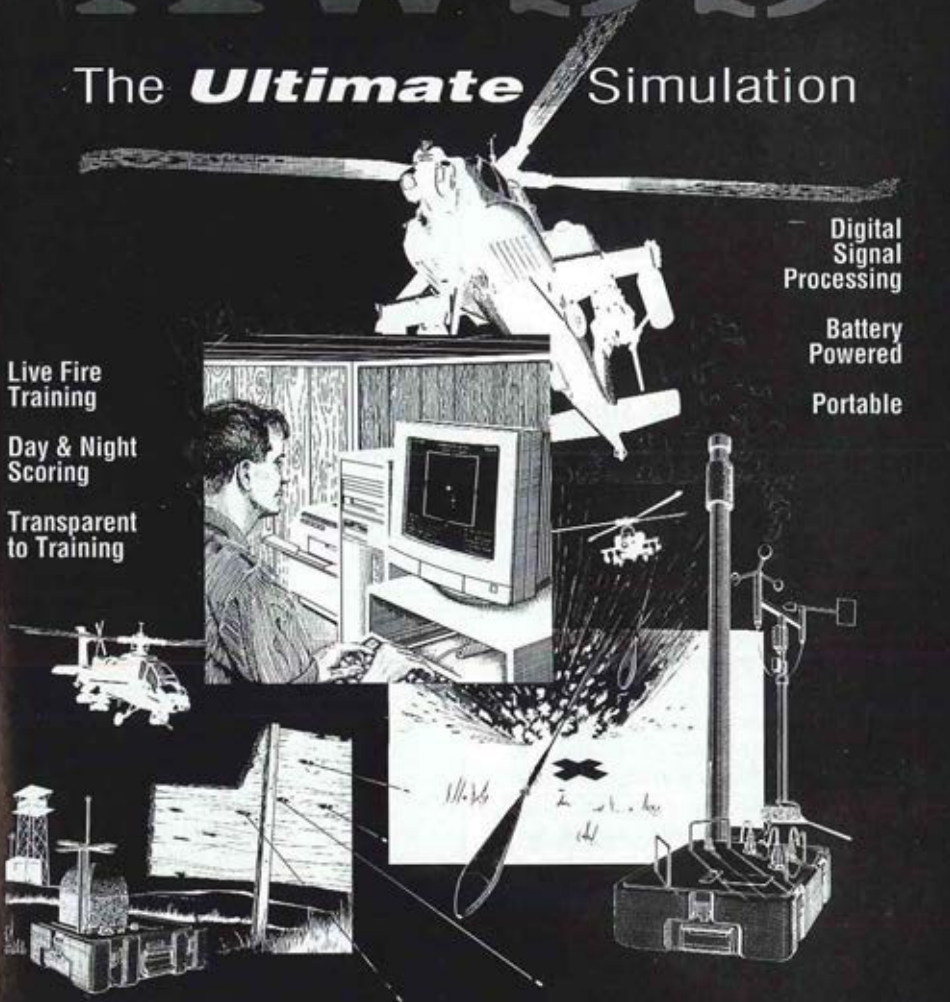

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environment. If AVCATT were already fielded in the appropriate numbers and in the correct geographic areas, Army Aviation could potentially create a significant cost avoidance or savings for reinvestment in our Aviation Simulation Strategy. Unfortunately, Army Aviation does not have AVCATT. Hopefully, its importance can be realized.

Currently under development are two ongoing programs that could provide some answers to the AVCATT dilemma. The first is the Aviation Reconfigurable Manned Simulator, or ARMS, being developed by National Guard Bureau, STRICOM and the Army Aviation Center. The second is the Longbow Collective Training System, or LCTS, which is being developed by PEO-Aviation and the Army Aviation Center.

The Aerial Weapons Scoring System (AWSS) is designed to objectively score helicopter gunnery training and qualification using acoustic and doppler radar technologies. It is a completely mobile and self-contained system that provides objectivity to the critical skill of applying steel to the desired target. It is currently underfunded by 10.2 million dollars. It is not only central to our ability to produce more highly skilled attack aviators, but is essential to further cost saving initiatives. Substantial cost savings can be realized by using Point Detonating rockets in place of Multi-Purpose Sub-Munitions rockets in training gunnery tables. Scoring Point Detonating rockets, which cost approximately one half the cost of MPSM rockets—objectively or otherwise—requires the use of AWSS.

Foundation pillar investments are those TADSS investments which are required at the training base and home station to provide for the initial qualification and sustainment of individual and crew skills. These investments are the OH-58D gunnery trainer, simulator concurrency program, and maintenance trainers.

There is a requirement to provide a means to train OH-58D aircrew gunnery in a more cost effective manner. Currently, OH-58D aircrews fire more training rockets than any other weapons platform because there is no existing TADSS to support OH-58D gunnery. We have demonstrated the feasibility of using the virtual environment for portions of initial AH-64 gunnery qualification and for sustainment of selected gunnery tables. By leveraging from existing simulation programs that provide nearly the fidelity required for an OH-58D gunnery trainer, a device could be quickly fielded to potentially achieve a significant cost avoidance over the remaining airframe life. Again, the time to act is now—the OH-58D community has trained for too long without adequate TADSS.

"...more training in the virtual simulation environment means that simulators need to be equipped to the same standards as the aircraft."

Present high fidelity flight simulators are not maintaining currency with the aircraft they simulate. The increased emphasis to conduct more training in the virtual simulation environment means that simulators need to be equipped to the same standard as the aircraft. Failure to maintain a high standard of concurrency jeopardizes readiness and safety. Investment in this critical TADSS is required to support airframes that are currently planned to be in the US Army inventory until the next century—an investment that should allow the realization of equivalent OPTEMPO cost avoidance.

There are significant returns on investments from maintenance trainers. For example, the Black Hawk Maintenance Trainers

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being delivered to the Aviation Logistics School provide training capabilities not possible with Category "B" aircraft. This trainer, which incorporates aircraft components in a replicated airframe, allows the maintenance student to fully operate, troubleshoot, and replace components. Fault insertion allows the student to "break" the system and then observe actual test equipment in operation. The Category "B" aircraft currently in use does not provide this capability.

Furthermore, five actual Black Hawk Category "B" aircraft cost approximately $40M. The cost for five maintenance trainers is approximately $15M—a significant savings. The use of state-of-the-art maintenance trainers is the most effective and cost efficient means to currently provide qualified maintainers to support Army Aviation's increasingly complex aircraft inventory.

Modeling and simulation have a number of applications and aviation is working hard in at least two of them: training, and research and development. Research is the work being done today in Advanced Technology Demonstrations (ATDs), Advanced Concept Technology Demonstrations (ACTDs), and Advanced Warfighting Experiments (AWEs). This work requires a disciplined but flexible approach to ensure valid technical and operational products are provided to the user, battle laboratory, combat developer, and the materiel developer. Various simulation tools are employed to address Doctrine, Training, Leader Development, Organization, Materiel, and Soldier (DTLOMS) issues and technology concepts. Constructive simulation models are used to achieve analytical information and then transition into manned interactive and virtual simulation devices. The variety of simulation models and data produces checks and balances for the analysts and, in turn, enhances the validity of information provided to the decision makers. The transition from constructive modeling to virtual is a significant challenge. A possible solution is a combination of reconfigurable simulators and modeling and simulations capable of exploring multifaceted applications of technologies which have not been previously represented in modeling and simulation.

Recent examples of research modeling and simulation efforts are Army Warfighting Experiments *Focused Dispatch* and the *Joint Precision Strike Demonstration*. These efforts examined the increased warfighting efficiency demonstrated by a digitized aviation force in two distinctly different environments and against two significantly different but capable threats. Aviation learned valuable lessons about the value of situational awareness, digital staff procedures, information sharing, precision attack operations, sensor to shooter time line requirements, and the value of graphic displays with fully integrated systems. Focused Dispatch live aviation play would have cost in excess of $13M. The use of simulation reduced the cost of the aviation portion of Focused Dispatch to $1.1M. Joint Precision Strike Demonstration aviation live costs would have exceeded an estimated $19M, yet significant DTLOMS insights were achieved for less than $300,000. These dollar savings and the ability to efficiently collect information, repeat scenarios, vary conditions, and test systems and concepts make simulation an essential element of aviation's continued research.

The Aviation Warfighting Cell at Ft. Rucker is Aviation's Test Bed—it provides a glimpse of the future. This second generation simulation combines virtual and constructive domains in an integrated way. It is comprised of the Longbow Player Station, the Comanche Player Station, and a constructive Simulation Interactive Tactical Environment Management System (ITEMS). Experiments using the Aviation Warfighting

(FUTURE — continued on page 34)

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BY COL ROY P. (PAT) OLER,
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PM-AEC: THE EYES AND EARS OF ARMY AVIATION

It has been just over four years since the Project Managers Office for Aviation Electronic Combat, PM-AEC, was formed from the merger of the Aircraft Survivability Equipment (ASE) and Avionics Project Management Offices.

During this time we have developed into a single PEO Aviation PM that is responsible for developing aviation equipment to enhance the areas of mission planning, navigation, communications, and aircraft survivability equipment. We realize that most of you are aware of our mission but we would like to restate it for those that may be new to Army Aviation.

"It is our mission to meet the user's requirements by constantly advancing the state-of-the-art in ASE and Aviation Electronics."

The Project Manager for Aviation Electronic Combat is responsible for the development, acquisition, and life-cycle management of Army Aviation's ASE and Avionics. It is our mission to meet the user's requirements by constantly advancing the state-of-the-art in ASE and Aviation Electronics. All together we have fourteen out of thirty one programs within PEO Aviation. These range in size from smaller Acquisition Category (ACAT) III systems to the larger ACAT I. They fall into virtually every phase of the materiel development life cycle model. We also have five joint service programs and non-developmental items (NDI) programs that were initiated in order to expedite development and minimize costs associated with the development of systems to meet the needs of our Aviation soldiers.

Virtually all of our developmental programs support one or more of the Army's five modernization over match areas and will help increase Army Aviation's relevance on the 21st Century Battlefield. These systems, when fully integrated into our aircraft, will provide for faster and improved mission planning and communications (voice and data), increased survivability and overall increased situational awareness.

Some of the avionics and aircraft survivability equipment that we are responsible for include Aviation Mission Planning System (AMPS), Embedded Global Positioning System (EGI), AN/ASN-128B Doppler Embedded GPS (DGNS), AN/ARC-164 HAVEQUICK II radio and

"There's a lot of pride in the work we do here. But then again, look at the aircrews we're doing it for."

Andy Whitaker,
ATIRCM/CMWS
Program Director

At Sanders, protecting aircrews means mission success. We're now developing the Advanced Threat Infrared Countermeasure (ATIRCM) system, a next-generation laser-based countermeasure system, and the Common Missile Warning System (CMWS) to sense and defeat even the most advanced threats. This cutting-edge technology will ensure more pilots make it home, and their aircraft along with them. ATIRCM and CMWS are just two of the revolutionary products we're working on for military and commercial markets. And they're two examples of how Sanders is building inventions for life.

SANDERS
A Lockheed Martin Company

AN/ARC-220 HF radio, The Improved Data Modem (IDM), The Army Airborne Command and Control System A2C2S, Suite of Integrated Infrared Countermeasures (SIIRCM), Suite of Integrated Radio Frequency Countermeasures (SIRFC, AN/ALQ-211), and the AN/AVR-2A Laser Detecting Set (LDS). Other articles in this issue of ARMY AVIATION Magazine will discuss in some detail a few of our more significant communication, navigation, and survivability programs. I'll leave these discussions to our real experts.

But, before we turn you over to discussion of specific programs we want to highlight several efforts that are key to getting our job done efficiently and effectively in today's environment.

We are always looking for more efficient ways of doing business in the material development and acquisition process. One of those ways is through the use of acquisition streamlining initiatives. The SIIRCM/CMWS, a joint service program, incorporated performance-based specifications in lieu of MILSPECS and MIL-STDS, pulled together a multi service team to meld requirements into a single RFP in record time, combined DT and OT, utilized extensive modeling and simulation, and is operating with minimum manpower support. Event-driven scheduling is also employed in the SIIRCM/CMWS program.

"We are always looking for more efficient ways of doing business in the material development and acquisition process."

This concept, when coupled with the Integrated Product Team (IPT) process, allows us to do what is smart when it is smart to do, not just "because it was scheduled to be done."

Another way of doing business more efficiently can be seen in the AN/ARC-220 program. This system is a non-developmental item, with production options included in the development contract. This strategy optimizes the use of existing technology and minimizes time and cost delays. Bottom line: this approach allows us to satisfy our user's requirement for an HF NOE radio faster and cheaper than the traditional development and acquisition process.

Integrated Product Teams (IPTs) have been formed to improve the overall quality of all our products produced, shorten development time and decrease cost. These IPTs, stressing team-building and the Mission/Vision statement, have successfully completed efforts such as participation, coordination, and approval of the RFP, ORD, TEMP, Army Cost Position and Decision Review documentation. The IPTs are further expanded into Government/Industry teams to address and resolve cost, schedule, and performance issues as the developmental process proceeds.

A streamlined acquisition process targeted at a best value product will allow us as a team to provide to our soldiers, sailors, and airmen—Tomorrow's Technology—Today. And they deserve nothing less. The future is one filled with many challenges that if properly approached will return many successes for Army Aviation. PM AEC is willing to accept this challenge.

★ ★

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BY MAJ STEVE MOORE
and MAJ WALTER M. WIRTH, JR.

AUTOMATED MISSION PLANNING AND PRECISION NAVIGATION INTO THE 21st CENTURY

New systems yield new capabilities for the warfighters.

Aviation's greatest contribution to the combined arms team is its ability to exploit the third dimension. Today, aviation can span a division front in minutes and deliver decisive combat power in a way never before seen on the battlefield. Army Aviators can rapidly effect the maneuver commanders battle space to bring decisive combat power to bear at the critical point and time on the battlefield.

Unfortunately, the ability to rapidly assess the area of operations, and the skill to navigate accurately, generally come with years of training and experience. When operating under combat conditions, information overload and high operational tempo make these tasks more difficult.

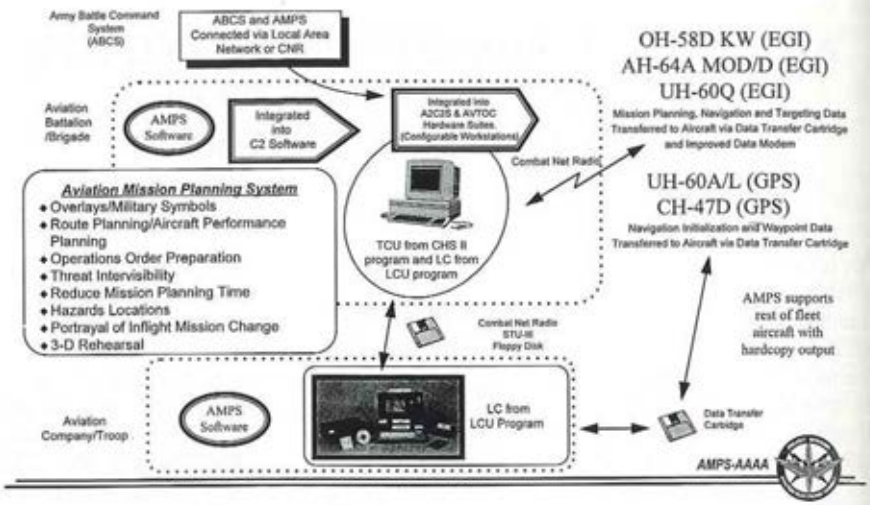
In the materiel development community, we recognize that doctrine and training are key in providing our aviators the tools to conduct combat operations, but we are doing our part to help aviators to visualize the current situation, visualize end result of an operation, execute a mission to achieve the end state, plan missions rapidly, and navigate precisely anywhere in the world. The tools being developed by the Project Manager for Aviation Electronic Combat (PM-AEC) to do this are the Aviation Mission Planning System (AMPS) and the Global Positioning System (GPS).

Present navigation tools are archaic. Paper I :50,000 and Joint Operational Graphics (JOG) maps are used for pilotage. Current tools for mission planning are not much better -- paper maps for terrain analysis, grease pencils and acetate for overlaps, and paper for OPORD preparation. The methods are time consuming, and when many people become involved in the reproduction of planning products, many errors are introduced and propagated to units.

Automated mission planning is coming by way of the AMPS. The AMPS is currently fielded to Kiowa Warrior units, will be fielded beginning this year to AH-64A (mod) Apache units, and will eventually be fielded to the entire fleet.

The system taps into the Army Tactical Command and Control Systems (ATCCS) and allows the planner to download

Aviation Mission Planner and Global Positioning System



Enemy Order of Battle (EOB), the friendly situation and other information needed to plan missions. Standard digital map products from the Defense Mapping Agency are displayed on a lightweight computer (LC) and the planner develops routes by pointing and clicking on the map. When the route plan is complete, the aviator can walk through the mission.

A 3D computer image of the terrain is generated using Digital Elevation Terrain Data (DETD) and the digital map. The aviator can step through the mission at 200 meter intervals, stop anywhere along the route, and view a representation of the terrain he will fly over. Future versions of AMPS will allow the pilot to "fly" the mission using a computer joystick, and graphics generated in "real-time."

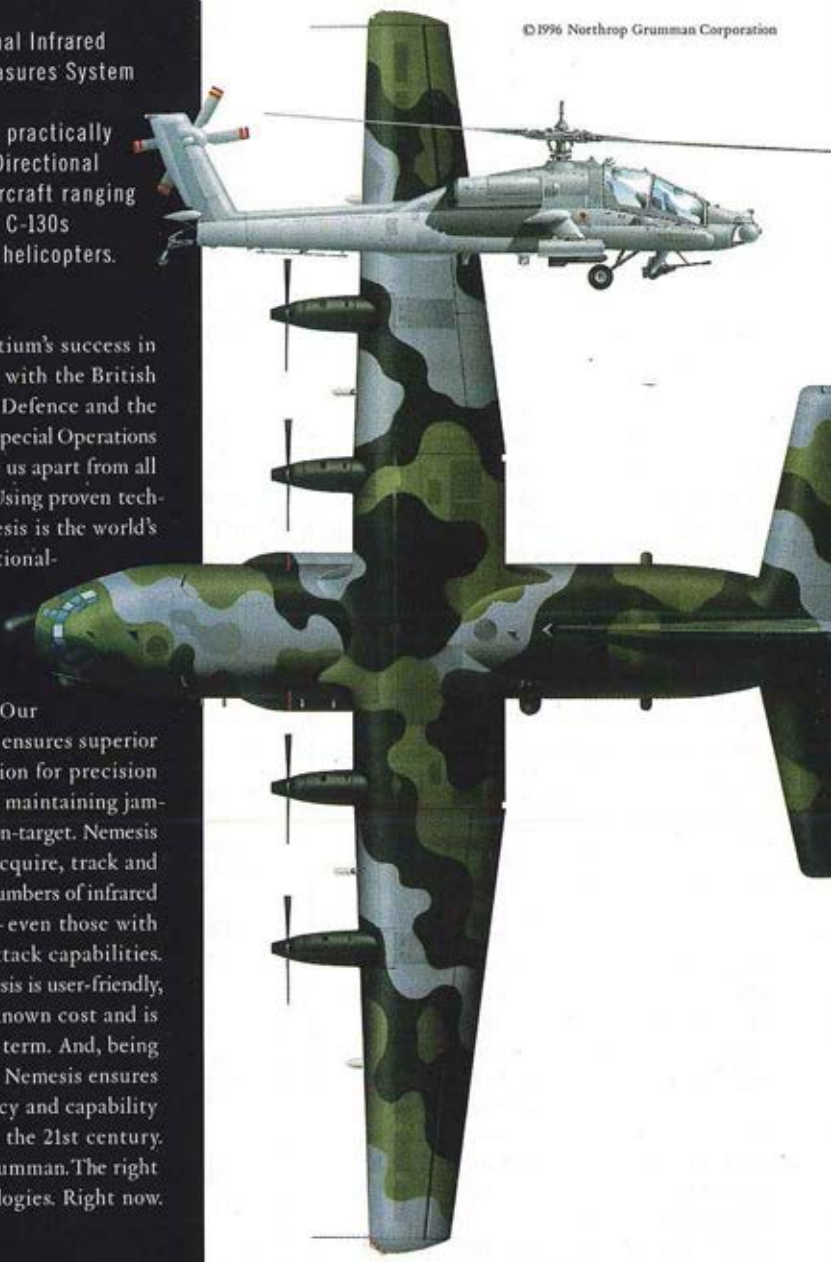
Information needed to initialize navigation suites and weapons systems is loaded into the AMPS. Communication plans are also developed and aircraft presets are loaded into the computer. When the mission plan is complete, waypoint coordinates, engagement areas, radio frequencies, and other data are loaded onto a Data Transfer Device (DTD), and carried out to the aircraft. The OH-58 Kiowa Warrior with the Improved Master Central Processing Unit (IMCPU) also accepts digital maps from the AMPS. When the aircraft is started, the information on the DTD essentially "boots up" the aircraft systems. No 20 minute run-up—the aircraft is ready to go.

Aviation Mission Planning System. The Global Positioning Systems (GPS) being fielded by PM AEC leverage the precision of GPS technology to enhance inertial and doppler navigation by embedding GPS modules to provide the aviation warrior with robust integrated

Directional Infrared Countermeasures System

The most practically suited Directional IRCM for aircraft ranging from C-130s to small helicopters.

Our consortium's success in working with the British Ministry of Defence and the United States Special Operations Command sets us apart from all competition. Using proven technology, Nemesis is the world's most operationally capable directional infrared countermeasures system. Our unique turret ensures superior stabilization for precision tracking and maintaining jamming energy on-target. Nemesis can detect, acquire, track and jam growing numbers of infrared threats – even those with all-aspect attack capabilities. Further, Nemesis is user-friendly, has a low, known cost and is available near term. And, being laser-ready, Nemesis ensures system currency and capability well into the 21st century. Northrop Grumman. The right technologies. Right now.



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navigation solutions for the force modernized Army aviation fleet. Both the Embedded GPS Inertial (EGI) and the AN/ASN-128B Doppler Embedded GPS (DGNS) systems provide precise positioning, accurate time sequencing for radios, reduced pilot workload (by automatically updating the inertial or doppler navigation systems), while improving the overall situational awareness of the pilot. Some systems accept data from AMPS via a data loader cartridge.

Both the EGI and the DGNS incorporate identical "datum" based mapping system, to include WGS 84 versus the current spheroid system. This allows pilots to use older datum paper map products still relied upon in many regions of the earth.

The EGI targeted for the AH-64 Modernized, Longbow, Kiowa Warrior and SOF aircraft is integrated with other onboard systems via a military standard 1553 data bus. The GPS provides constant inputs to the Inertial Navigation System (INS) while enhancing the targeting capability of attack/scout fleet.

The DGNS targeted for the Black Hawk and Chinook fleets can operate in Doppler only, GPS only, and combined Doppler/GPS modes. To accommodate this new functionality the faceplate of the Computer Display Unit (CDU) has been modified to include a four line display that is Night Vision Goggle (NVG)/ANVIS-HUD compatible. For future operations in controlled airspace the DGNS currently includes receiver autonomy integrity monitoring (RAIM) and Fault Detection Exclusion (FDE) features and is integrated into the Command Instrument System to provide a single navigational solution. It should be noted that at this time that not all controlled airspace issues, to include requirements, procedures and architecture for a GPS based enroute navigation, non-precision and precision approaches are resolved within DOD or the FAA.

Although the fielding of these systems has already begun, provisions for future upgrades to the EGI and DGNS are already being examined under a DoD directed Tri-Service Navigation Warfare Integrated Product Team. These advanced capabilities will be demonstrated in a joint service Advanced Concepts Technology Demonstration (ACTD) during FY99. Likewise future versions of AMPS are under development, and will provide automated performance planning, and automated weight and balance computations as well as advanced mission rehearsal software. Weapons with greater lethality and mobility cannot influence combat unless in the right place at the right time. Together, AMPS and GPS provide tools for the Army Aviator to rapidly plan and execute missions on today's high OPTEMPO battlefield.

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BY RUSSELL STANTON

SIIRCM + SIRFC + AN/AVR-2A > SUM OF THEIR PARTS

The latest and greatest in Aircraft Survivability Equipment.

The Suite of Integrated Infrared Countermeasures (SIIRCM) and the Suite of Integrated Radio Frequency Countermeasures (SIRFC) are the two most critical development programs in the area of Aircraft Survivability Equipment within the Aviation Electronic Combat Project Managers Office (AEC-PMO). The AN/AVR-2A is the production laser warning receiver managed by the AEC-PMO. Both of these developmental systems and the AN/AVR-2A have been described in prior issues of this magazine.

The programs will be summarized below to refresh one's memory. The key feature to be addressed in this article is the integration of these three systems and the expected benefits of this integration. This is a case of the integrated systems being greater than the sum of their individual parts.

The Suite of Integrated Infrared Countermeasures/Common Missile Warning System(SIIRCM/CMWS) program marks the beginning of a new era in Aircraft Survivability Equipment for the US Army. It is a fully integrated infrared countermeasure system with application to the fleet of modern US Army rotary wing aircraft.

In addition the CMWS portion of the system provides missile warning capability for the fleet of US Air Force, US Navy and Us Marine Corps Tactical Fighter aircraft with potential application to US Air Force transport and bomber aircraft. The drive for this capability for all three services comes from threat weapon systems, especially man-portable Surface-to-Air Missiles (SAMs), becoming more easily obtainable. In the near future, more foreign threat weapon systems technology will be seen than in the past 25 years.

The SIIRCM/CMWS is the program within the Project Manager-Aviation Electronic Combat (PM AEC) to develop a replacement for the AN/ALQ-144A, AN/ALQ-156 or AN/AAR-47 (developed by the Navy), the M-130 and the M-206 decoy. This replacement will be a modular, re-configurable system able to detect and defeat current, near future, and

projected infrared (IR) threat missiles on a wide variety of aircraft platforms. The SIIRCM/CMWS is designed to meet operational requirements for a modular IRCM system capable of self-protection IR jamming countermeasures, infrared decoy dispensing, and providing sensor input for situation awareness.

The SIRFC is the program within the AEC PM to develop a replacement for the APR-39 radar warning receiver, and AN/ALQ-136 and -162 radar jammers. The SIRFC (AN/ALQ-211) is a multi-service Radio Frequency countermeasure system with application to the fleet of modern US Army rotary wing aircraft. In addition the SIRFC is being baselined for application to the V-22 Osprey aircraft. The SIRFC is designed to meet the operational requirements for a modular RFCM system capable of providing self-protection RF countermeasures and situational awareness on these aircraft.

"Each system can be integrated with current generation production systems."

The AN/AVR-2A is a laser warning receiver currently in production for application to US Army helicopters. The system provides warning to the flight crew that the aircraft is being targeted by a laser rangefinder, laser designator or laser beamrider and also provides an approximate direction of arrival of the laser beam. As currently implemented it is then up to the flight crew to take appropriate evasive action.

Each of these systems provides countermeasure response on a stand-alone basis when confronted by the threats for which they were designed. The SIIRCM provides a capability against a wide variety of infrared missiles; the SIRFC provides similar capability against a wide variety of RF guided missiles and the AN/AVR-2A provides warning for most all laser based weapon systems. Each system can be integrated with current generation production systems. As an example the SIIRCM can be integrated with the APR-39 radar warning receiver to allow the display of threats using the APR-39 display and to allow the SIIRCM to better use its countermeasure capability if in a highly dense threat environment. Likewise the SIRFC can be integrated with the existing M-130 dispenser to allow for the dispensing of RF chaff if required as a part of the threat response.

Each of these systems provides the countermeasure response needed in the face of today's threats, but an integrated system provides even higher effectiveness and will allow expansion to handle the threats of tomorrow. Several examples of this system response follow. In one case the SIIRCM is commanded by the SIRFC to dispense an active RF expendable in combination with an aircraft maneuver to provide enhanced countermeasure in a high intensity threat environment. The command is based on a combined threat assessment from the SIRFC radar warning receiver and the CMWS. In a second case the integrated system has detected an incoming RF missile and the SIIRCM jam head is used to track the missile and provide a feedback to the SIRFC as to the effectiveness of the jammer technique. This can be accomplished due to the precision tracker on the SIIRCM jam

head. As a third example the SIIRCM is already occupied with an incoming IR missile when the missile detector senses another threat on the way.

The SIRFC radar warning receiver provides sufficient information to determine that this new threat is RF based and thus the IR jammer does not need to be "hurried" from one threat to the other. Yet another example can be cited in the case of a laser based threat, the AN/AVR-2A alerts the crew that a laser is illuminating the aircraft and the CMWS alerts the crew as to the exact direction of a missile launch thus allowing the crew to take proper maneuver to cover to break the line-of-sight to the missile. In today's sophisticated threat environment many other examples could be cited since there are many multi-spectral threats using combinations of RF and optical guidance or RF and infrared guidance. A fully integrated system provides the flight crew with the most protection possible.

"The ability to communicate in a joint service arena will be critical and these integrated systems will provide additional data sources to that communication path."

Departing from the survivability enhancement provided by the integrated system, let's examine the effect on the aircraft mission. The integrated system can provide considerable information to the mission processor on an attack or scout helicopter. Examples of this will follow. The ATRJ detects the track radar associated with a long range RF guided missile threat. This information can be passed to the computer for hand-off to an attack aircraft to take out the radar system. This could be either another Army attack aircraft or one from another service. The ability to communicate in a joint service arena will be critical and these integrated systems will provide additional data sources to that communication path. Another example is that the missile detector declares the launch of a missile from close range, the countermeasure is effective, but in addition the launch location is provided to the gunner on the attack helicopter who visually locates the launcher and attacks the launcher with the gun system on the helicopter. This eliminates the launcher from further action on other helicopters.

The combination of precise radar warning, laser warning and missile approach warning allows for much better identification of threat air defense systems. This provides the forces with a much better "picture" of the battlefield for any future engagements in the same area and provides the flight crew with an ability to adjust their mission plans in the air.

A few examples of how an integrated infrared and radar countermeasure system can be employed to enhance not only the survivability of the aircraft but also enhance the mission effectiveness of the aircraft. It is easy to see that the "new math" does indeed hold for fully integrated survivability systems on today's rotary wing aircraft.

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BY MAJ JOSEPH KLUMPP
and MAJ EDWARD HEALY

TACTICAL AIRBORNE COMMUNICATIONS

One of the major axioms of warfighters throughout history is shoot, move, and communicate. The first two pillars of this axiom are frequently trained, analyzed, and discussed. In fact, many a heated discussion has occurred over which aircraft is the fastest, shoots the best, or lifts the most. However, it's not until we experience lost commo on our annual instrument checkride that we actually consider the importance of communications.

Improved communications increase tactical ability on the battlefield.

As Army Aviators, when we hit the Push To Talk (PTT) switch on the cyclic, we expect to communicate quickly and effectively. This communication imperative is the goal that we strive for in the office of the Project Manager for Aviation Electronic Combat (PM AEC). The purpose of this article is to address the various radios on Army Helicopters, their role on the modern battlefield, and ongoing efforts by the Avionics team within PM AEC to improve airborne tactical communications.

The modern fleet of Army Helicopters contains a suite of communication radios that covers a wide spectrum of the frequency band. Each radio plays a key role in accomplishing the mission of Army Aviation and each radio as a whole provides the overall tactical communication capability. The following table identifies the current and planned communications systems by aircraft type.

From a cursory examination of the accompanying table, it is readily apparent that the Army Aviator has at his disposal numerous communication links. Maintaining good communications and "keeping up" with the radios are major duties of the Aircrew during all phases of a mission. Each radio is an integral part of the aircraft system and has both capabilities and limitations. Let's further investigate each radio, its primary role, and what changes are coming in the future.

AN/ARC-201 Single Channel Ground Air Radio System (SINCGARS). The SINCGARS family of radios is the primary tactical communication radio of the United States Army. In Army Aviation we utilize the airborne version of the

Army Aircraft Communication Matrix

RADIO / ACFT	FM #1 ARC-201	FM #2 ARC-201	VHF-AM ARC-186	UHF-AM ARC-164	HF ARC-220
AH-64A	RT-1476A [1]	RT-1354/ ARC-186 (Shared [2])	RT-1354 (Shared [2])	RT-1518C	ARC-220
AH-64D (Planned)	RT-1478D (SIP)	RT-1478D (SIP)	RT-1300B	RT-1614	ARC-220 w/o CDU
UH-60A/L	RT-1477A	RT-1477A	RT-1300A	RT-1518C	ARC-220
UH-60Q (Med) (Planned)	RT-1478D (SIP)	RT-1478D (SIP)	ARC-222 [3]	RT-1518C on bus controlled by Acft CDU	ARC-220 w/o CDU
OH58C	RT-1476A	RT-1476A	RT-1354	RT-1518C	
OH-58D	RT-1478A	RT-1478A	RT-1300B	RT-1614	ARC-220 w/o CDU
OH-58D (Planned)	RT-1478D (SIP)	RT-1478D (SIP)	RT-1300B	RT-1614	ARC-220 w/o CDU
CH-47D	RT-1476A [1]	RT-1354/ ARC-186 (Shared [2])	RT-1354 (Shared [2])	RT-1518C	ARC-220
AH-1F	RT-1476A		RT-1354	RT-1518C	
UH-1H	RT-1477A	RT-1476A	RT-1354 or RT-1300A	RT-1518( ) or RT-1504	
UH-1V (Med)	RT-1477A	RT-1476A	RT-1354 or RT-1300A	RT-1518( ) or RT-1504	ARC-220

Notes:
1. Only one SINCGARS installed on the CH-47D and AH-64A
2. One RT-1354/ARC-186 is used for both VHF-FM #2 and VHF-AM
3. VHF-AM/FM SINCGARS Multiband Radio. Includes Maritime Frequency band.

AMPS-AAAA

SINCGARS radio, AN/ARC-201, to communicate with the supported ground units, artillery support, and for command and control purposes.

The SINCGARS is a Line of Sight radio operating in the Very High Frequency (VHF) band from 30 to 88 megahertz and is Frequency Modulated (FM); thus giving the radio its famous name, the Fox Mike.

The ARC-201 can be operated in either the single channel or frequency hopping mode. The frequency hopping or Electronic Counter Counter Measure mode (ECCM) allows the system to operate in an electronic jamming environment. Communications on this radio are secured by the KY-58 Communication Security Device (COMSEC). The primary Combat Net Radio, SINCGARS is truly the backbone of Army communications.

The radio's output power is 10 watts, which at altitude is sufficient to ensure communications at 30 kilometers. However, the ground SINCGARS radio has 40 watts of power causing a situation at Nap-of-the-Earth flight profiles where an aircraft can hear a ground station but cannot talk to it. Also, to compound this problem the aircraft signal strength is attenuated by terrain and vegetation thus limiting the effective range of the radio. In order to overcome this problem, PM AEC, CECOM and Program Manager Tactical Radio Communications Systems (PM TRCS) developed and fielded the

Improved Frequency Modulator (IFM) AM-7189A.

The IFM boosts the output power of the SINCGARS radio to 40 watts, giving Army Aircraft system parity with a ground system. The fielding is conducted in conjunction with Airborne SINCGARS radio and is ongoing with an expected completion in February 1998.

AN/ARC-164 HAVEOUICK II. The AN/ARC-64 HAVEQUICK II radio is an Ultra High Frequency (UHF) Amplitude Modulated (AM) radio that operates from 225-99.975 MHz. Commonly referred to as the "uniform", it can be utilized either in a single channel or in the HAVE-QUICK II frequency hopping mode. The system is used primarily in the voice mode but on an aircraft with a 1553B databus and an Improved Data Modem (IDM) the radio provides a robust data capability.

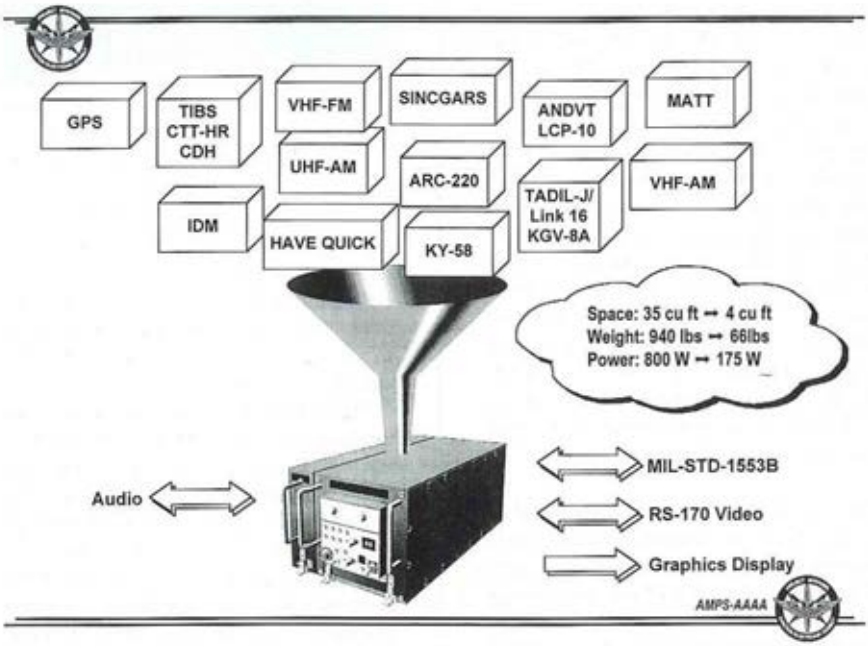
The AN/ARC-164 HAVEQUICK radio was developed and designed by the US Air Force. It was adopted for use in the Army as an upgrade to the legacy UHF single channel AN/ARC-5 IBX. The primary mission of the radio is air-to-air communications within Army Aviation as well as with Air Force, Navy, and NATO for joint operations. The radio also has a secondary role in and around controlled airspace for Air Traffic Control.

The system has been in the Army inventory for over ten years and various configurations of the system exist. In an effort to standardize the field and cut logistic costs, PM AEC is currently upgrading the fleet to a common HAVE-QUICK II solution. Most aircraft are receiving a panel-mounted radio (RT-1518C) which is Night Vision Device compatible and has an electronic fillport to facilitate rapid loading of the Multiple Work of the Day (MWOD) TRANSEC variable. All aircraft with a 1553B databus will have a bussed controlled system (RT-1614). The remaining UH-1H aircraft will have the remote version (RT-1504, C-11721).

In addition to the Airborne radios, PM AEC is fielding the AN/GRC-240 ground UHF/VHF AM HAVEQUICK II radio with an organic net timing capability. This system provides the Aviation Commander with the ability to communicate with his aircraft on both the AN/ARC-164 and AN/ARC-186 VHF radios. PM AEC is committed to developing and fielding ground systems for Army Aviation units that mirror the radios available in the aircraft.

AN/ARC-220 High Frequency Radio System. Army Aviation typically operates at NOE altitudes and at ranges beyond the capability of tactical VHF or UHF line of sight radios. Based upon this requirement, PM AEC initiated a project in 1992, in conjunction with CECOM Research and Development Center to procure a new High Frequency (HF) radio system. A Non-Development Item (NDI) acquisition, with advance digital signal processing, the AN/ARC-220 will replace the existing AN/ARC-102 and AN/ARC-199 radio sets. The system is in the final stages of Engineering Manufacturing Development and is currently undergoing integration testing at the Aviation Technical Test Center at Fort Rucker.

The AN/ARC-220 radio provides secure and nonsecure voice and data communications in the 2.0-29.999 Mhz range in 100 Hz increments. The beauty of the system is that it allows the aviator to talk at distances from 0 to 300 kilometers. In fact, the radio has demonstrated successful communication links in excess of 1000 miles. The ARC-220 radio system is user friendly and makes HF radio feasible for the pilot through the use of Automatic Link Establishment (ALE). This feature



takes the guess work out of frequency selection by allowing the radio system processor to pick the best frequency for long range communications. The system also features Electronic Counter Counter Measure (ECCM), pilot directed position reporting, and limited data capability.

The radio consists of three line replaceable units; the Receiver/Transmitter (RT-1749), Power Amplifier Coupler (AM-7531), and Control Display Unit (C-12436). The system can be controlled via the 1553B databus without the CDU. The ground configuration of the radio is designated as the AN/VRC-100 and consists of the airborne system repackaged with a speaker and power supply for operation at 115/220 VAC or 28VDC.

The primary mission of the ARC-220 HF radio system is to augment internal aviation line of sight radios when they can no longer maintain connectivity. Because of its long range, the system naturally complements deep strike or reconnaissance missions. The pilot directed position reporting feature will prove invaluable for situational awareness in all mission profiles. Finally, an aircrew will no longer have to perform precautionary landings to an area within walking distance to a telephone, so that he can call back for maintenance support. The ARC-220 HF radio system will fill the non-line-of-sight void in Army Aviation.

The Future. Significant recent advances in electronics, microchip technology and software processing hold great promise for the future of Army Avionics. PM-AEC is working diligently towards the goal of combining the current suite of black box radios into one small box filled with modules that emulate radios. The Joint Combat Information Terminal is currently being developed by PM-AEC

and the Naval Research Laboratory. The radio of the future holds modules that through software will be dynamically reprogrammed to emulate any radio selected by the aircrew.

By simply selecting frequencies through the push of a button, an aircrew member could make a module function as a SINCGARS for one transmission and a Havequick for the next transmission. This multiband, multimode radio weighs less, costs less and is more capable than all current radios on board Army aircraft. In addition, the JCIT also offers a tremendous level of redundancy because modules can function as many different radios with a push of a button.

Effective communications are critical to the successful accomplishment of Army Aviation's mission on the modern battlefield with the dawning of the information age, an understanding of avionics becomes even more important. It is essential that we, as Army Aviators, understand the missions, capabilities and limitations of our communication systems. This article was an attempt to provide some of that information. It discusses the various radios available to the Army Aviator and the avionics programs being developed and fielded by PM AEC to improve communications. Finally, it demonstrates how the Program Management Office for Aviation Electronic Combat is committed to providing tomorrow's technology today.

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FUTURE
(Continued from Page 18)

Cell have yielded insights related to hardware, software, doctrine, force structure and tactics. Some of these include a redefining of the operational environment in the battle space where altitudes and capabilities are increased without a loss of force protection; new requirements for mandated system compatibility for joint and combined operations; and a paradigm shift from restrictive to permissive control measures. We have seen the future now.

The reality is that we must make sound investments to fix problems within identified resource constraints. In other words, there is no new money to fix current or future readiness challenges—working smarter with the resources on hand is the solution. We can create cost avoidance through reinvestment in virtual and constructive simulation to create a more balanced portfolio of readiness resource investments.

My challenge to you—to all of us—Industry, STRICOM, PEO Aviation, AAAA, and the National Guard Bureau, is to help find ways to balance the aviation readiness resource portfolio. Aviation resources should be used in such a way that units in the field do not experience a degradation in warfighting readiness between the time that a reinvestment occurs and the time that the supporting TADSS hits the ground. I am convinced that working together, we can find a solution to the "how" piece of the Aviation Reinvestment Strategy. I also believe the solution may have to be unorthodox, but the time for us to "speak with one voice" and to act is now—because the future is now.

★ ★

MG Adams was the Aviation Branch Chief and CG, U.S. Army Aviation Center (USAAVNC) and Ft. Rucker, AL, and Commandant, U.S. Army Aviation Logistics School (USAALS), Ft. Eustis, VA, when this speech was delivered.

BY CW5 RANDOLPH W. JONES

SOME MEMORIES WILL NEVER FADE

Did Randy's "Mississippi Queen" end up as a bunch of beer cans?

Once upon a time as a post-diluvian (non-conversational adjective) author, I recanted to some peers and professional colleagues some rather dim memories of my year in the Air Cavalry in Vietnam. A full quarter century casts shadows which most likely would have precluded my unstimulated memory from formulating anything other than a novel. However, as the years pass, I remain entangled in what probably could be a legal basis for royalty entitlement for the theme portrayed in the popular movie comedy *Groundhog Day*.

As is the case with most aviators participating in protracted combat operations, I was assigned as Aircraft Commander (AC) to one AH-1G Cobra, tail number 67-15546, which I proudly christened the "Mississippi Queen." I mentioned this aircraft by tail number in the article which appeared in the December 1995 issue of ARMY AVIATION Magazine. Naturally, sentimental attachment evolved from many combat operations which serve as reinforcement for many of my memories. Quite unexpectedly, after returning home safely from my tour, a chance meeting in 1973 with my aircraft, newly refurbished from the Corpus Christi Army Depot, rekindled embers as I flew it the remainder of the year while assigned to "A" Company, 158th Aviation Battalion at Fort Campbell, KY. In those days the Alpha companies of the 158th and 101st Aviation Battalions were attack helicopter companies which were organic with a Headquarters Company and three UH-1 assault helicopter companies to each of the battalions.

January 1974 arrived as I PCS'd to Ft. Rucker, AL for the Aviation Warrant Officer Advanced Course. Staying in place until 1976 for degree completion, I received my RFO for Germany. I returned stateside to Fort Campbell in 1979 and was assigned to B Company, 229th Attack Helicopter Battalion. In summer of 1979, we received three Production Model AH-1S aircraft to replace some of our aging fleet. Surprise, surprise, there was my "Queen." Once again, reunited with 67-15546, I soared

Pictures don't lie, complete with legible tail markings. Looks as though the pilot could use a fresh coat of paint, though.

The pilot and his "Queen", back when both still sported their original paint jobs.

with the Eagles. A little over a year elapsed as we nurtured night flying techniques and began dabbling in FLIR and NVG flight with our Cobra aircraft. Soon tactics and techniques mandated a platform shift to smaller and more versatile platforms as we honed our night fighting skills. I left the 229th and my trusty steed in 1980, for what is to this day my home in Special Operations Aviation.

Fifteen years "FLY" by. January 1996, a curious, yet professional piece of correspondence arrives in the mail. I do not recognize the business logo nor am I able to make a mental sorting of the likelihood of being a new "Publisher's Clearing House" gimmick. "Surprise" to the third power as Gomer Pyle would acclaim! The document-sized manila envelope contained a handwritten memo and a newspaper clipping from CW4 Oscar Max Hall.

"Red", as he is known by his friends and family, is a Vietnam helicopter pilot veteran and active participant in the Arkansas National Guard. He operates Engineering Services Inc. and has a hangar and office space at the Springdale, AR Municipal Airport. His first interest was in letting me know how my December 1996 article had been parlayed to him and that he wished to relay that my aircraft in the story had not been converted to soda pop cans and razor blades. In fact, Max was instrumental in transferring its service-lifed carcass from the Arkansas National Guard to the caring hands of Pat and Cissy Edling, who along with some of their staunch American counterparts, Mr. J.T. Smith and Mr. Kenneth Hughes were emplacing the Northwest Arkansas WWII Aviation Museum. The incubating museum is located at the Siloam Springs, AR, municipal airport. Open to the public, it boasts a fixed wing T-6 Texan trainer, a T-2 Buckeye, J-3

Here's the proof: Max follows the checklist through a much anticipated ground run and taxi drill.

Cub, an L-3, a Beech 18, an A-7 Corsair, an A-4 Skyhawk Navy jet fighter, a 155 MM towed howitzer, and you guessed it, my AH-1G "Queen," 67-15546. Pat and Max say the aircraft have added much sparkle in local kids' eyes as they sit at the controls and envision virtual reality dogfights.

A chance coordination meeting at Ft. Chaffee, AR in March 1996 for an upcoming JRTC exercise, with freeplay around Camp Richardson and Ft. Chaffee provided the opportunity to flyby and make overhead photos and later a 30 mile ground excursion to visit the museum and its organizers. I traveled with CPT(P) Greg Petrik, our RS3 Current Operations Officer. We could not wait to meet the entrepreneurs. The Siloam Springs airport, not yet progressed to the AVJET era, is a quaint and perfect setting for the project. Located in the northwestern-most region of Arkansas, very near the Oklahoma border, its scenic setting is well complemented by the true American spirit of its citizenry. The airport and its museum supporters have a weekly get-together to tell embellished stories and try to keep the museum premises in shape with volunteer support. Needless to say, they have my heartfelt thanks.

A small digression is necessary to make public and hopefully bring appropriate accolades to Max Hall for his contributions in rejuvenating Army Aviation history. Max has undertaken no small chore in refurbishing his chariot of war, an H-21 Shawnee. Max and his friend Rec Murray, a native of Fayetteville, AR traveled overland to Alaska with his truck and trailer on his sheet metal forage. They slept in the truck and subsisted on sandwiches and occasionally splurged on a motel for a shower on the three week journey. The hulk he last transported had to have 50 foot tall

Pat Edling and his favorite Queen, the T-6 Texan.

trees, that had subsequently grown around the abandoned fuselage, cut and cleared to allow access. Max and his compatriots in Springdale, AR have searched and acquired three H-21 airframes and innumerable pieces and parts to restore to airworthy condition a flyable H-21. Mind you, "airworthy" is an understatement, as the photos attest. Max and his colleagues' craftsmanship rival original factory specifications and aesthetically surpass any expectation. Not one wiring harness contains a splice-plug. Silver solder and heat shrink are the only tell-tale signs that new wiring has spool constraints. Max has cranked, ground run, and taxied his trusty workhorse. Awaiting a shipment of airworthy certified blades, their mounting and tracking is one of the last hurdles to complete his dream to fly his heart throb to the Oshkosh reunion next summer.

I cannot describe a more dedicated group of true Americans. Everything the Hall, Edling, Hughes, and Smith families do is from the heart, out of pocket, and ensures "Some Memories Will Never Fade."

Those of you who want to volunteer or contribute in some way to the establishment, expansion, or upkeep on this commendable project can contact Pat Edling or Kenneth Hughes at:

Northwest Arkansas WWII
Aviation Museum
Route 3, Box 92
Siloam Springs, AR 72761
Phone (501) 524-4103.

★ ★

CW5 Jones is the Regimental Standards Officer, 160th Special Operations Aviation Regiment (Airborne), Ft. Campbell, KY.

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Top Chapters

The 1 October 1996 Membership Enrollment Competition standings have the following chapters ahead with two months left in the CY96 contest ending 31 December. The rankings are based on **CY96 net membership gain.**

Master Chapters (170+ members)		Senior Chapters (80-169 Members)		AAAA Chapters (25-79 Members)	
1. North Texas	35	1. Flying Tigers	37	1. Northern Lights	46
2. Potomac	18	2. Jack Dibrell	19	2. Rising Sun	34
3. Savannah	15	3. Tennessee Val	13	3. Armadillo	17

Top Guns as of 1 October 1996

The member who sponsors the greatest number of new members during the contest year ending 31 December 1996 wins an all expense-paid trip to the AAAA Annual Convention, as well as a $300 cash award, and receives a plaque. Please note that the Top Gun program has been expanded to include prizes for 2nd place, $400; 3rd place, $300; 4th place, $200; 5th place, $100.

CPT Susan M. Lind	148	MAJ David R. Brown	16
CW3 Dale E. Stroud	118	CW2 Kris A. Rogers	16
CPT Andrew B. Nocks	75	CW2 Russell O. Stark	16
CW4 Wendall A. Condon	53	Ms. Susan E. Barnes	15
CPT Curt S. Cooper	44	Mr. Alan E. Goess	13
CPT Daniel L. Clark	26	MAJ Michael T. Shifflett	12
Mr. Joseph A. Caines	21	SFC Pamela L. Shugart	12

AAAA President's Message

(Twelfth in a Continuing Series)

MG Richard E. Stephenson, Ret.

The Fall of 1996, and we are closing out a significantly successful year, particularly in an AAAA financial sense. Other indicators are not as encouraging. Your National Executive Board will meet on 14 October 1996 in conjunction with the AUSA convention in D.C.

We will be thumbs up on a great Fort Worth convention from General Ham Howze's remarks and moving presence in receiving the AAAA Order of St. Michael Gold Award for being a giant and an icon of Army Aviation for over 50 years to the stirring speech of LTG Jack Keane who did more to credit Army Aviation in 20 minutes than some of us have done in 20 years. The video says it all, folks, so use it in your chapter activities.

I'm rapidly down to three NEB meetings to moving on as your President. It is my intent to consummate two actions and launch a strong third action prior to the end of my watch.

I hope to have an Executive Director hired and functioning by next April, and I hope to have a new contract signed for AAAA incorporating the needed changes that our Contract Review Committee and AAPI have been discussing for several months.

The strong third item is a revitalization of our membership by laying out a smorgasbord of activities and initiatives, all calculated to retain old and attract new members through improved and expanded support, service, and stewardship to the membership, private, military, corporate, etc.

Please weigh in on the minutes of the October NEB meeting and if you see anything causing us to move in directions other than I've indicated, or that you cannot support, please let me know.

There are alternatives for the future of AAAA that can be explored in whatever depth events might lead us to move. I do not believe we can simply mark time, and have no intention of doing so. Your National Executive Group (Stephenson, Robinson, and McNair) is committed to a viable, robust AAAA—out front and framing the AAAA future of which we can all be justly proud.

The entire Army Aviation family should close and join with ATCOM in St. Louis and do all we can to make their move to the new Aviation and Missile Command (AMCOM) as successful as possible. I'm sure MG Gibson would appreciate all the help he can get.

I'll give you another situation report on these items after the October meeting. Comanche is flying while the Soviet Army bear is dying. Peace in Bosnia, the Holy Land, and elsewhere will give us all a well-deserved pause to reflect on our good fortune as Americans, once again reviewing our national leadership.

Have a great Fall season.

Army Aviation Simulation Symposium

Above: GEN John M. Shalikashvili (center left), Chairman of the Joint Chiefs of Staff, listens to a presentation by COL William W. Powell (center right), Director, Directorate of Training, Doctrine, and Simulation (DOTDS), Ft. Rucker, AL as MG Richard E. Stephenson, Ret. (left), AAAA President, MG Ronald E. Adams (center), Aviation Branch Chief, and Mr. Mike Edwards, Ft. Rucker, AL, look on.

The First Annual Army Aviation Simulation Symposium was an outstanding success. More than 200 attendees gathered at the Crystal Gateway Marriott, Arlington, VA on September 4-6, 1996 to hear the army aviation community speak with one voice on simulation technology, training and acquisition issues. The event was co-sponsored by the AAAA Potomac Chapter and the AUSA, another first at the national organization level.

Following a welcome by COL Joseph L. Ferreira, AAAA Potomac Chapter President, MG Richard E. Stephenson, Ret., AAAA President made a few remarks and awarded Order of Saint Michael Awards to LTC Jan Drabczuk, Ret., who first proposed the idea of a simulation symposium three years ago, and COL Bob Godwin, the immediate past Senior VP of the Potomac Chapter, who really got this event off the ground.

Next, MG Ronald E. Adams, then Aviation Branch Chief and CG, USAAVNC and Ft. Rucker, AL, presented his Keynote Address, "The Future is Now in Simulation" (see page 6 of this issue).

Following the Branch Chief's address, GEN John M. Shalikashvili, Chairman of the Joint Chief of Staff, arrived to take a 20 minute tour of the military and industry exhibits. Exhibitors included: Lockheed Martin; Northrop Grumman; Army Aviation Center, DOTDS; ARPA; National Guard Bureau, Aviation Reconfigurable

Manned Simulator; Naval Aerospace Medical Research Laboratory and NASA; STRICOM; 18th Aviation Brigade; and the 160th Special Operation Aviation Regiment (Airborne).

After the CJCS departed, the program resumed with the "Army Aviation Simulation Strategy" panel chaired by MG Adams. Panelists included: MG John M. Riggs, Assistant DCSOPS, Mr. Thomas L. House, Executive Director, RD&E Center, USAATCOM, Mr. James M. Skurka, Deputy Commander, U.S. Army Simulation, Training, & Instrumentation Cmd. (STRICOM), Mr. Paul Bogosian, PEO, Aviation, Mr. Charles A. Gainer, Chief, U.S. Army Research Inst. Avn. R & D Activity, COL William W. Powell, Director, Training, Doctrine & Simulation, U.S. Army Aviation Center, COL James C. Reynolds, APEO Task Force XXI, COL Henry C. Ruth III, Division Chief, Army Models and Simulations, ODCSOPS.

The Industry and STRICOM panels were next and followed by the luncheon address by MG Riggs.

Three industry papers were presented in the afternoon: "Army Aviation Collective Training Requirements for Simulation Systems" by Mr. Jay Anton, Requirements Engineering Manager, Lockheed Martin Information Systems; "Aerial Gunnery/Scanner Simulator (AGSS)", by Mr. Robert N. Kriedler, VP & General Manager, Binghamton Simulator Company, Inc; and "What to Look For in a Reconfigurable Simulator" by Mr. Randy Boys, Manager, VST Strategy and Fanout, Texas Instruments.

The Banquet was highlighted by a heartfelt address by GEN Ronald H. Griffith, Vice Chief of Staff, U.S. Army and an emotion-packed, patriotic performance by the Army Chorus.

The morning of the 6th saw the Breakfast Professional Session, with the Honorable Gilbert F. Decker, Assistant Secretary of the Army for RDA as Guest Speaker.

Following the Breakfast Session, the first Professional Session Panel got underway with the theme, "Academia in Army Aviation Simulation".

After a quick refreshment break, the last event of the day, the "Army Aviation Priorities for Simulation, Trainers, and Devices" panel addressed current simulation challenges and included: COL William W. Powell, Director, Training, Doctrine & Simulation, U.S. Army Aviation Center, and COL Robert E. Godwin, Deputy Assistant Commandant, National Guard, U.S. Army Aviation Center

Panelists: COL Henry C. Ruth III, Division Chief, Army Models and Simulations, ODCSOPS, COL James C. Reynolds, APEO Task Force XXI, MAJ James W. Arp, Aviation and Maneuver Battlefield Operating Systems, CW5 Cliff McGee, Ret., SHARICON Inc. who briefed on the 160th SOAR(A)'s simulation efforts.

Hats off to the Potomac Chapter for an extremely successful event and especially chapter members SFC Pam Shugart, VP Programs, MAJ Dan Newcomb, and LTC Tom Petrick, who helped make it all happen.

Solicitation now underway for CY 96 AAAA National Awards:

NOMINATIONS DUE AT THE AAAA NATIONAL OFFICE ON OR BEFORE JAN. 15, 1997

"Award Presentations"

Up to eight AAAA National Awards for accomplishments made during Calendar Year 1996 will be presented at the 1997 AAAA Annual Convention in Louisville, KY. Senior members of the U.S. Army will be invited to present the AAAA's top awards to the 1996 winners.

"Outstanding Aviation Unit Award"

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

"ARNG Aviation Unit Award"

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

"USAR Aviation Unit Award"

Sponsored by AlliedSignal Engines, 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"

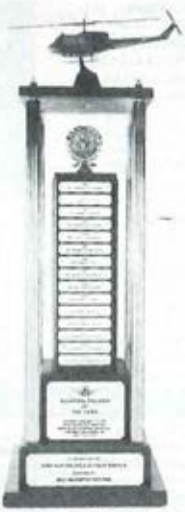
Sponsored by the Northrop Grumman Corporation, this award is named in memory of Brigadier General Robert M. Leich, USAR, the AAAA's first president (1957-59) and its Awards Committee Chairman for 23 years. It is presented periodically to a unit for sustained contributions to Army Aviation, to a unit or an individual for a unique, one-time outstanding performance.

"Army Aviator of the Year Award"

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

"Aviation Soldier of the Year Award"

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



"James H. McClellan Aviation Safety Award"

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

"Joseph P. Cribbins DAC of the Year Award"

Sponsored by Boeing Helicopters, this award is named for Mr. Joseph P. Cribbins, the award's first recipient in 1976. It is presented annually by AAAA "to the DAC who has made an outstanding individual contribution to Army Aviation in the awards period encompassing the previous CY." A candidate for this award must be a current Department of the Army Civilian.

Administrative Details

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

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

ALOHA
HONOLULU, HI
CW3 David W. Hayter
CPT Charles A. Jamot
CW5 Raleigh L. Voight

AVIATION CENTER
FORT RUCKER, AL
2LT Kathy L. Allison
CPT Tony Angela
2LT John E. Arnold
WO1 Christopher L. Ashe
WO1 Rebecca J. Battleson
WO1 David S. Bebich
2LT Monica E. Benjamin
2LT Drew P. Berwanger
2LT Bradley S. Biggs
WO1 Barry P. Bowen
2LT Marla K. Bradbury
2LT Thomas K. Brede
WO1 Evan J. Brown
WO1 Daniel C. Bryant
2LT Brandi L. Bult
WO1 Alexander A. Chickosky
WO1 Frank A. Chudy
WO1 Daniel E. Cole
WO1 Rick J. Cote
WO1 Eric V. Cox
WO1 Matthew S. Crandall
2LT Matthew A. Crouch
WO1 Timothy A. Daley
LTC Marc Demler
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WO1 Steven E. Schwab
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Mr. Frank T. Lawrence
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SGT Leroy G. Gutierrez

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SFC Bert C. Reyes

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ARLINGTON HALL STN, VA
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CW3 Gary Nisker

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FORT POLK, LA
CW2 Leonard B. Shafer, Jr.

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1LT Christopher L. Bonner
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SSG Wayne A. Knowles
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SGT Avery T. Mayfield
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CW3 Jack D. Pennington
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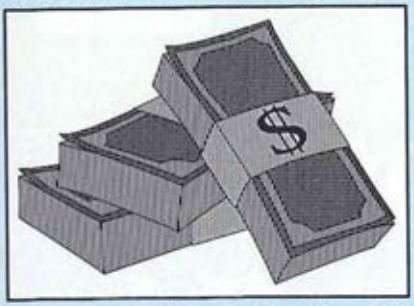

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The AAAA Scholarship Foundation, Inc. (AAAASFI) is now part of the Combined Federal Campaign (CFC), a workplace charitable fund drive conducted by the U.S. Government for all federal employees. It is the single largest workplace fund drive in the country, raising approximately $195M in pledges annually.

Please consider making a CFC-sponsored contribution to the AAAA Scholarship Foundation this year. AAAA's code number for the Fall 1996 CFC is **2121**.

NEW AAAA E-MAIL ADDRESS!

The AAAA National Office now has a new E-Mail address via the Internet. Our address is: aaaa@quad-a.org

AAAA CALENDAR

A list of upcoming AAAA Chapter and National events.

AAAA NEWS

October 1996

Oct. 14. AAAA National Executive Board Meeting, Sheraton Washington Hotel, Washington, DC.

Oct. 14. AAAA Scholarship Board of Governors Executive Committee Meeting, Sheraton Washington Hotel, Washington, DC.

Oct. 29-31. AAAA Colonial Virginia Chapter and AHS Hampton Roads Chapter, Helicopter Military Operations Technology Specialists Meeting (HELMOT VII).

November 1996

Nov. 12-15. AAAA Avionics and Electronic Combat Symposium (formerly AEC Symposium), Ocean Place Hilton, Long Branch, NJ.

December 1996

Dec. 12. AAAA Morning Calm Chapter Christmas Ball, Seoul, Korea.

January 1997

Jan. 29-31. Joseph P. Cribbins Product Support Symposium sponsored by AAAA Lindbergh Chapter & AAAA Logistics Support Unit Awards & AAAA Industry Award Presentations, Stouffer Concourse Hotel, St. Louis, MO.

February 1997

Feb. 7. AAAA Scholarship Board of Governors Executive Committee Meeting, National Guard Readiness Center, Arlington, VA.

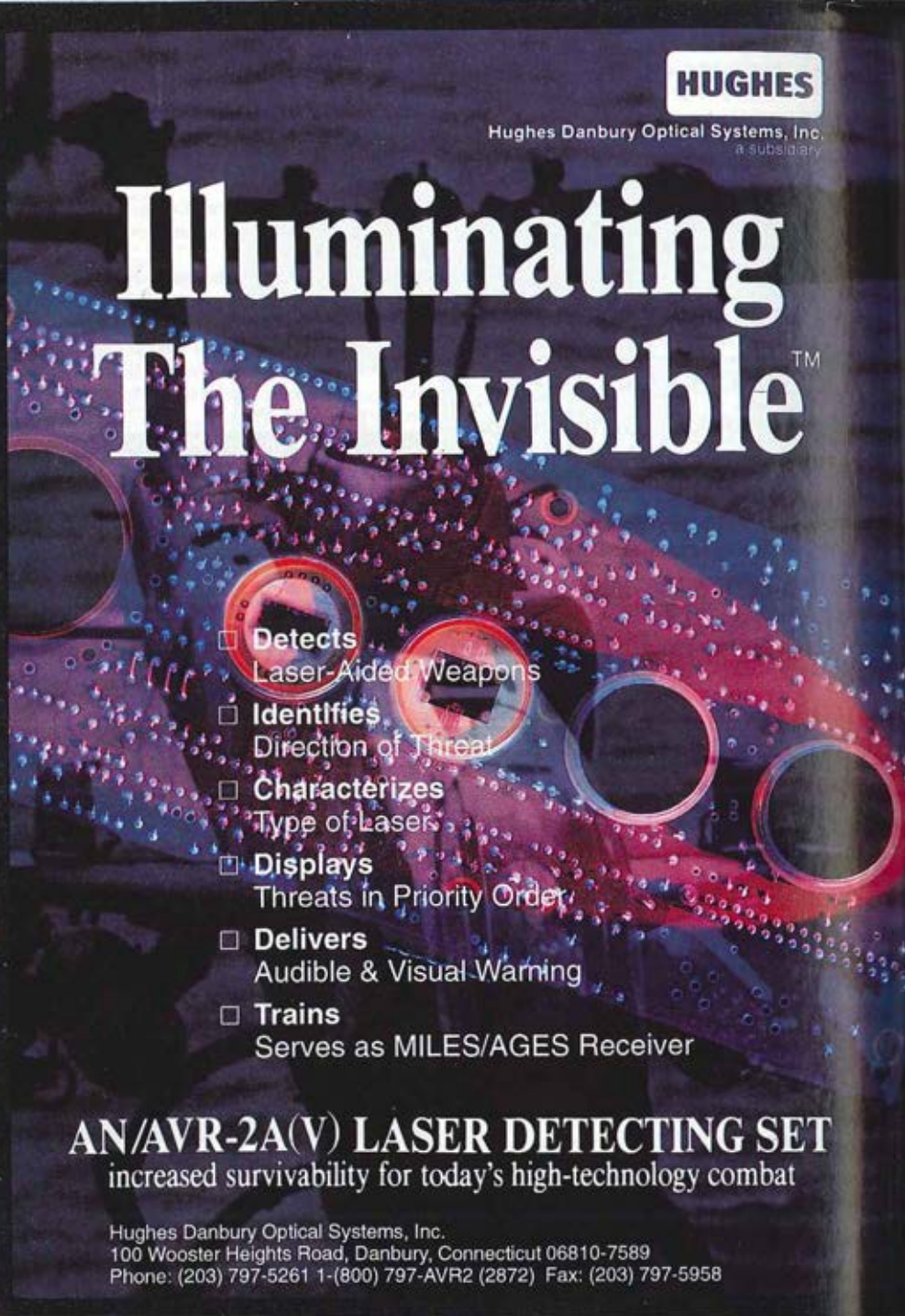
Feb. 8. AAAA National Awards Selection Committee Meeting to select 1996 National Award Recipients, National Guard Readiness Center, Arlington, VA.

April 1997

Apr. 23-26. AAAA Annual Convention, Kentucky Fair and Expo Center, Louisville, KY.

April 1998

Apr. 1-4. AAAA Annual Convention, Charlotte Convention Center, Charlotte, NC.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