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SIMULATION & TRAINING SPECIAL FOCUS

ARMY AVIATION

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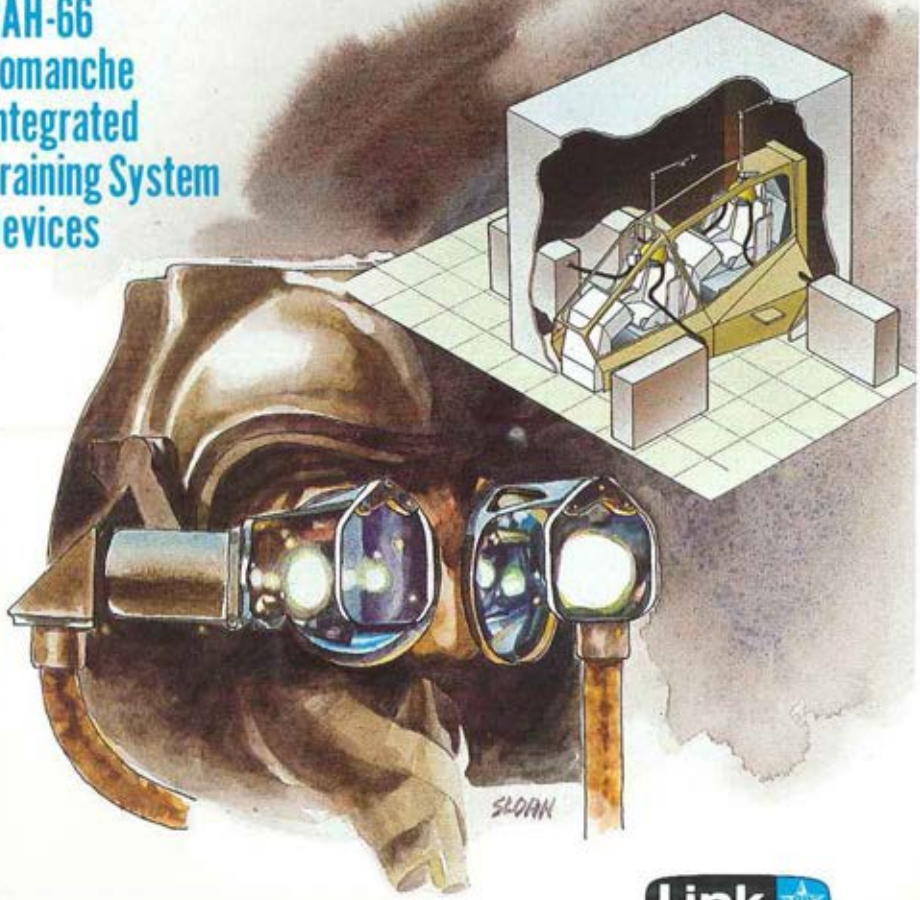
RAH-66 Comanche Integrated Training System Devices



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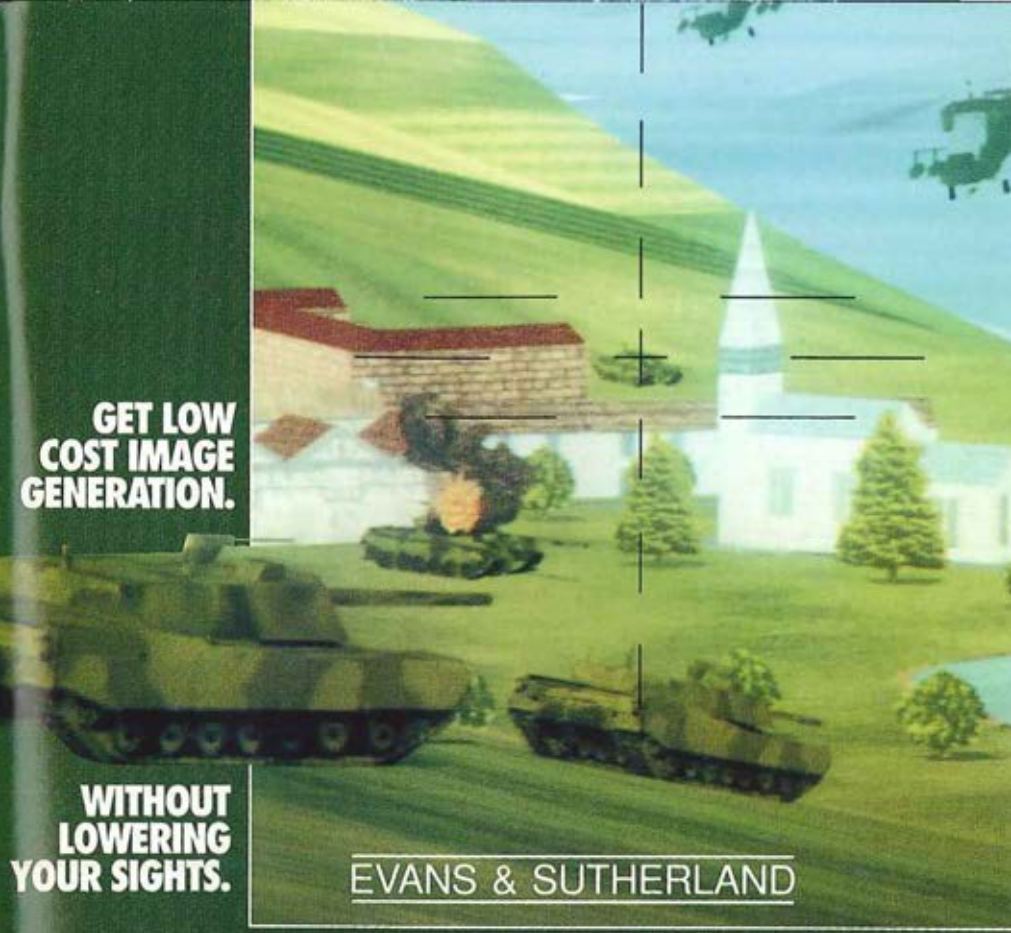

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Aviation: Our Most Flexible Combat Multiplier

By General Edwin H. Burba, Jr.

In the pre-dawn darkness, U.S. Army OH-58s and Apaches slip across the border between Saudi Arabia and Iraq. The mission is one that is crucial to the success of the war effort. In a brief window of time, these aviators must take out a small number of critical radar sites. If they fail, surprise will be lost and Iraqi air defenses will be alerted. Casualties in the air armada that is nipping at their heels will be much higher. In a dazzling display of flying and gunnery, the aerial hunters destroy the stations in an almost picture-perfect operation, allowing the joint operation to continue.

Several days later, and miles to the southeast, a brigade from an armored division is given the mission of staging a feint to draw the Iraqi's attention away from the Third Army's main attack. As the brigade presses its attack across the border, divisional aviation assets are placed OPCON to the brigade. The brigade commander places the aviation units out in front of his force and uses them to develop intelligence on enemy locations and strength. Aerial delivered fires, in conjunction with artillery and some direct fires from maneuver units, inflict substantial casualties on the entrenched Iraqis. At the end of approximately 24 hours, the brigade cleanly breaks contact and moves from positions along the Iraqi-Kuwaiti-Saudi border back south, following the main attack to the west. Through the use of combined arms tactics, the brigade succeeded in diverting Iraqi attention from GEN Schwarzkopf's "Sunday Punch" coming from the west.

GEN Burba is Commander in Chief, Forces Command, Ft. McPherson, GA.

In a lightning maneuver, the 101st Airborne charges across the vast wastelands on the Third Army's left flank to position itself astride the enemy's lines of communications. There, it cuts off not only the enemy's resupply capability but his line of retreat as well. This was an attack with

operational implications, allowing us to use "positional leverage" against a well dug in Iraqi defender.

Even after the ceasefire, U.S. units are drawn into combat. In one instance, Iraqi units attack in an attempt to move out of an area where they have been pocketed by U.S. forces. A divisional aviation brigade is given the mission of stopping this Iraqi violation of the ceasefire. Attempts to "wave off" the Iraqis are ignored and the aviation brigade is locked in combat. In a three hour battle, the aviation brigade destroys the Iraqi force and fires almost 110 Hellfire missiles. Only five are reported to miss. Army Aviation chalks up another battlefield success, this time as a "pure" force.

These, along with other engagements, demonstrate the flexibility and combat power inherent in the newest member of our combined arms team. Our success on the battlefields of Southwest Asia speaks volumes for the professional competence, tactical improvisation, and courage of the members of the Aviation community. But now we must turn our sights to the present to see how we must chart our course for the future.

Present Issues

A fundamentally new world order now has arrived. The democratization of Eastern Europe and the Soviet Union, and the reduction of Soviet forces in Europe have caused us to re-examine our strategic plans in light of a new multipolar world. In *National Security Strategy of the United States*, dated August 1991, President George Bush has laid out the military elements of our new defense strategy. They are: nuclear deterrence, forward presence, crisis response, and reconstituting forces in case of global war.

Forces Command (FORSCOM) has a large share of responsibility for the latter three elements of this strategy and Army Aviation will play a critical role in all three. In the arenas where we maintain a forward presence, particularly in Europe, there is now the potential for less stability and a greater likelihood for battlefield emergencies to develop. The enormous combat power and operational and tactical flexibility that can be generated by deploying even small numbers of aviation units can shore up stability, relieving political and military pressures that might otherwise result. Crisis response forces will initially consist of light forces that will seize and hold airfields, seaports, transportation and economic nodes, and key terrain. They are vulnerable to a highly mechanized threat. There is no more valuable covering force combat multiplier to compensate for this weakness than Army Aviation. Such units can be used to buy us time for the deployment of heavy forces. In an era of uncertain dangers, the ability to mobilize necessary forces to meet large threats is extremely important. Aviation skills have more in the way of civilian equivalency than do many other branches. When this is combined with the more readily accommodated weekend training that is characteristic of this arm, the meaning is clear. RC aviation will be able to be readily mobilized when they are needed. Thus, their potential for rapid reinforcement will be significant.

The challenge we face now is to improve upon our past performance during the coming austere fiscal environment. The lessons learned by mobilizing and deploying both active and reserve aviation to Southwest Asia will provide a basis for us to work from but are still under review. In addition, two significant studies on Army Aviation will be in their final stages as this issue of ARMY AVIATION MAGAZINE goes to press. The findings of the Aviation Systems Program Review (ASPR) and Aviation Requirements for the Combat Structure of the Army (ARCSA) soon will be presented by their proponents. These efforts will address the future force structure of Army Aviation in both short and long terms and are important tools in the process of ensuring that our aviation structure and modernization plans keep pace with emerging doctrinal developments. Of particular importance to FORSCOM will be their recommendations on the Active and Reserve component mix. All of these projects will yield important results. What we must now do, however, is look at the short term programs that will

produce tangible gains. There are two that you will hear about in the near future: the FORSCOM Aviation Program and BOLD SHIFT.

Building Blocks

Our success in Southwest Asia came from practicing sound fundamentals. We will continue to emphasize these in the months ahead and focus on four specific areas: training, maintenance, standardization, and safety.

- Training is *the most* important activity within any unit in the Army. All members of the Aviation community have the responsibility to look at our recent experiences in Southwest Asia and extract the lessons that can be learned. Discussion alone will not suffice, however. These nuggets of wisdom must be integrated into our daily training routines. The burden of this integration falls, as do so many things, on the shoulders of the commander. The commander of the unit is responsible for that unit's preparedness when it is called to deploy. If realistic, demanding training has not been the standard, we are failing in our duty to our subordinates and the Army.

We have just completed the FORSCOM Aviation Brigade Commander's Conference. The theme was well chosen—"Training, the Cornerstone to Victory." The conference was an opportunity to assemble the senior aviation leadership in FORSCOM and provide a forum to raise issues requiring FORSCOM attention. We will use the results of this conference to hone our training goals, requirements, and policies for our aviation units.

Generally speaking, however, there were four training lessons learned from our latest combat operations in the Gulf. We need to ensure that we can rearm, refuel, and sustain effectively. The foe we fought did not press us as we expected, but the distances over which we operated did. The techniques and procedures that we developed to overcome these problems need to be captured. Furthermore, we have to focus on methods that will allow us to protect the force and ensure its survivability. The tactics used to do interactive reconnaissances and fire and maneuver have to be refined and promulgated. Finally, in the process of disseminating these doctrinal lessons, we must ensure that we have not garnered the wrong ones. Combat in this day and age is a fast-paced and unforgiving environment that does not allow us the luxury of a second chance.

- Maintenance is the second building block. Our directive to FORSCOM aviation leaders is that 50% of every duty day should be devoted to this crucial activity. We are fully aware of the problems that you face. Aviation force structure limits the number of authorized mechanics to the minimum necessary to support our aircraft fleet. Quality maintenance programs require command involvement to minimize distractors. Unplanned demands for detail personnel, assignment turbulence, and any number of training distractors can reduce available maintenance work time to 25% of the duty day if the leadership is not watchful. Solutions to these problems have to come from within your units.
- In aviation, success is guaranteed by doing things right the first time, every time. Standardization has long served as one of the guiding principles of aviation training. Standardized procedures provide unity of effort and clearly defined guidelines that can be used to develop highly skilled, mission ready crews and units. Safe and successful aviation operations are rooted, therefore, in a sound standardization training program.

FORSCOM ensures that the sustainment and collective training of its Active and Reserve Component units measure up to the latest doctrine. Our FORSCOM supplements to aviation regulations delineate policy that defines standards across the board. The Aviation Resource Management Survey (ARMS) program is the most visible FORSCOM standardization initiative. The ARMS checks the pulse of our aviation community and provides the commander an assessment of the organization's training readiness. The ARMS focus is aligned with the concept and philosophy of FM 25-100. In addition, inspection criteria will be standardized for

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greater insight into the quality of our Active and Reserve Components. Implementation of this program begins this fiscal year.

- Aviation is truly an unforgiving, dangerous business. Safety is, therefore, the linchpin holding together our building blocks. We hold all commanders responsible for ensuring that safety is preached and practiced as the standard in all training. During DESERT SHIELD/STORM, more aircraft were lost to accidents than enemy action. It is incumbent on us to develop in peacetime those same habits that will protect us in time of war. This effort must go beyond a command memorandum on a day room bulletin board. It must be an enthusiastic, visible concern which energizes everyone to protect our valued personnel and conserve limited equipment resources.

Every commander has the responsibility to foster a focus on safety within the unit. Here is a suggested way to meet this obligation. First, perform a risk assessment to identify potential hazards which threaten your soldiers. Second, pinpoint who your high risk people are. Finally, meet with these personnel to share your concerns, involve them personally, establish your goals, and launch your program. Your focus on safety shows a personal interest in their welfare. Be creative, but whatever you do, be effective!

RC Enhancement—BOLD SHIFT

Not enough can be said about the magnificent performance turned in by our Reserve Component (RC) units, to include our great RC aviation units, during the Gulf War. Their readiness and ability to meet the demands placed upon them, coupled with our reductions in the size of the active force, are major factors in a revival of interest in their contribution to the national defense. In the future, we can expect to see RC forces playing a more active role in all the elements of our military strategy. More RC units will be involved in crisis response forces, reinforcing units, and in the reconstitution of our forces for major crises. Our RC aviation units will play a significant if not overriding role in all these missions.

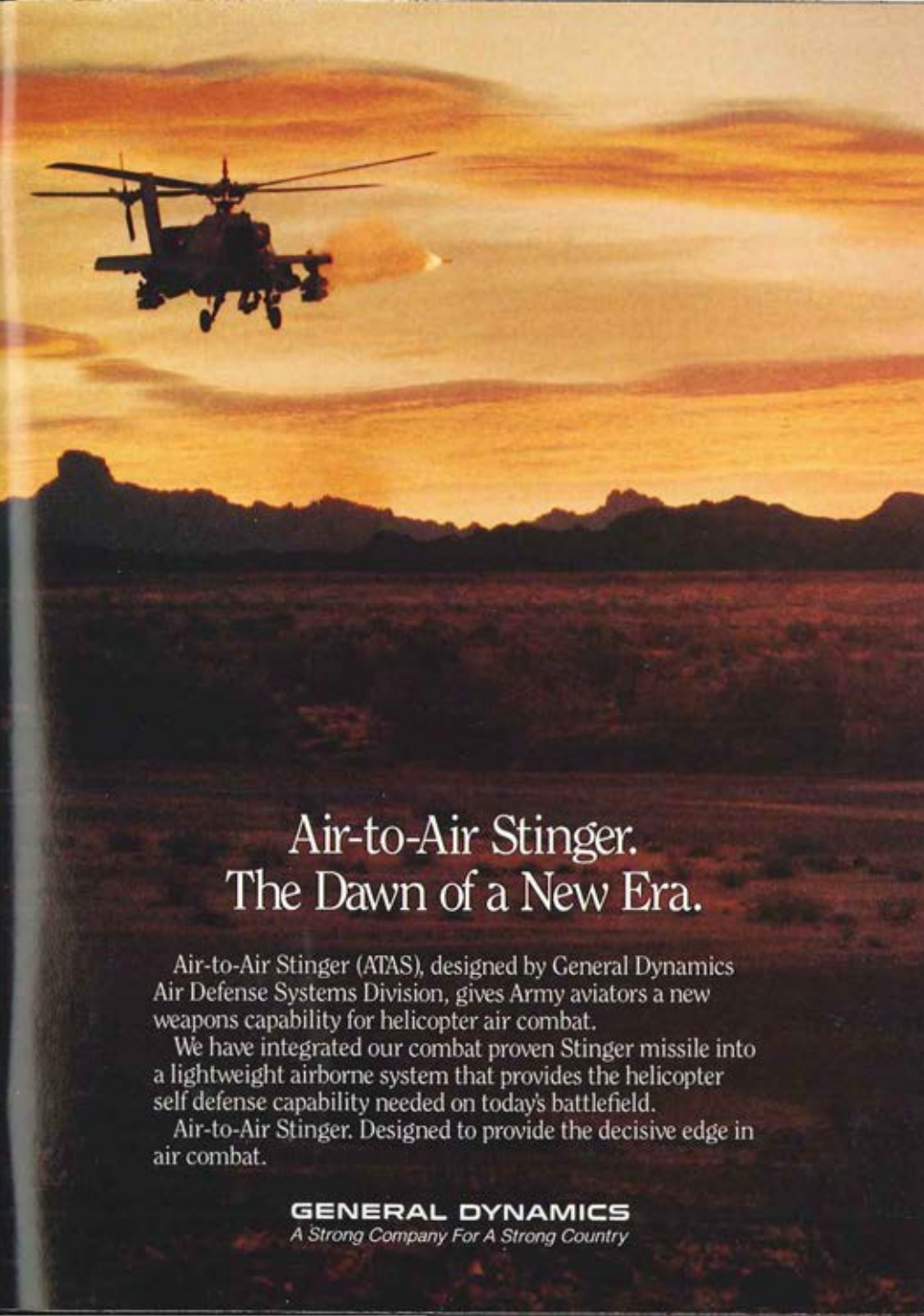
We have initiated a program entitled BOLD SHIFT to ensure that we can make immediate gains in the overall readiness of our RC units. A special task force, composed of both AC and RC members, has been convened at FORSCOM headquarters that is looking at all aspects of the readiness equation. They will develop programs that will provide high payoff increases in RC combat effectiveness through better communications and synchronization of AC/RC efforts. Initially, these programs will be applied to high priority units (Roundout and Roundup brigades and 35 early deploying RC combat support and service support units) for final "tweaking". Once the programs are completed, they will be applied to the remaining RC units. As stated earlier, Army Aviation is an area where Guardsmen and Reservists can play a particularly effective and timely role and the BOLD SHIFT Task Force will keep this in mind as it goes about its work.

I cannot emphasize enough how important it is that we view the Army as a Total Force. RC units comprise roughly 40% of the overall Aviation force now and possibly in the future. We must seek out more effective ways to train and integrate RC units into the Total Force. The success of our crisis response and contingency forces very well may depend on their capabilities.

Future Challenges

Where do we go from here? To a large extent, this rests in the hands of the members of the Aviation community and its ability to discern current and future challenges and trends and clearly fashion contemporary responses. These areas, in particular, will require your attention: sustaining a warfighting mindset, and developing new organizations, equipment, doctrine, and training procedures.

Aviators cannot be distracted from their basic mission—participating as a member of the combined arms team to provide reconnaissance, fire support, maneuver, and sustainment capabilities. Preparedness is a must and, for this, tough demanding



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training is essential. Safety requirements must be carefully balanced with the needs of realistic training so that our future knights of the sky have a feel for the demands of combat. We do not have the luxury of staging demanding training only during the mobilization period. Moreover, Army Aviation's leadership must train as well as fight and lead from the front. There is no substitute for seeing the battle firsthand, and by extension, seeing and influencing training firsthand. Only through the use of your own eyes can you cut through the fog of war and peace and see what is actually happening on the battlefield and in the training areas and skies.

Doctrine and organizations will come under more intense scrutiny in the upcoming years as we attempt to milk every ounce of strength from each defense dollar. "Nice to have" options must be ruthlessly pruned and the focus must be on enhancing our combat effectiveness. We must look at creative solutions to organizational problems. Force structure has to be revised to keep pace with future technology. In Vietnam, a Captain with only six years in the service could be found commanding an aviation company with over 200 soldiers and 20-30 airframes. It was not unrealistic for them to fly over 3,000 hours a month. Compare this with our current organization and the 13,000 hours flown by the Apaches during DESERT STORM. What should the structure be? Have we gotten here as a result of increasingly complex technology and control requirements, or for other reasons? Where should aviation assets be concentrated—at Division, Corps, or Field Army level? What should the organization of our future air-ground teams actually be? All of these are fertile grounds for inquiry and are areas where the men and women at the cutting edge *must* make their views known.

A New Beginning

DESERT SHIELD and DESERT STORM are behind us now. As we review the performance of all arms of the services and continue the laborious process of compiling the lessons learned, it is obvious that we have come a long way from where we were at the end of the Vietnam War. We are better equipped, better manned, better organized, and better trained than ever before. Our success has come from a dedicated team effort in which Army Aviation has played a major role. We have reached the end of an era, one in which we can all be proud. But we are now embarking on a dramatically new one. The dynamics are different, the challenges greater.

If your past performance is any indicator of the future, I am confident that we can meet any challenge and that Army Aviation will remain our most flexible combat multiplier. I salute all of the members of the Aviation community in our Total Force. You have made us proud. IIIII

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DEFENSE

An Integrated Training Philosophy

By Major General John D. Robinson

One of the emerging observations from OPERATION DESERT STORM is that "We fought like we trained ... and it worked." The Army training strategy, followed for more than a decade, paid great dividends on the battlefield. As we look to the future, the perspective of recent battle and the challenges of the new strategic environment must be combined to influence how we think about training for the remainder of this decade and into the next century.

Recent events have changed the context for future operations. First, the Army will become mostly a CONUS-based contingency force, comprised of active and reserve components, with a significant power projection mission. Second, training will be greatly influenced by the emerging technologies being applied in our force structure and new systems. Third, future conflicts will demand adherence to joint operations and are likely to be coalition based. Each of these factors, by itself, is enough to suggest some tuning in our training strategy. Taken together, they suggest that substantial institutional adjustments may be required.

Our mission in the new strategic environment will require competency across the spectrum of conflict; a relevant strategic Army force must operate in the joint environment and expect projection anywhere in the world against ill-defined adversaries. AirLand Operations concepts are being developed now and will soon be promulgated in revised AirLand doctrine. The USAF is undergoing massive reorganization; Army force structure is adjusted to meet future missions. Changes in joint and combined arms operations will cause shifts in our doctrine and demand innovative adjustments in our tactics, techniques, and procedures. We must creatively exploit the full potential of the technology base. This calls for a systems' approach to training that vertically integrates training from individual through crew and collective levels—and horizontally through the battlefield operating systems.

We'll be challenged to institute means to validate performance at each level and simulation strategies that address all battlefield tasks. Risk assessment methods must be matured and routinely applied in our peacetime training operations. Each year we learn more about the psychological dimension of training—the way people learn, the way soldiers behave in combat; such knowledge must be applied in our training environment. In coming to grips with the changes needed in this new environment, we may discover that perhaps we've only scratched the surface in training. More questions than answers exist.

Right now, our best Aviation training is focused on individual skills. Through repetitive task iterations and annual verification, we've

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

"Can complex individual tasks be conducted in a realistic combat environment?"

ensured that our individual aviators are proficient in flying skills. But work is still needed. Are individual tasks fully integrated into crew tasks? Are our crews fully coordinated in operating complex mission equipment packages? Are there individual battlefield tasks that cannot be effectively trained in peacetime because of cost or safety risks? Can complex individual tasks be conducted in a realistic combat environment?

While we are improving in the area of Aviation crew training, we still have a way to go. Aviation crew training must be standardized and team tasks fully integrated. We've made a lot of progress recently in this area, but have not yet succeeded in institutionalizing what we know on the subject. Continued input from the field is needed to develop focused training literature.

Some crew tasks are expensive or too risky to train in peacetime field training environments. Can we harness crew simulators, adequately address these tasks, and can we measure skill transfer? Do we have the ability to stimulate the crew with stress levels equivalent to combat? What are the human or psychological factors that enhance crew coordination? There are subtle relationships between people and diverse personality profiles that greatly influence crew performance. There is much to learn in this area. Can individuals be tested, profiled and then matched into more proficient combat crews? How do we teach, standardize and evaluate crew performance?

And what about collective training—the team level through battalion? Are crew level tasks cross-walked with the team drills? How often does team training take place, and how do we validate the training? What is the effect of personnel turbulence on the collective level? Are company level units provided the time and assets to execute an adequate collective training program in peacetime?

While we've done well in the past, a need exists to continue the refinement of our training philosophy and improve training methods at every level. We must seek innovative ways to harness the full potential of technology, fully explore all the human dimensions of the soldier, and devise training that is integrated vertically and horizontally throughout the combined arms team. Performance must be verified and economies sought. In short, we need to seek an integrated systems approach to training.

In recognition of the complexity and importance of this problem, we've recently begun several new initiatives here at Fort Rucker. A re-write of the entire TC series of manuals is underway, concentrated on the vertical integration of battlefield tasks. The new Commander's Guide will focus on training on unit Mission Essential Task List (METL) tasks and unencumber the commander from ATM bureaucracy. With your help, we will prioritize and develop training strategies and devices to train tasks that have significant fiscal or safety impact. It is a time of change. We must be active in anticipating future needs, and craft meaningful training methods. It is not going to be easy and it will not be done overnight. Our goal is a branch of world-class, joint and combined arms team warfighters who are capable of deployment anywhere in the world and will be decisive against any foe. IIIII

A New Training Helicopter

By Lieutenant Colonel Pat Oler

Why a New Training Helicopter (NTH)? The short answer is that the Huey is too much aircraft for the job, is getting old, and costs too much to operate. Pursuit of a NTH for use in Initial Entry Rotary Wing (IERW) flight training is not a new initiative. It began in 1986 when the Army's Vice Chief of Staff directed the Training and Doctrine Command (TRADOC) and the U.S. Army Aviation Center (USAAVNC) to develop a replacement for the TH-55. Consequently, the UH-1 was designated as the interim primary trainer in 1988 while TRADOC continued to work toward formalizing the requirement for a new training helicopter.

The Huey offers many advantages over the TH-55, but as a primary trainer, it is very expensive to operate. An Economic Analysis conducted by Science Applications International of Orlando, FL indicates that IERW pilot training costs could be significantly reduced by displacing the UH-1 with a commercial training helicopter whose operating and support costs are much lower. It is anticipated that as much as a 63% reduction in operating and support costs could be achieved with the introduction of the NTH as the Army's primary trainer. This translates to a $40 million per year savings once the displacement is completed.

LTC Oler is PM, Light Observation Helicopter (LOH) and NTH, St. Louis, MO.

What Will the NTH Look Like?

The NTH is envisioned to be a commercial "off the shelf" non-developmental helicopter with no military specifications and weighing 6,000 pounds or less. It is to be certified by the Federal Aviation Administration (FAA) for both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR), and can be configured with three crashworthy seats and a crashworthy fuel system. The NTH will be powered by a turbine engine and have, at minimum, the ability to:

- Maintain a cruise speed of 90 knots;

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The TH-55 Osage was the Army's last initial entry training-dedicated helicopter. It was retired from the Army inventory in June 1988.

- Maintain a 500 feet per minute rate of climb from sea level through 5,000 feet of altitude.
- Maintain an out of ground effect hover at 3,000 feet pressure altitude, 95 degrees Fahrenheit, with a 20 knot wind.
- Start up and shut down in winds up to 35 knots with a 20 knot gust spread without incurring damage.
- Conduct a safe, power off, autorotational maneuver.

Above all, the NTH must be an effective primary training aircraft that emphasizes positive habit transfer for young pilots transitioning from basic flight training into the Army's more sophisticated aircraft.

Contractor Provisions

In general terms, we want 157-180 NTHs and 12 Cockpit Procedures Trainers (CPTs) with operating and support cost guarantees. Additionally, we want the NTH Contractor to provide spare parts support, guarantee spare parts availability and be responsible for depot level repairs on both the NTH and CPT. He will also be required to conduct Initial Key Personnel Training (IKPT) for Instructor Pilots, Maintenance Test Pilots, and Fort Rucker maintenance personnel; plus provide a full-time, on-site Field Service Representative at Fort Rucker.

When Will We Get the NTH?

The stops have been pulled to streamline the acquisition process as much as absolutely possible so as to minimize any delays in obtaining and fielding the NTH at Ft. Rucker. A Draft Request for Proposal (RFP) was distributed to over 120 interested contractors on 6 September 1991. By the time this article is published, we will have received industry's comments on the Draft RFP and will be busily working on finalizing the Formal RFP.

It is our goal to mail the Formal RFP by 1 December 1991 with proposals due from prospective contractors by mid-February 1992. The evaluation process will begin shortly after receipt of the proposals with contract award projected for 4th Quarter FY92. We anticipate aircraft deliveries will begin 12 to 18 months after contract award, and an Initial Operational Capability (IOC) should be achieved eight months after deliveries commence. IIIII

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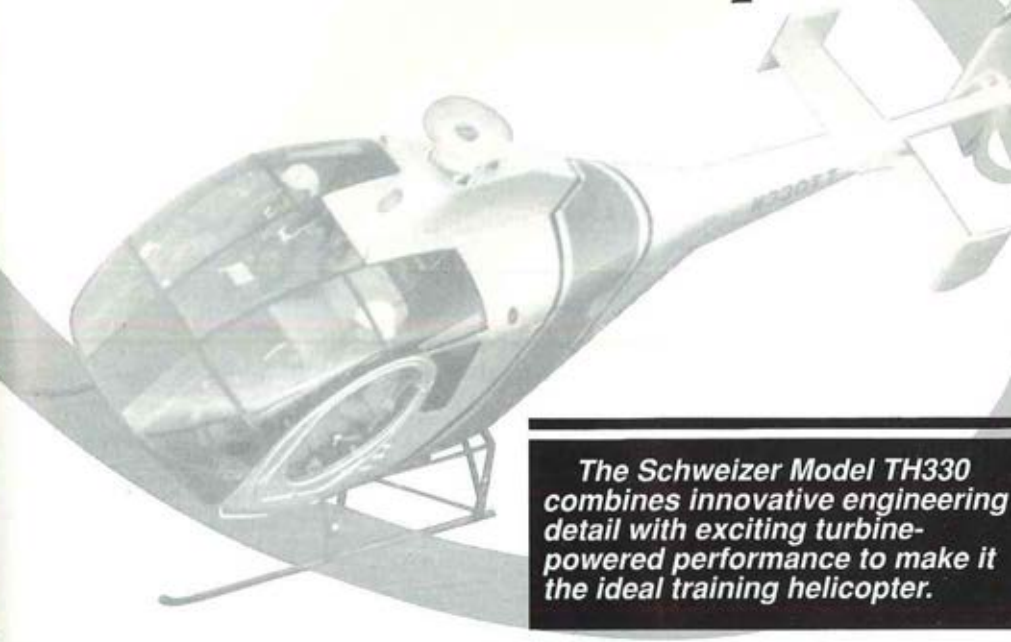
The TH330 Turbine Helicopter



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DESERT STORM and the 3-D Maneuver Battlefield

by
LTC William H. Bryan and CPT Michael A. Albaneze

The widespread introduction of the Apache Attack Helicopter Battalion (ATKHB) into the U.S. Army has expanded the newest form of maneuver to the AirLand battlefield. The concept of aerial maneuver is not widely understood nor accepted by the various branches of the Army, to include Army Aviation. Current doctrine states that the ATKHB is used primarily for deep fires on the battlefield. The October 1989 FM 6-20-30 "Fire Support for Corps and Division Operations" focuses more on the use of the ATKHB in JAAT operations and as an aerial fire support asset, than as an aerial maneuver unit that requires fire support. The AH-64 ATKHB can do much more than fly cross-FLOT, kill tanks, and RTB.

This article will address considerations for the ATKHB as an aerial maneuver battalion on the AirLand battlefield, particularly as employed during DESERT SHIELD and DESERT STORM in the Kuwait Theater of Operations (KTO).

LTC Bryan is Commander, 2-229th Aviation Regiment, Fort Rucker, AL.

Tactical Force

The ability to take and hold ground has been the long-standing definition of a ground maneuver force. The tank was originally considered as an "infantry support vehicle" and poor at holding ground. Air Cavalry was a development from the Vietnam era and demonstrated that several cavalry missions could be conducted from the air by the AH-1 and OH-58 team. The ARA Cobra Battalion was converted into Cobra ATKHBs, and then, through the UTP at Fort Hood, into Apache ATKHBs. The evolution from aerial rocket artillery was spawned by advances in technology.

CPT Albaneze is FSO, 2-229th Aviation Regiment, Fort Rucker, AL.

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The technology of the Apache enables it to go farther, for a longer period, and employ Hellfire missiles at stand-off distances from enemy ADA and armored forces. The Apache ATKHB can deny terrain through fire and maneuver as well as conduct a delaying action. This was the mission for several ATKHBs during DESERT SHIELD and the reason the ATKHB was so high on the list for combat units deploying to the KTO. Apache attacks are doctrinally "raids" (FM 100-5 definition) where the mission objective is not to take terrain but to destroy an objective. The Apache ATKHB exploits its mobility, speed, and firepower to accomplish its aerial maneuver missions.

Current Doctrine

Employment of the ATKHB is recommended by the corps artillery commander based on the Target Value Analysis (TVA) conducted by the corps targeting cell. The corps' aviation brigade commander is the most qualified person in the corps to make recommendations about the employment of aviation assets. Distances covered for ATKHB operations in the KTO were greater than those covered in CONUS and European theater training scenarios. A doctrinal deep attack for the ATKHB (as taught in both the Field Artillery and Aviation Officer Advanced Courses) was about 30 kilometers; deep attacks in the KTO exceeded 100 kilometers. Training areas in the U.S. and Europe are primarily designed for ground maneuver units, and do not adequately support the maneuver space such deep operations require. The ATKHB frequently operated along or beyond the corps and ARCENT Fire Support Coordination Lines (FSCLs) during Operations DESERT SHIELD and DESERT STORM.

An attack helicopter battalion is designed to do just what it is called—attack. AH-64 battalions are manned and equipped to fight the close, deep, and rear anti-armor battle. The primary tactical missions of the AH-64 attack battalion are:

- Movement to Contact
- Hasty Attack
- Deliberate Attack
- Aerial Escort/Security
- Counterattack

Special purpose missions the AH-64 battalion may be expected to conduct are:

- Air Cavalry Operations
- Delay
- Rear Operations
- Spoiling Attack
- Reconnaissance in Force
- Demonstration
- Exploitation
- Pursuit

A Passage of Lines (forward and rearward) and Battle Handover are implied in most AH-64 battalion operations.

AH-64 Attack helicopter battalion mission statements describe the results that the attack battalion commander requires when he assigns the battalion a mission.

- Attack to destroy
- Attack to attrit
- Attack to disrupt
- Deny avenues of approach (delay)
- Overwatch

A given percentage of kills and ammunition expenditure is associated with each mission statement.

Current doctrine employs the entire ATKHB OPCON to the ground maneuver brigade. However, for specific missions in support of a brigade, an attack helicopter company should be used to fight the mission to more effectively employ the entire ATKHB. This can only be done for specific missions of a short duration of time because of the lack of command & control and logistical support assets when fighting only the attack helicopter company. This was successfully done during DESERT SHIELD and DESERT STORM.

When Apache units operate in the same maneuver space as a ground unit, the ground brigade S-3 and FSE are responsible for deconflicting airspace for the safety of the Apaches. Because the infantry or armor "owns" the terrain, the Apaches were viewed by the ground elements as airborne fire support platforms during DESERT SHIELD/STORM. Forward observers searched for a call-for-fire format to suit the Apache, and some even thought that they *had* to lase for the Apaches with the Ground/Vehicular Laser Locator Designator (G/VLLD). The best way to relay tar-

get information to Apaches is to send a SITREP.

Fire Support Peculiarities

There is no habitual field artillery battalion to provide direct support for the aviation brigade and its ATKHB(s) in the division; nor is there an established relationship between the corps artillery and the corps ATKHBs. The ATKHB continually operates in depths far exceeding U.S. field artillery coverage, often as much as 80 kilometers beyond the maximum range of available U.S. FA assets. The use of 2.75" rockets for suppression necessitates the trading of Hellfire missile "rail space" on the Apache, and therefore reduces the tank-killing capability of the ATKHB. Additionally, 2.75" rockets are not as reliable and accurate as FA-delivered fires that can also mass their fires in far greater volumes than 2.75" rockets.

The division or corps aviation brigade with Apache battalions should also receive a tactical mission for field artillery fires in support of their operations. This mission should always be General Support (GS) to the Aviation Brigade unless there is an available unit to provide Direct Support (DS) fires, or provide support through a non-standard tactical mission. At the outbreak of DESERT STORM, the 101st DIVARTY was given a GS role to the 101st AVN BDE and was available for non-standard tactical mission support to the ATKHBs.

A more aggressive commander would consider placing a field artillery battalion in Direct Support of attack operations when those operations are the main effort of the division or corps, specifically a deep attack. The divisional ATKHB(s) need DS Multiple Launch Rocket System (MLRS) fires and close Joint Air Attack Team (JAAT) to fight the division battle, if only for a period of time. The corps ATKHBs need DS MLRS and/or ATACMS and deep JAAT to support the deep battle, again, if only for a limited period. With the commencement of "G-Day" operations in the 101st Airborne Division (Air Assault), air assault artillery raids were the only potential way FA fires could be brought to bear in support of ATKHB operations due to the blazing pace of the offensive. ATACMS fielding will enable the field artillery to deliver deep fires out to ranges within which the corps ATKHBs are expected to operate.

The air assault artillery raid was planned several times, but was not executed with the divisional ATKHB during DESERT STORM. On a deep raid, the ATKHB must provide control of artillery and CAS, engage with their own weapons systems, and provide security for the field artillery. Depending on how long the raid is going to last, having to provide security for the artillery reduces the capability of the ATKHB to fight the battle. There is a fine line distinguishing the ATKHB supporting the artillery raid, or the FA supporting the Apache attack. The supporting FA and lift aviation units *must* be prepared to initiate the mission at the onset of the Apache attack.

Summary

The attack helicopter battalion proved to be a most versatile and swift force on the desert battlefield. AH-64 battalions need to be viewed as aerial maneuver battalions by the aviation, infantry, armor, and field artillery communities. The depth of Apache operations exceeded those projected by the doctrine writers at Fort Rucker, AL. Field artillery fires were frequently unable to range the battlefield the Apaches were fighting on, making CAS the only lethal fire support asset immediately available to support the Apache battle. Field artillery commanders were not given direct support or non-standard missions to support the ATKHBs throughout the Gulf Conflict, and therefore did not have to support such deep and rapid attacks by the AH-64s. By lending adequate support to the ATKHB, the close, deep, or rear battle will only be more effectively fought and all the more decisive. The mobile, swift, and precision-guided firepower of the Apache supported by the massive fires of MLRS and ATACMS is a combination to throw fear into the heart of any foe. The true potential of the Apache attack battalion as a fighting aerial maneuver element on the battlefield will only increase when it is given the same support and employment considerations that any other maneuver asset can expect on the battlefield of tomorrow.

Safety: a Training and Combat Requirement

By Brigadier General Clyde A. Hennies

We did great! We accomplished the mission, and we can all take great pride in the tremendous success of Operations DESERT SHIELD and STORM. Much of that success is the result of progress the Army has achieved in integrating safety into its operational processes and leadership ethic. This is evidenced by the significant reduction in non-battle death and injury rates compared with other wars.

We did falter in some areas, and we at the Army Safety Center are now in the process of studying Operations DESERT SHIELD and STORM in great detail. We're taking a hard look at both the positive and negative lessons learned during that unprecedented campaign. And we also have an experienced safety professional working with the Center for Army Lessons Learned. Solid research and analysis are the keys to unlocking accident causes and prevention measures. Although there's still much work to be done in the postwar research and analysis phase, some lessons learned are already quite obvious.

BG Hennies was CG, U.S. Army Safety Center, Ft. Rucker, AL when this article was written.

Safety/Standardization Personnel

Overall, Operation DESERT SHIELD gets an "A+" on deployment. We pulled off the best safety effort in our history when we consider the massive size of the deployment, the tight time constraints, and the possibility of imminent combat.

Some safety personnel assigned to corps, division, and corps support commands were determined to be essential to mission accomplishment and deployed with their units. However, some units deployed without their safety and standardization personnel. These personnel deploy with their units during field training and should do so during combat. Units that deployed without them soon discovered they erred. Active involvement of safety and standardization personnel enhances battlefield sur-

vivability, thereby becoming a combat multiplier. It didn't take these units long to regroup and get this problem under control.

Not only did field units learn their lesson quickly, we at the Army Safety Center also learned ours. As the events of DESERT SHIELD and DESERT STORM began to unfold, we found that we had no contingency mission, no contingency plans, and no doctrine for field safety support. There had been virtually no battle focus in development of our organizational mission. This deficiency within the Army Safety Center is being remedied, but it must also be remedied at all levels Armywide.

Performance Standards

Over the past few years, we have been moving toward becoming an Army of Standards—the big "S" word—but we're not there yet. Standards are essential to efficient, effective, and, therefore, safe operations. But standards must also meet an enduring set of criteria. First, they must be reasonable and attainable. They must be periodically reviewed for reliability and validity. Our leaders and soldiers must be trained to a reasonable level of proficiency to meet those standards and required to perform to those standards. Performing to standards is a requirement that cannot terminate when we deploy from a training or operational environment to a combat environment.

Then it's up to commanders to enforce these standards and ensure individuals comply with the standards set for each task. Performing to standard becomes even more important in combat. When we are in a training environment, we have the luxury of repetition if performance fails. We don't have that luxury in combat. Leadership—enforcement of standards—is a job requiring 24-hour-a-day "tough caring."

Accident Investigation

Operation DESERT STORM provided the opportunity to conduct accident investigations during contingency or coalition operations in combat. One lesson hammered home is that we must have Army Safety Center personnel forward deployed.

Another problem that soon became apparent was the need for a streamlined version of an accident report for contingency or combat operations. AR 385-40, "Accident Reporting and Records" specifies requirements and procedures for reporting mishaps. However, these requirements and procedures proved too cumbersome in a combat environment. Modifications will be made, including methods for getting accident reports to the Army Safety Center. We are developing a new abbreviated contingency operations accident report form that can be used for reporting both aviation and ground accidents.

Night Operations

During Operation DESERT SHIELD, we had seven Class A aviation accidents; five of them at night.

When we looked at common threads in the night accidents, we found that, for the most part, people did not slow down as they got lower at night. Our crews were hitting the ground or the sides of dunes at speeds ranging from 25 to 70 knots. We also found that night flight in the Saudi Arabian desert presented unique challenges that our previous limited desert training had left us ill-prepared to handle. The problems were further compounded by the lack of visual cues and terrain contrast, which in turn caused our night vision devices to be considerably less effective than they had been in other environments. In addition, there was constant dust in the air up to 2,000 feet, making it difficult for pilots to judge the horizon.

As we got into the operation, we very quickly identified some of these problems. The combination of visual illusions and featureless terrain created unforgiving situations for night vision goggle crews. We quickly realized the need to assess these hazards and provide additional training guidance for our aviation units. This need led to an Army Safety Center sponsored evaluation of NVG operations in Southwest Asia by a team of representatives from the Army Safety Center, Army Research Institute, Aviation Training Brigade, and Center for Night Vision Electro-Optics.

From actual flights, analysis of audio and video tapes, and interviews with pilots, the team determined and recommended maximum airspeeds and altitudes for the different types of desert terrain and levels of illumination. Mission planning charts were developed, published, and quickly distributed to aviation units.

Aviation Systems Command (AVSCOM) also responded quickly to the need for an audio warning in the radar altimeter. Due to the low visual cue flight environment, pilot scanning workload dramatically increased. Scan stop of more than 3 seconds is risky at any time, and that risk was increased by the night desert environment. Without an audio warning, the pilot on the controls would have to divert attention from the flightpath to come inside the cockpit to check altitude. Preset to a specific altitude, the audio warning device would alert pilots when they were too low.

We now own a portion of the night—more than any army in the world. If we are to own more of it, we must improve our night vision capability as well as our operational structure and supervisory effectiveness for missions in this environment.

Risk Management

Risk management was integrated into planning and decision making at corps, division, and brigade levels with beneficial results. However, junior leaders—those people making risk assessments in the cockpit and in combat—were not properly trained to integrate risk management into their decision-making process. And, in some cases, preventable accidents resulted. Today's Army has realized only a small portion of the potential safety and training realism benefits of thorough implementation of risk management.

An examination of DESERT SHIELD and DESERT STORM accidents revealed that the most important risk-manangement skill is the ability to recognize risks. We used to call it the "sixth sense of safety." Today we are able to define the risk-recognition skill and other risk-management skills in conventional Army task, condition, and standard terms.

Leaders must be able to integrate risk management into mission analysis. For example, is there an operational necessity for a night assault in marginal weather with zero illumination? If so, do the benefits to be gained from the mission outweigh the possible costs of risk? When planning missions, leaders must be able to recognize risks and associated consequences and accept or reject those risks based on the benefits and/or operational necessity of the mission.

The U.S. Army Training and Doctrine Command (TRADOC) and we at the Army Safety Center are active in developing and integrating risk management into leadership training, field manuals, and professional development courses. The training is available, and we must ensure our leaders receive it and, in turn, make risk management an integral part of each mission plan.

Challenges Ahead

There is no question that in an operational sense, we own a portion of the night, but we don't own all of the night—yet. And as we work toward "owning the night," we have already indentified some challenges that we must meet and conquer before we can lay claim as the true owners of the night.

- Heads Up Display (HUD)—the pilot on the controls should have few, if any, reasons to bring his sight from the flightpath inside the cockpit. It's critical that we acquire the HUD—not necessarily one that has everything, but one that has the essentials—because control of the aircraft is the single most important thing in aviation.

- Improved night vision goggle (NVG)—the AN/AVS-6 is clearly superior to the AN/PVS-5, and the AN/PVS-5 was clearly superior to darkness. However, the AN/AVS-6 has some shortcomings. We need an NVG capable of better contrast identification and one with a 60-degree field of view. We also need a more precise way of focusing the goggles so we get their full potential. The Army Aviation Center and the

Army Aeromedical Research Laboratory have just recently developed a focus procedure—including both indoor and outdoor binocular focus adjustment—that can help us optimize both the AN/PVS-5 and the AN/AVS-6 image.

- Forward-looking obstacle-avoidance capability—we had tremendous problems with hitting or running into things while pilots diverted their attention inside the cockpit. One CH-47 aircraft hit a 350-foot microwave tower. The sole surviving crewmember of that accident said the last words he heard from the pilot on the controls were, "Where did that come from?"

- Training—preventing accidents in future conflicts depends on action taken now in training. We must systematically review our training for opportunities to require leaders to deal with the double challenge of identifying safety standards for combat and then any safety standards needed for training.

These training standards must be recognized as add-ons and peeled off when units deploy. The combat core is retained. We also must change peacetime training by allowing junior leaders to perform missions on their own, without constant supervision and correction—just as they'll have to do in combat.

Summary

Our aviation successes in Operations DESERT SHIELD and STORM are highly commendable. Our aviators flew missions in the toughest environment any Army aviator has ever faced. And as great as our successes and victory were, we have now turned our attention to that difficult task of taking a long, hard look at those tough, controversial issues that came out of this campaign.

As we move forward toward owning the night with our sophisticated, high-tech aviation forces, we must not forget the hard-bought lessons we learned in the darkness and dust of the Southwest Asian desert.

Freedom's Eagles: Army Aviation in Korea

by

Colonel John M. Riggs and Major Greg Kaufmann

For the last year, the world's attention has been focused on Southwest Asia (SWA), and rightly so. The largest mobilization of U.S. forces since Vietnam occurred in response to the overt aggression of Saddam Hussein. Army Aviation played no small part in that effort, being perhaps the branch which best embodies the three characteristics toward which the Army is striving: versatility, deployability, and lethality. Army Aviation silenced critics with the successful employment of many new systems in a harsh, combat environment which vindicated much embattled research and development data. But that 100-hour war is over, and world attention is once again refocusing on a nation which continues to be torn by a forty-year-old conflict moderated only by a cease-fire—the Republic of Korea (ROK).

Constant vigilance and combat readiness is the heritage of this conflict. A stabilized Korean peninsula is imperative to continued peace and economic prosperity in the Pacific Rim area, and serves our national interests. Threatening this stability is North Korea, which has the fifth largest army in the world, having devoted 25% of their gross national product to it. They enjoy numerical superiority in many critical areas, with 65% of their ground forces in very close proximity to the DMZ and capable of being hidden in underground facilities. The current discussions over the nuclear capability of North Korea is the latest example of North Korea's attempts to destabilize the peninsula. It is in this politically sensitive, militarily charged atmosphere in which the 17th Aviation Brigade Freedom's Eagles operate and prepare for any eventuality.

COL Riggs was Commander, 17th Aviation Brigade, Korea, when this article was written.

MAJ Kaufmann was XO, 4th Bn, 58th Avn Regt, Korea when this article was written.

Above, the typical configuration of a CH-47 "Fat Cow" FARP.

The 17th Aviation Brigade's mission is to conduct combined ROK/US combat aviation operations in support of Combined Forces Command (CFC), US Forces Korea (USFK), and Eighth US Army (EUSA). CFC, of which GEN Robert W. RisCassi is the CinC, consists of ground, naval, and air component commands, as well as the Combined Unconventional Warfare Task Force (CUWTF). The Ground Component Command (GCC) controls the ROK/US Combined Aviation Force (CAF), of which the 17th Aviation Brigade is a part. The Brigade can perform integrated combined and joint maneuver operations in support of theater campaigns. In order to meet this theater-level mission, the Brigade has an echelons-above-corps aviation structure (Fig. 1) consisting of five aviation battalions, and a headquarters company with an assigned pathfinder platoon. The assets of the Brigade are scattered across a 4,000 square kilometer area on seven different installations.

There is a concentration of unit headquarters in Yongsan, Seoul. The Brigade headquarters is here. Also, the 1st Battalion, 501st Aviation is headquartered in Yongsan. This theater aviation battalion contains a theater aviation company, two UH-60 assault companies (one special operations), a UH-1H general support company, and an AVUM-level maintenance company. It is employed in several roles to include SOA, C^3I enhancement, liaison, air assault and air movement operations, and reconnaissance and surveillance.

The theater Air Traffic Services (ATS) battalion—4th Battalion, 58th Aviation—is also located in Yongsan. Aside from providing vital tactical and fixed air traffic services with two widely dispersed companies, this battalion also performs the critical Army Airspace Command and Control (A^2C^2) function for the theater, coordinating the employment of airspace users—synchronizing time, space, and purpose. The medium helicopter battalion—2nd Battalion, 501st Aviation—is located at Camp Humphreys, Pyongtaek. These CH-47D aircraft are a valuable resource, able to perform both CS and CSS missions in support of the theater campaign or specific air assault and air movement operations.

The final two units in the Brigade provide the "Sunday punch" capability for the theater anti-armor mission. The 4th and 5th Battalions, 501st Aviation, are attack helicopter battalions located at Camp Page, Chunchon, and Camp Eagle, Hoengsong. A C-NITE conversion program is on-going, and the units are scheduled to modernize to the AH-64 in the near future.

17th Aviation Brigade

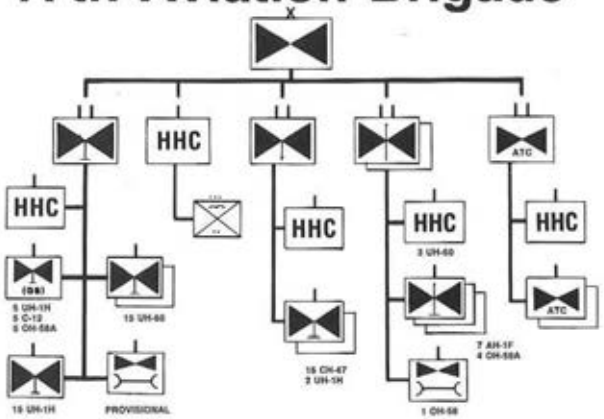

Figure 1

The Brigade has broad-based responsibilities within the theater—anti-armor, SOA, ATS, C^2 enhancement, air assault, and air movement. However, as the North Korean armor threat has grown, the emphasis within the Brigade has shifted to its attack capability and its function as the CFC reserve. Realistic, challenging mission training is conducted in a demanding, unforgiving environment combining weather extremes, terrain, and wires. Frequent field exercises and no-notice deployments at all levels of the force result in units, staffs, and soldiers that can function effectively in both joint and combined tactical situations. The very nature of combined/joint operations, coupled with the enormous turnover of personnel every year, dictate a high training OPTEMPO, perhaps the highest in the world.

With this structure and mix of capabilities, the 17th Aviation Brigade is capable of supporting USFK and EUSA in the conduct of any operation. However, the Brigade primarily functions as a member of the Combined Aviation Force (CAF) in support of CFC operations across the peninsula. The other half of the CAF team is the ROK Army Aviation Command. This melding of assets produces the largest combined army aviation structure in the free world, a division-level aviation unit that supports all of GCC and CUWTF. The CAF is organized with 14 battalions, 376 aircraft, and over 4500 personnel. Forces are task organized for specific tactical missions. Training is conducted continuously with biweekly air assault training and Joint Air Attack Team (JAAT) missions, resulting in the optimum enhancement of theater army aviation capabilities. A major player on the JAAT team is a USAF Tactical Air Control Party, which coordinates and facilitates preplanned and immediate JAAT missions.

In a recent seven month period, two of the four annual combined exercises entailed total activation of the CAF, and exercised its ability to support the varied missions of the CFC CinC. FOAL EAGLE '90 and TEAM SPIRIT '91 found the CAF performing single and dual ship CUWTF missions, rear area operations against simulated OPFOR special forces, cross-FLOT and deep attack helicopter operations, and regimental-sized air assaults. These exercises validate the tenets of AirLand Battle-Future: a nonlinear battlefield characterized by unprecedented violence and increased speed demanding initiative, agility, and synchronization. The CAF allows the CinC to exploit the aerial dimension of maneuver, providing him the battlefield mobility and agility necessary to negate the terrain restrictions of Korea.

Typical FARP established for all major exercises and when CAF is activated.

Emphasis is on the principles of mass and offensive spirit to exploit mobility and firepower. In sum, the CAF provides the CinC a potent combat multiplier for use in wartime.

One tremendous challenge which constantly undergoes scrutiny and refinement is the support and sustainment of the aviation force while conducting tactical operations. Combat service support is focused at the task force level. While the units have jump FARP capabilities, fuel and ammunition is centralized at "anchor" FARPs to help the units rearm, refuel, and refit. These anchor FARPs are established for all Brigade, joint, and combined level exercises, and have proven valuable in conducting more efficient, more responsive aviation operations.

In March, former U.S. Army Chief of Staff GEN Carl E. Vuono issued a two-page directive to the field on the adoption of a new war-fighting blueprint for the Army. He addresses the national military strategy shift from containment to "a focus on power projection . . . supplemented by forward presence in vital areas with fewer units forward deployed, and ultimately backed by an ability to reconstitute a larger force over a longer period of time." This reflects recent DoD decisions to reduce American troop strength in Korea in those areas where ROK forces have reached comparable capabilities. It also contains serious readiness implications for those "fewer units forward deployed." Forward deployed units will be required to survive and operate longer before reinforcements arrive. Army Aviation may well remain a significant deficiency offset in Korea for years to come. The continued forward deployment of American forces in Korea as an instrument of peace and stability means Army Aviation must recognize its commitment and strive to maintain a deployable, effective, and sustainable aviation force on this peninsula.

The threat against all allied forces in Korea continues; despite events of the past two years elsewhere in the world, North Korea continues its belligerence and military modernization. In the midst of drawdowns and elusive "peace" dividends, the moral and financial commitment of our aviation soldiers must continue in order to support the high OPTEMPO which maintains combat readiness.

The Freedom's Eagles of the 17th Aviation Brigade meet this challenge. They stand ready to fight highly synchronized deep, close, and rear battles in the face of superior numbers. They are prepared to fight, survive, and win on the battlefield—today and tomorrow. Freedom's Eagles! IIIII

Special Operations Aviation in Operation DESERT STORM

By Major Robert Bruns

DESERT STORM validated in combat many U.S. Army concepts, doctrine, and equipment programs. This combat validation also extended to Special Operations Aviation as it was employed on the conventional mid-intensity battlefield and sustained for the duration of combat. This article will provide the unclassified activities of U.S. Army Special Operations Aviation (ARSOA), as executed by the 3rd Battalion, 160th Special Operations Aviation Regiment (Airborne), while it supported the combat operations of Special Operations Command Central Command (SOCCENT). The three areas of discussion will be operations, command and control, and maintenance.

The soldiers of the 160th are known as the Night Stalkers because they train and conduct missions under the cover of night. The 3rd Battalion's Night Stalkers were part of a Task Force (now full-fledged Regiment) composed of the base battalion assets; HHC, A, B, and C companies,

MAJ Bruns is S-3, 3rd Battalion, 160th SOAR (ABN), Hunter Army Airfield, Savannah, GA.

augmented by selected Regimental, 1st Battalion and 2nd Battalion Night Stalkers, and an element composed of the 498th and the 45th Air Ambulance companies.

This integrated force was commanded by the 5th Special Forces Group (Airborne) Commander, who wore two hats—the other being theater Army Special Operations Task Force Commander. Operational control of the 3rd Battalion was executed primarily by SOCCENT through its single air manager, Air Force Special Operations Command. In reality, the 3rd Battalion received missions and priorities established by the Air Force. This joint aspect of special operations occurs at all command levels.

Successful combat operations were facilitated by extensive and demanding Night Vision Goggle (NVG) flight operations which employed Combat Search and Rescue (CSAR) as the training vehicle. NVG flight skills of 20-40 feet above ground level at

"Our training profile was exactly the same as our combat profile. We trained as we fought."

100-140 knots during periods of zero illumination were obtained during DESERT SHIELD and routinely employed during both the air war and ground war. The 3rd Battalion's training program, both in peacetime and in DESERT SHIELD, completely prepared aircrews for combat in DESERT STORM. Our training profile was exactly the same as our combat profile. We trained as we fought.

Missions included short, medium, and long-range infiltration and exfiltration of Special Operations Forces for resupply, emergency extraction, MedEvac, Forward Refuel and Rearm (FARP), reconnaissance, photo reconnaissance, CSAR, and security. Virtually all missions were conducted in a high risk environment, with 56 percent in the NVG mode.

The 3rd Battalion experienced no accidents and suffered no casualties. Although effective anti-aircraft artillery and missile fire were received, only five small arms hits occurred. This exceedingly low number, especially considering the aircraft were in the enemy's backyard for extended periods of time (in both day and night), is attributable to superb intelligence support, enhanced pilot skills, and the self-discipline of the aircrew members.

Aircrew maintenance was an unexplored area for ARSOA in a conventional battlefield. Non-divisional Aviation Intermediate Maintenance (AVIM) units were unavailable for area support group employment. Since no doctrinally-correct aviation maintenance unit was available, the 3rd Battalion coordinated and received Authorized Stockage List/Prescribed Load List (ASL/PLL) support from the 8th Battalion, 101st Airborne Division (Air Assault). The low number of aircraft in the 3rd Battalion did not affect divisional units. Without this combat-mandated relationship, our successes would have been dramatically reduced.

The 3rd Battalion's maintenance company had both Aviation Unit Maintenance (AVUM) and AVIM, and possessed its correct amount of special tools and superbly trained mechanics. Repair parts represented the only unknown factor and were resourced through the relationship with the 101st. The 3rd Battalion's successes were measured by how well we were supported by the ground force commander.

A routine mission started with the extraction of a compromised special forces operational detachment. The planning of the NVG infiltration, pickup, and partial exfiltration were uneventful. While en route to friendly lines, a second Operational Detachment (Alpha) (ODA—formerly referred to as an "A-Team") required an immediate extraction and the returning MH-47 was diverted deeper, another 90 miles. This inflight mission change, subsequent pickup and exfiltration of the ODA through enemy lines was all planned in the cockpit. To the aircrews, it was a difficult but manageable mission; to the detachment extracted, it was a lifesaver! In reality, it was a routine mission executed flawlessly, like many others.

Special Operations Aviation was a small reflection of the outstanding successes all aviation experienced in DESERT STORM. Solid doctrine, excellent equipment, superbly trained and led soldiers proved Army Aviation to be a glorious success. This "Cutting Edge" of doctrine, equipment, and soldiers must be maintained as our Army downsizes. IIIII

Challenging Times at DCD

By Colonel Theodore T. Sendak

Fort Rucker has welcomed MG John D. Robinson as our new Branch Chief and school center commander. We have also greeted him with some of the most significant challenges a leader could face as Army Aviation downsizes, reorganizes, and works to incorporate DESERT SHIELD/STORM lessons learned into all facets of our business.

The Directorate of Combat Developments (DCD) is helping clear the path for aviation's future in all areas of the concept based requirements system. With the 1988 Army Aviation Modernization Plan (AAMP) as the foundation, DCD worked on three significant projects last year that have in turn blossomed. These are aviation participation in the development of the AirLand Operations (ALO) umbrella concept, the Aviation Systems Program Review (ASPR), and the 1991 update of the AAMP with COL Dave Carothers' folks in Washington.

The ALO concept led us to develop an Aviation Branch Concept. Not only does the Branch Concept outline Army Aviation's role in AirLand Operations and define general requirements in the areas of Doctrine, Training, Organization, Leadership, and Materiel (DTOLM), but it also has generated a series of "enabling concepts": Scout/Attack Mix, Forward Rearm and Refuel Points (FARPs), Air Traffic Services (ATS), Unmanned Aerial Vehicles (UAVs), Aviation Command and Control, Targeting and Target Acquisition, Aerial Mine Warfare, and Intratheater Cargo to name a few. We will use the enabling concepts to identify efficiencies and deficiencies to apply to DTOLM fixes. Several of these concepts are now in worldwide staffing, and we hope to have them published in increments throughout FY 1992.

The Aviation Systems Program Review (ASPR) held in July 1990 yielded numerous VCSA directives covering 15 key aviation

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issues. The Vice Chief's directives required a visible and dynamic action plan to drive progress in each subject area. The General Officer Steering Committee (GOSC) comprised of 18 general officers and a Council of Colonels (COC) with 16 senior officers reviewed ASPR findings and issued initial guidance. The COC followed up actions by sending quarterly reports to the VCSA. This process will culminate with a brief back to the VCSA this Fall.

ASPR force structure issues included: AH-64 battalion (35 man plus-up) and E Company (Reserve Apache Company without equipment), two pilots for the Kiowa Warrior, door gunners for assault aircraft in the contingency corps, Forward Support Battalion-Aviation, Command Aviation Battalion, and aviation brigade enhancements (10 man plus-up). Force modernization directives included: elevating the priority for acquisition of FARP equipment and a review of FARP concept, evaluating the Operational Need Statement for command and control aircraft in the attack battalion, proceeding with the Required Operational Capability (ROC) for command and control consoles in UH-60 aircraft for maneuver commanders, addressing the utility modernization shortfall, examining the procedure for redistribution of aircraft to first-to-fight units, and providing a lay down of TMDE/AGSE equipment packages to the VCSA. Supportability issues included resolution of disconnects between readiness reporting regulations, expansion of special repair activities, and creation of a maintenance cultural change (an apprentice mechanic that gains experience in maintenance organizations while NCOs crew the aircraft).

I am pleased to report to you that these issues are essentially on track and meeting the Army's expectations. The July session generated several major spin-offs. First was the task to solve aviation force structure problems through the Total Army Analysis (TAA) process in the mid-term and through a restructure study, Aviation Requirements for the Combat Structure of the Army (ARCSA) V, addressing long-term issues and solutions.

The TAA process takes major combat forces contained in the Army Plan and according to a given scenario, develops the combat support, combat service support, and general support forces necessary to sustain them. The TAA wargames the combat force to determine the actual mix of support units required. This begins with a simulation of the deployment of major combat forces and proceeds into a warfighting model. It produces a force that is doctrinally sound and sustainable. It includes all Army components. As of the July 91 General Officer Steering Committee at Department of the Army (DA), the following issues were supported:

- Resource the 35 man plus-up for AH-64 battalions
- Allow an incremental change package to document a second door gunner/crewchief in assault units—major commands may resource
- Resource two pilots for the Kiowa Warrior
- Resource the forward support battalion-aviation in heavy divisions
- Resource the command aviation battalion in heavy divisions
- Allow an incremental change package to document an aviation brigade headquarters enhancement—major commands may resource.

Although, as of this writing, the TAA results are not final, our Army has shown its vision and understanding of aviation needs by its support of these issues.

The second part of the force structure fix was to the conduct of ARCSA-V. COL Bob Hurley was tasked to lead the effort with a full time team from Ft. Rucker, Ft. Eustis, and Ft. Leavenworth.

During the first phase, the Study Group identified the roles, missions, and functions of Army Aviation in AirLand Operations. They also developed, in coordination with USAAVNC, an operational concept statement for Army Aviation. Phase two addressed the organizational requirements. Battalion and company size building blocks form the nucleus of the effort. The building blocks form the larger organizations at the various echelons. All of the study's

"A recent Army decision to terminate UH-60 production at 1,427 aircraft ... and an earlier decision not to pursue the LH utility option, left a void in our warfighting capability which requires a near-term fix."

essential elements of analysis should support the organizational design decisions.

During the ASPR, the Vice Chief of Staff directed Ft. Rucker to develop a solution to the utility helicopter fleet modernization issue and implement this solution as part of the Aviation Modernization Plan revision. A recent Army decision to terminate UH-60 production at 1,427 aircraft (rather than procure the objective of 2,253 aircraft) and an earlier decision not to pursue the LH utility option, left a void in our warfighting capability which requires a near-term fix. The study is complete and at TRADOC for certification. In conjunction with the Aviation Program Executive Officer, Aviation Systems Command, and the Army Staff, we hope to take the study forward for Army decision before the end of the year.

The last major item stemming from the ASPR was the requirement to address deficiencies in the fixed wing and special electronic mission aircraft (FW/SEMA) arena. So in January 1991, Ft. Rucker sponsored a FW/SEMA Systems Program Review (SPR). Our goal was to develop an FW/SEMA road map for the 90s. The SPR established four different panels: policy, force structure, modernization, training, and standards. Each panel addressed various FW/SEMA issues and presented their recommendations to a GOSC co-chaired by the commandants of the Aviation and Military Intelligence Schools. The GOSC established a COC to periodically review the progress of decisions made by the steering committee.

Again, I can report to you that these issues are on track. Our next COC was at the end of August 1991, and we will provide the GOSC with our final report in January 1992.

AAMP

MG Jerome H. Granrud signed the 1991 update of the AAMP in May 1991. The update reflects the recent shift in the threat emphasis from a European conflict to a more global, contingency focus, recent decisions on aircraft procurement quantities (Comanche, Kiowa Warrior, Apache), and ASPR decisions. Major revision work has already started to incorporate all of the aforementioned studies and initiatives. DA plans to have the revised AAMP published during the 2nd Quarter of FY 1992.

Potpourri

There are many other things that remain in the DCD hopper and are certainly not low priority. Examples include the Air-to-Air Combat Test II that we will conduct in January-February 1992 using the Ft. Rucker AIRNET simulation facility, building the Long Range Army Materiel Requirements Program in support of the next DA budget cycle, and the painful and difficult personnel reductions and function eliminations in DCD. You can see there are many significant issues which remain in the future of Army Aviation. I look forward to reporting back in greater detail soon, but that's the basis for the next update as Army Aviation remains "Above the Best." IIIII

A Year of Change

by
LTC Mark W. Russell and Donald H. Jones

Since last year's ARMY AVIATION Magazine's issue on simulation, the entire world has experienced dramatic changes—revolution, coup attempts, even war in Southwest Asia. These changes have also brought about corresponding changes in our philosophies on training our soldiers.

Our experiences during this tumultuous year have shown that the homestation training/training devices were not sufficient to prepare units for that conflict. Apache units arriving in the desert had to go through additional training in theater before combat operations. Training devices that we used in CONUS prior to this conflict, for the most part, were not designed to be easily transported overseas to support operations in another theater. What would have happened if Saddam Hussein hadn't given us several additional months to prepare for war? Would the outcome have been the same? As we ready the Army for contingency missions, additional training in theater to reach combat proficiency becomes more of a luxury rather than a reality.

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In order to be better prepared for our next conflict, there are typically two areas we can focus on to improve our training—the frequency in which we train, and the quality of training we are conducting. Budget constraints and the spiralling costs of ammunition, fuel, and spare parts, the lack of adequate training ranges and resources, and environmental restrictions have virtually eliminated the option of increasing the frequency of training with operational equipment. Simulation can provide both the frequency and quality of training that we need to prepare for

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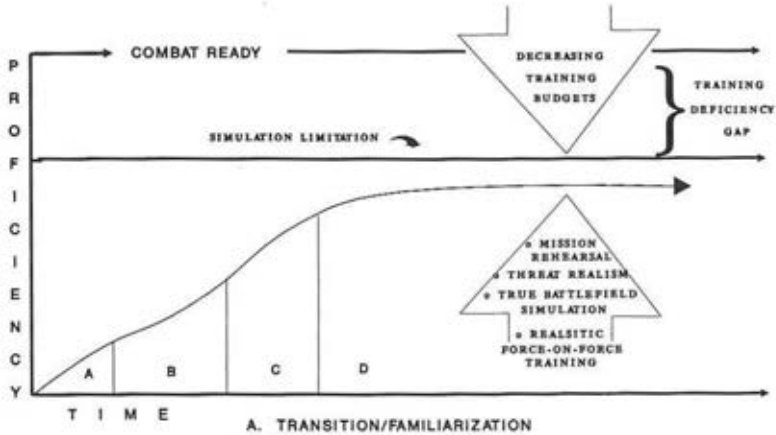

A. TRANSITION/FAMILIARIZATION
B. WEAPON SYSTEM OPERATION
C. THREAT RECOGNITION/BASIC RESPONSES
D. OPERATIONAL EMPLOYMENT/MISSION REHEARSAL

Figure 1

our next conflict.

Figure 1 depicts a soldier's proficiency levels as he progresses through his military career. He begins with early training on the equipment or weapon system and becomes more familiar with its operation and capabilities (Areas A & B). Once he has become proficient in the operation of his weapon system, his training then shifts to using the system in an operational environment against likely threats (Areas C & D). Yet, he is primarily constrained by resources and cannot receive the quality or frequency of training necessary to achieve total combat readiness. This shortfall is depicted by the Training Deficiency Gap in Figure 1. There will always be a limitation in the level of proficiency derived from using simulation and training devices. However, the Army has recognized the importance of training devices and is now using more realistic and sophisticated simulations in order to reduce this training deficiency.

PM TRADE has been working on several programs and initiatives that specifically address training through simulation and increasing our proficiency toward combat readiness. These initiatives include: realistic force-on-force training, combined arms team training, mission rehearsal against active/relocatable/smart threats, and transportable/networked flight simulators.

In this issue several PM TRADE Project Directors have authored or co-authored articles that will discuss how the Army is moving toward improving its combat readiness through simulation training. To provide realistic force-on-force training at homestation and at the Combat Training Centers, the Army is using Multiple Integrated Laser Engagement System (MILES) technology. Our aviation forces use this same technology—the Air-Ground Engagement System (AGES II) on their aircraft. MAJ Kevin Noonan, in his article "AGES II: The Road to Production", provides an update on the Air Ground Engagement System II production contract.

Mr. Bill Blanding continues by discussing AGES II and force-on-force training on the future Army Aviation programs, the AH-64B, and the OH-58D Kiowa Warrior. The article also discusses how steps are being taken to improve system reliability and maintainability, and decrease installation time.

Another article is co-authored by Mr. Eric Routledge, PM TRADE, Mr. Willie Lapham, DOTD, USAAVNC, and CW3 Charles Fulmer, an AH-64 Flight Instructor Pilot at USAAVNC. This article describes a little-publicized program we termed Project Desert STAARS (Sustainment Training for Army Aviation Readiness through Simula-

(Change — continued on page 63)

AGES II: The Road to Production

By Major Kevin S. Noonan

The training/simulation world is attempting to mirror our soldiers' professionalism as Army Aviation continues on its successful path after DESERT STORM. The Multiple Integrated Laser Engagement Systems (MILES), Air Ground Engagement Systems (AGES) II team is moving forward toward the order to execute and start production of these systems. First however, we are ensuring that our systems will correctly simulate the lethality of their hosts.

Our goal at Project Manager for Training Devices (PM TRADE) is to provide quality products that simulate the host system's performance. This allows realistic training and ultimately contributes to the saving of our soldiers' lives through close crew coordination and familiarity with their equipment and environment.

AGES II has an interesting history. Its beginning is based on Training Device Requirement (TDR) number 0111, dated 10 January 1983, which defined the performance for an Air-to-Ground Engagement System (AGES). The AGES system would be an addition to the basic MILES. The basic MILES development effort was completed in 1979 and production started shortly afterwards. MILES, as most of us have experienced by now, is a family of low power, eye safe laser transmitters and receivers, designed to simulate the operational characteristics of various weapons. These systems allow units to conduct realistic force on force tactical training exercises.

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The 1983 TDR authorized Army Aviation and Air Defense Branches to place MILES equipped units into the MILES arena. The AGES/AD I program provided MILES devices for the Chaparral, Vulcan, and Stinger Air Defense Systems, and the AH-1S, OH-58, and UH-1H aircraft. Fielding of the systems began in 1984. After the fielding of AGES I came the birth of AGES

"This is as close to combat as it gets without spilling blood."

II and its specification 234-182, dated 13 November 1984. The contract was awarded to Fairchild Weston Systems, Incorporated (FWSI) in March of 1986 for Full Scale Development (FSD) and production options. In August of 1987, several developmental prototype systems were delivered. These systems consisted of AH-64, OH-58D, UH-60, CH-47, Hellfire Ground Support System (HGSS) and Simulator System Controller Devices (CD).

These prototype systems followed the developmental track and proceeded into Technical Test (TT) and User Test (UT) leaving some open issues/discrepancies to be resolved prior to starting production. Due to a series of interface problems and the changing configuration of the AH-64, the AGES II AH-64 system did not keep pace with the other elements.

In June of 1989, Loral acquired FWSI and became Loral Fairchild Systems, Incorporated (LFSI). These two companies, Loral and FWSI, conducted novation proceedings which basically substitutes a new legal obligation for an old one. This required the newly formed Loral Fairchild to be bound by the contractual requirements from the 1986 (FWSI) contract.

Separate Paths

At the completion of user testing it was decided to proceed with the AGES II system along two separate paths. The AH-64 remained in development while the rest of the systems, now called AGES minus (-), were approved for production after several mandated changes at the MILES/AGES II Milestone III In-Progress/ Process Review (IPR) in August of 1990. The Milestone III IPR also required expanded testing with IPR approval of First Article Test Contractor (FAT C), Government (FAT G), and Follow-on Test and Evaluation (FOTE) prior to entering full-scale production.

On 8 September 1990, PM TRADE received a Department of the Army requirement, directing procurement of 30 AH-64 AGES II with a classification of Limited Procurement Urgent (LPU). The directed LPU request for 30 AH-64 systems was incorporated into the current proposal with the already IPR III approved AGES(-) systems.

The Transition

During this same time frame, Loral corporate headquarters decided to consolidate MILES systems design and production at its Pomona, California division, Loral Electro-Optical Systems, (LEOS). This action resulted in a separate government contract award for production of the AGES II systems to LEOS on 28 September 1990. This contract called for delivery of 45 OH-58D, 341 UH-60, 48 CH-47, 260 HGSS, 150 CD, and 30 limited procurement urgent AH-64 systems. At this point two separate contracts still exist; the full scale development contract with Loral Fairchild and the production contract with Loral Electro-Optical Systems. These two Loral divisions are currently consolidating FSD open item issues as they work toward novation and transfer of all actions to LEOS.

A contract modification package including an updated specification, statement of work, schedule of CDRLs, which incorporated all IPR III directed items and developmental changes, was submitted to LEOS in July of 1991. At the same time, a reduction of system quantities has been recommended. This reduction in system quantities grew out of an Army Audit Agency (AAA) investigation started in November of 1990 that is currently wrapping up. These new quantities are currently being staffed for approval. The reduced system quantities, if approved, will have a

(AGES II — continued on page 43)

AGES II: The Future

By William A. Blanding

The Air Ground Engagement System II (AGES II) is a training device for Aviation assets that includes the AH-64A, OH-58D, UH-60A and CH-47D helicopters and the Hellfire Ground Support System (HGSS), which is a MILES surrogate for the Field Artillery Ground/Vehicle Laser Locator Designator (G/VLLD). The objective of AGES II is to provide aviation units with a training device that will closely simulate the effects of weapon engagements. With the advent of shrinking budgets, training devices that provide weapon system simulation and casualty assessment are becoming vital in training Army Aviation units in a cost effective and realistic manner. In keeping with that philosophy, the AGES II training device designs are being planned for the future trend of Army Aviation Systems.

The future of Army Aviation will include the OH-58D Kiowa Warrior, the AH-64B, the Longbow Apache, the RAH-66 Comanche and the introduction of the AN/AVR-2 Laser Warning Receiver. In support of these future systems, Project Manager for Training Devices (PM TRADE) is in the process of providing force-on-force training devices for the future Army Aviation systems that will be compatible with the fielded MILES training devices. The future systems will include imbedded features, new technology and upgrades to existing devices. Since the Longbow Apache and the Comanche force-on-force training systems are still in concept formulation/early development, this article will concentrate on the future force-on-force training devices for the OH-58D Kiowa Warrior, AH-64B and the AN/AVR-2/AGES II integration.

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OH-58D Kiowa Warrior AGES II

The OH-58D Kiowa Warrior AGES II configuration upgrade effort is currently being performed by Loral Electro-Optics

"The benefits [of integration] include the ability to conduct pilot and realistic MILES force-on-force training with the AN/AVR-2. . ."

Systems (LEOS) in Pomona, CA. LEOS is preparing an Engineering Change Proposal (ECP) to upgrade the current OH-58D AGES II system to the Warrior configuration. The OH-58D Kiowa Warrior AGES II configuration will include changes and upgrades to the current OH-58D system. The design changes will include the addition of weapon simulations for the Hellfire, 70mm rockets and .50 cal. The Air-to-Air Stinger (ATAS) MILES compatible training device is currently a separate stand alone program within PM TRADE. Other design changes include hardware and software changes to incorporate data bus changes, the Integrated System Processor (ISP), Controls and Display System (CDS) and Mast Mounted Sight (MMS) processor changes, and the addition of Aircraft Survivability Equipment (ASE) to include AN/AVR-2, AN/ALQ-144 and AN/APR-44.

To ensure proper integration of the AGES II design with the OH-58D Kiowa Warrior, LEOS has been required to subcontract with Bell Helicopter Textron Inc. for assistance in preparing the ECP. This action will result in LEOS receiving up-to-date Warrior design information and provide a vehicle to integrate and consolidate the training device design with the Warrior design while fostering a working relationship between the two contractors.

The basic requirement of ECP is to ensure fidelity in the operation of weapon systems while providing a simulation that will replicate weapon characteristics and effects on target. It is envisioned that the hardware configuration will include an eye-safe Laser Range Finder/Designator (LRF/D) that replaces the tactical LRF/D, a control panel in the cockpit, MILES type laser detectors, an external kill indicator used to alert ground units that the helicopter has been hit, killed, or near-missed and various processors and interface units that will be housed in a surrogate weapon pod attached to one of the aircraft's external pylons.

Upon receipt of the ECP and trade off analysis, PM TRADE will coordinate the proposed effort with the aviation community to ensure that all requirements are adequately addressed, that all designs are feasible, and that the effort reflects (as closely as possible) the operation of the OH-58D Kiowa Warrior.

AH-64B AGES II

The current AH-64A AGES II training system will be upgraded to the AH-64B configuration. As with the OH-58D Kiowa Warrior AGES II efforts, the AH-64B AGES II upgrade involves LEOS providing an ECP that includes McDonnell Douglas Helicopter Company (MDHC) assistance which will minimize program risks as discussed above for the OH-58D Kiowa Warrior AGES II.

The AH-64B AGES II configuration will include changes and upgrades to the current AH-64A AGES II. Changes to the basic configuration will include the addition of Automatic Target Handover System (ATHS), Global Positioning System (GPS), AN/AVR-2 and ATAS provisions. Additionally, the Fire Control Computer (FCC) software, data bus format and traffic, and selected interfaces are anticipated to be changed to implement the AH-64B configuration.

AN/AVR-2/AGES II Integration

This exciting effort began in November 1990. The U.S. Army Aviation Center (USAAVNC) requested the Project Manager for Aircraft Survivability Equipment (PM ASE) investigate the feasibility of modifying the AN/AVR Laser Warning Receiver to detect, process and transfer MILES laser informationn to the AGES II system. Several technical meetings were held between PM ASE, PM TRADE, Hughes Danbury Optical Systems (HDOS, the AN/AVR-2 contractor), LEOS and the USAAVNC to determine the feasibility and risk of performing this effort. The conclusions were that the effort was

technically feasible and could provide several benefits. The benefits include the ability to conduct pilot and realistic MILES force-on-force training with the AN/AVR-2; and the potential to eliminate some or all of the AGES II detector belts in the AH-64B and OH-58D Kiowa Warrior designs. The elimination/reduction of the detectors would provide and increase in the AGES II system reliability and maintainability, provide a reduction in installation time by an estimated four man hours and provide a procurement cost reduction for the AH-64B and OH-58D Kiowa Warrior AGES II systems.

The joint effort is progressing. On 4 September 1991, a successful laboratory demonstration at HDOS proved the technical concept. A modified AN/AVR-2 detected, processed, and transferred MILES laser information to the AH-64A AGES II system, and still retained all its original tactical characteristics.

Currently, field demonstrations are being conducted to determine if the modified AN/AVR-2 has an acceptable MILES detection coverage (hit profile). If the hit profile is acceptable and all the tactical characteristics of an original AN/AVR-2 are retained, then PM TRADE and PM ASE will jointly determine whether to proceed.

PM TRADE is committed to providing useable and realistic training devices. We are utilizing lessons learned from the original AGES II efforts to avoid pitfalls and enhance success. This coupled with the support and involvement of the Aircraft PM's and the contractors, will provide an environment that is conducive to teamwork. It is this teamwork that will provide our Army Aviation units with beneficial training devices with which they can conduct meaningful and realistic combat training. IIIII

AGES II

(continued from page 40)

ripple effect which requires the contractor to complete a reduction proposal prior to submitting their modification proposal. All this and the efforts depicted in "AGES II: Concurrent Development and Unit Training" at the National Training Center (NTC) (see article, page 65, June 30 1991, ARMY AVIATION MAGAZINE) have made for a vibrant program. However, with the incorporation of the modification package and lessons learned while supporting NTC rotations, the program has only gotten better.

On Track

With the upcoming novation and contract modification being incorporated, the AGES II program will be on track heading into First Article Testing (FAT). A 25-26 September 1991 Test Integration Working Group (TIWG) finalized plans for the expanded testing required for the AGES II. A three phase test program will be used. Phase one, First Article Contractor (FAT-C) will occur at the contractor plant witnessed by USATECOM. Phase two, First Article Test Government (FAT-G) incorporates technical testing by USATECOM. Phase three, Follow-on Test and Evaluation (FOTE) will be conducted by USATEXCOM. After successful completion of these three phases, full scale production authorization will be received and the order to execute past to LEOS.

Conclusion

The AGES II production contract is well underway. We will provide a realistic means of simulating helicopter operations during the course of force on force training. Using eye-safe lasers and receivers compatible with the basic MILES, AGES II will provide realism in tactical training by the inclusion of real-time casualty assessment. These systems will assist Aviation in training its personnel in all phases of the AirLand Battle while providing results as a lethal combat multiplier as demonstrated in Operations DESERT SHIELD/STORM.

This is as close to combat as it gets without spilling blood.

The AGES II team continues to work for you, the soldier, to provide a quality product that both of us can be proud of. IIIII

AH-64 Apache CMS Prepares for War

by
Eric M. Routledge, Willie Lapham, and CW3 Charles Fullmer

In October 1990, USARCENT established a requirement for immediate AH-64 Combat Mission Simulator (CMS) training in Southwest Asia (SWA). In November 1990, HQ DA tasked the Project Manager for Training Devices (PM TRADE) to take the lead in this special project with the specific objective being to provide a unique desert training capability in SWA within a record 90 days after contract award. On 18 January 1991, the Link Flight Simulation Division of CAE-Link Corporation was awarded the contract to begin the program now known as Project Desert STAARS (Sustainment Training for Army Aviation Readiness through Simulation). Many innovative methods and procedures were devised to accelerate the program and a set of ground rules was established and approved by HQ DA. No formal documentation was procured initially and normal configuration management procedures were deferred. An ambitious and extremely short acceptance test program was developed. A parallel program was initiated to move an existing CMS from CONUS and be set up and operating with the highly classified Desert STAARS software load not later than 111 days from contract award (see Figure 1.) While the total Desert STAARS program would not be complete 90 days after contract award, a significant interim desert training capability would exist in the day-90 to day-111 time frame. Due to the swift and early success of DESERT STORM, the physical movement of the CONUS CMS did not occur, however; the rest of Project Desert STAARS proceeded on schedule. As can be seen in the following text, the re-

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Mr. Lapham is AH-64 Systems Manager, Department of Training & Doctrine, Ft. Rucker, AL.

DESERT STAARS

CRITICAL MILESTONES - FROM C/A IN DAYS

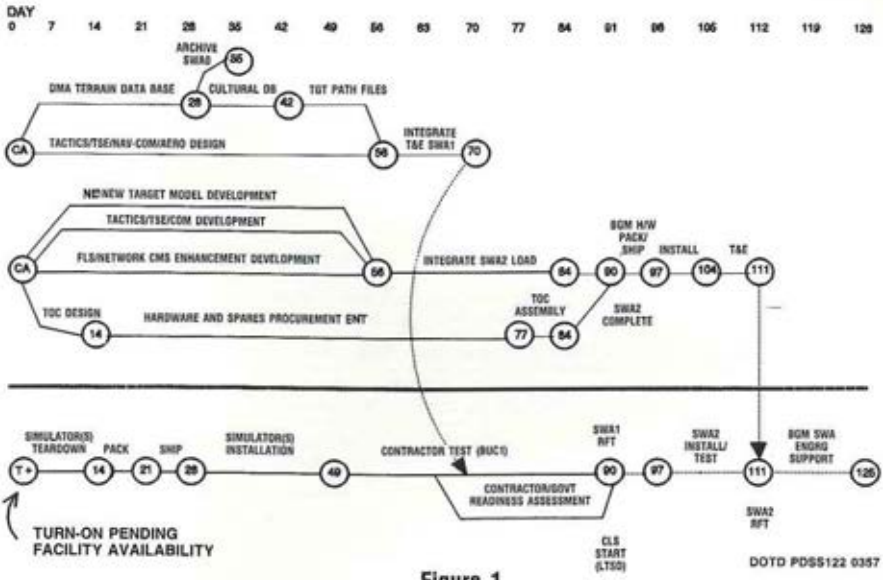

Figure 1

markable results of the project have provided exciting new features to the CMS fleet (to be installed in the August 1992 time frame) and promise to add a new dimension to future Apache CMS training.

One of the most visible enhancements made to the CMS as a part of the Desert STAARS project was the development and integration of a real-world geo-specific visual data base. CMS devices (as well as UH-60, CH-47 and AH-1 DIG devices) utilize generic terrain data bases. The Todendorf data base, as it is known in the CMS, is a gaming area that is 32 x 40 km consisting of fictitious terrain characteristics of the European landscape. The data base developed for Desert STAARS is an 80 x 100 km (almost 1° by 1°) area that encompasses most of the actual country of Kuwait.

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The data base was derived through the use of Defense Mapping Agency (DMA) Level 1 data. This DMA data consists of Digital Terrain Elevation Data (DTED) and Digital Feature Analysis Data (DFAD). The elevation data provided elevation values for every third arc/sec or approximately every 100 meters. The DFAD data provided locations and elevations of manmade features. Once the DMA data was fed through the transformation software and put into a format that the CMS processors used for displaying the data base, a workable data base resulted.

Realism

Due to the coarseness of Level 1 data, this "first cut" data base displayed features on the terrain that were in the right position and the right height but did not resemble the actual feature. Urban areas appeared as large "city" blocks with no distinction between buildings; significant tall buildings were simply larger blocks that towered over

OTHER DESERT STAARS ENHANCEMENTS		
NO.	ENHANCEMENT	DESCRIPTION
1.	Relocatable Target Sites	Relocatable Target Sites allow the instructor/operator of the CMS to position target/threats anywhere on the data base. This can be accomplished rapidly and can be based on "Real World" intelligence.
2.	Special Environmental Conditions	New Environmental Conditions such as extreme high ambient air temperatures, rotor-wash effects (Brown-Out), dust storms, and a tan colored horizon haze added.
3.	Debriefing Capability	A new Debriefing Capability of integrated FLS and CMS missions has been added. The entire mission is recorded and can be played back as often as desired or stored for future use.
4.	Tactical Operations Center	A Tactical Operations Center (TOC) has been added where repeaters of all the visual displays are located. The TOC allows groups of people to watch missions as they occur or to perform debriefs using the debriefing capability.
5.	New Navigation Model	A more current Navigation Model World Geodetic Survey 1984 (WGS 84) has been added. This model allows the CMS to navigate virtually anywhere in the world.
6.	New Threat Models	Ten New Threat Models were added as well as a frigate and a Tarawa Class Carrier.
7.	New FARP Model	The existing FARP Model (blivits and hoses) was replaced with a "Fat Cow" (CH-47 with refueling hoses coming from the ramp area.
8.	Roll On Terrain	A feature called Roll On Terrain (generic terrain that borders the edge of the data base) coupled with the WGS 84 NAV Model allows crews to initiate missions from well off the data base.

Figure 2

the smaller city blocks. Power lines, radio towers, oil derricks, etc., appeared as extremely slender pyramidal columns. All of these features required hand modeling to transform the first cut data base into the finished product that displayed pipelines, oil gathering centers, and individual buildings that replicated their real-world counterparts.

The current CMS method of displaying the surface of the terrain is through the use of texture patterns on large polygons. Texture patterns are computer generated irregular geometric shapes that, when viewed, give an illusion of surface texture. The Desert STAARS data base employed, for a majority of the terrain, a process known as photo-texturing. A photograph of a desert area was scanned into a digital format and applied to the desert areas of the data base. This process was also used for portions of the city of Kuwait where time prevented the hand modeling of each and every building or domicile.

Second Enhancement

A second major enhancement included in the project was the inclusion of a threat simulation system known as Force Level Simulation (FLS). Force Level Simulation provides a force on force simulation, where threats or players are modeled with real world characteristics, including command, control, communications, and intelligence reporting chains and procedures. FLS uses a proprietary shell built around the government owned and validated Suppressor war model.

Thirty-one threat types were identified by the government to be modeled in the FLS system. These 31 also existed in the CMS threat library (no additional effort was required to generate visual models for the CMS). In the final outcome, over forty player types were modeled in the FLS system. The player inventory incorporates models not available in the CMS (eg: artillery batteries, ADA batteries, forward observers, unit specific commanders, etc.) All players are modeled with "real world" parametric data, if available, and are in most instances classified as a result of the data. These models also include real-world communications capabilities, multiple weapons and multiple acquisition methods (when applicable).

Scenarios are developed which incor-

"One of the greatest benefits to training is the ability of the government operators to generate scenarios as required."

porate player models and numbers as required. These scenarios also depict levels of command, define communications nets and player movements. One of the greatest benefits to training is the ability of the government operators to generate scenarios as required. The system is not dependent upon contractor engineers to generate and subsequently conduct training scenarios.

The FLS system is an entire simulation system and is capable of operating independently of the CMS (stand-alone). In order to integrate the system with the CMS, hardware and software was procured and developed to network the systems. This networking capability (SCRAMNET) also allowed the inclusion of a co-located UH-60 Flight Simulator to be included in the network.

Demonstration

A demonstration of the entire project pitted crews in the AH-64 CMS and UH-60 FS against two simulated advanced warning radar sites similar to those engaged by Apaches during the opening moments of Operation DESERT STORM. In this demonstration the crews were able to see each other in their visual displays as they moved toward a holding area where the UH-60 landed to secure the area. The Apache continued and engaged the radar sites.

The first radar site offered little or no resistance as the players were modeled to have little or no C^3I capabilities. The second radar site was modeled with effective C^3I and ultimately provided the Apache crew quite a "battle". As the Apache neared, enemy radar systems reported the presence of a hostile aircraft to the radar site commander, this player then notified Anti-Aircraft Artillery (AAA) Systems of the Apache's presence and approximate location.

Updates were continually made by the threat players as the terrain offered little or no opportunity for the Apache to utilize masking terrain. Effectively employing stand-off ranges, the Apache was able to neutralize the radar capability of the site but was severely damaged as the crew moved to within engagement range of an undetected AAA system.

The demonstration was conducted numerous times and in one engagement, the radar site commander happened to be one of the first taken out by the Apache crew. The balance of the force was easily engaged by the Apache as the threat no longer had effective communications or guidance.

Project Desert STAARS was indeed an overwhelming success that allows combat crews to conduct missions on real terrain against a "thinking" threat. The threat can be rapidly modified and repositioned to correspond to actual or suspected enemy positions and conditions based on real reconnaissance/intelligence. The capabilities built into the CMS as a part of the Desert STAARS project provide a mission planning and limited mission preview ability. They also lay the groundwork for true mission rehearsal systems. Space limitations of this article preclude a comprehensive discussion of each of the many new CMS capabilities. An abbreviated listing of other features can be seen in Figure 2. IIIII

AVCATT: Ensuring a Trained and Ready Force

by

Captain Thomas J. Stafford and MW4 Frank Paul

The face of Army Aviation is rapidly changing. Complex new aviation systems will be added to the force over the next 10 to 15 years. Consequently, warfighting doctrine, tactics, and techniques will continue to evolve as time marches on. This is clearly evident if we look back over the recent history of Army Aviation. During the mid 1960s, Army Aviation finally came of age and forever changed the framework of the combined arms battlefield. Attack and utility helicopters saw extensive use in Southeast Asia providing maneuver commanders with responsive fire support and unparalleled mobility to anywhere on the battlefield. During Operation DESERT STORM, Army Aviation demonstrated unprecedented capability as a vital maneuver force. Our attack aircraft displayed capabilities only dreamed of just a few years prior. It is now clear that modern attack and scout aircraft, coupled with tough, realistic training, are enormous combat multipliers. Our experience in DESERT STORM proved that modern Army Aviation is beyond a doubt one of the most efficient and effective maneuver arms in history. Its speed, maneuverability, and firepower provide commanders with agility and ability to seize and hold the initiative as never before. When attack and air cavalry operations are synchronized with the operations of other modernized air and ground units, the effect is a lethal and extremely agile combined arms. The bottom line is that superb maintenance and properly employed high technology equipment are the essential ingredients for success on the modern battlefield.

CPT Stafford is AVCATT Project Director, PM TRADE, Orlando, FL.

The mission at hand is complicated by a rapidly downsizing Army with scant OPTEMPO funds. That put aside, the task

MW4 Paul was AVCATT Project Officer, Directorate of Training & Doctrine, Ft. Rucker, AL, when this article was written.

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confronting aviation leaders now and in the future is that of maintaining that edge honed in the deserts of Southwest Asia and training the next generation of air combat crews to employ weapons platforms of increasing complexity in an era of dramatically reduced blade time. As always, the primary mission of all aviators will be ensuring the aviation force is trained and ready. This challenge will be as great, or greater, than any faced in the past.

A quick look into the future shows us that none of the combined arms partners will have adequate field training resources to meet readiness objectives. Because of the enormous expense associated with operating aircraft, the aviation element of the combined arms team can expect to face a particularly severe and austere future. A closer look at present resources reveals that it is already difficult to plan and execute both proficiency flying and tactical combat flying. Fortunately, work being undertaken today will provide a solution to this dilemma. That solution is based on a greater use of simulation.

Aviation units in the latter part of this decade will have available to them a very unique training system based on computer simulation and modeling. Currently, computer-based simulation devices are used to train and sustain individual crew level skills and exercise command and control functions of large units. These simulations and models range in level of detail from high to low, based on training objectives associated with the device.

Imagine being able to conduct company level tactical exercises anywhere on a battlefield 100 km x 150 km. Environmental conditions ranging from day to night and clear to overcast (including rain, snow, and fog) would be tuneable to fit training objectives. Your company or troop would be able to fight on any one of three types of terrain —European, Desert, or Jungle. AirLand Battle Operations could be conducted. Actions could be synchronized with those of a ground maneuver battalion or task force. Restrictions on the use of lasers and terrain would not exist. Use of ammunition and fuel would only be limited by the ability of the simulated logistics system to move and supply it. Units would routinely fight against a certified battalion-size opposing force. All of this could be possible without ever using a helicopter or leaving the installation. The cost of using this training system, when compared to the cost of a five-day FTX or rotation to the National Training Center (NTC), would be insignificant.

This training utopia will become a reality with the Aviation Combined Arms Tactical Trainer (AVCATT). AVCATT will be used by company/battalion and troop/squadron commanders to prepare their units for and supplement training between scheduled FTXs. This system will be key to maintaining training within an established band of excellence. AVCATT is not intended to replace field training; however, it will allow units to learn how to crawl and walk in simulation, thereby ensuring the greatest benefit is attained with field training dollars. While simulation is by no means new to Army Aviation, AVCATT's distributed simulation technology is (see Figures 1 and 2). Distributed simulation was pioneered by the Defense Advanced Research Projects Agency (DARPA) during the mid to late 1980s. DARPA's efforts supplied 236 ground combat and eight generic rotary wing aircraft simulators, known as SIMNET and AIRNET (Simulation Networking and Air Networking) to the U.S. Army. AVCATT is now the natural evolution of these advanced technology demonstrators.

Unlike SIMNET/AIRNET, AVCATT is a requirement established by the U.S. Army Aviation Center, and is based upon the needs of the scout and attack helicopter team which have been repeatedly identified since 1978. When AVCATT is fielded, it will be a group of fully interactive networked simulators and emulators replicating attack helicopter and air cavalry organizations. The system will be provided to installations configured as company sets consisting of eight manned helicopter simulators, battalion staff work station subsystem, aviation emulation and support subsystem, Blue and Red semi-automated force or SAFOR subsystem, After Action Review (AAR) sub-

AVCATT TECHNOLOGY COMPARISON

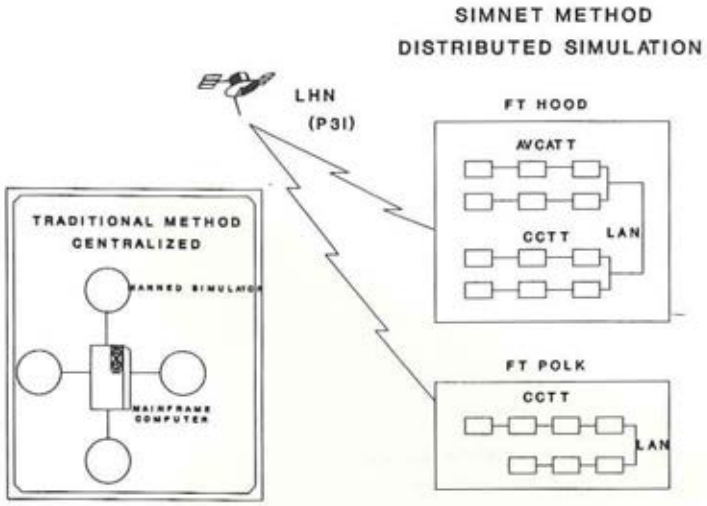

Fig. 1

system, and local area computer network (see figure 3). AVCATT will allow units to conduct collective task training in real time, on a computer-generated battlefield, using combined arms force-on-force free play training scenarios. Manned simulators in AVCATT will replicate the cockpits of the AH-64 Apache, RAH-66 Comanche, and OH-58D Kiowa Warrior. Opposing forces are provided by SAFOR work stations. Other elements present on the modern battlefield such as Combat Support and Combat Service Support are emulated as part of the simulation.

In AVCATT, aircrews will experience the cockpit, flight characteristics, and weapons characteristics to the degree necessary to conduct successful unit level collective task training. This concept is referred to as selected fidelity. Each aircraft cockpit is connected to the local area network, allowing each aircrew to interact with each other and the total AVCATT environment, i.e. battalion TOC/ALOC, friendly ground forces (SAFOR), opposing forces (SAFOR), adjacent units (aviation emulation station), etc. Therefore, warfighting takes place within the confines of an environment created by software and a Computer Image Generator (CIG). These simulators differ from traditional flight simulators in that each one is made up of a visual system containing a display device and CIG; its own microprocessor; and its own copy of the data base. Each simulator updates its copy of the data base by receiving and passing data packets across the local area network, thereby keeping track of all relevant activities occurring in the simulated environment. AVCATT is intended to be a medium to teach *warfighting skills*, not flying skills. As such, personnel using the device must already be qualified and proficient in their individual aircraft. In a nutshell, AVCATT manned simulators provide the company/troop the ability to shoot, move, and communicate during a computer simulated battle.

The staff work stations represent the Tactical Operations Center (TOC) and Administrative and Logistics Operations Center (ALOC) of the higher headquarters. The TOC performs all those functions normally associated with an aviation battalion TOC. Its major purpose is to drive the simulation

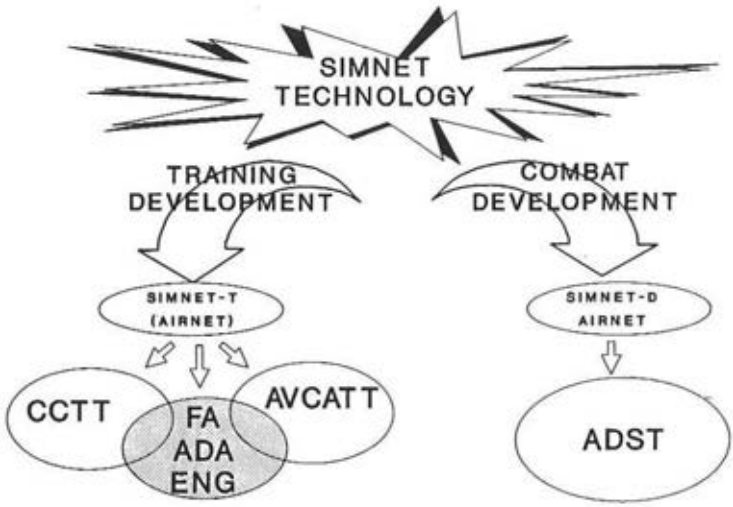

Fig. 2

The SIMNET/AIRNET efforts during the mid and late 1980s demonstrated simulation potential to benefit both training and combat developers.

from the top down. It will maintain communications and coordination with higher, lower, and adjacent units. The TOC consists of the operations, fire support, and intelligence work stations with appropriate communications equipment. The ALOC will be the focal point for all CSS actions and emulate all logistical efforts within the unit. It will consist of maintenance, administrative, and supply work stations and appropriate communications equipment.

The SAFOR subsystem adds friendly and opposing forces, not represented by manned simulators, to the simulation. It will perform all battlefield tasks and supporting functions that live forces can perform in the simulation with minimal human involvement. The subsystem includes armor, infantry, artillery, air defense, engineer, aviation, air force, and naval systems expected to be encountered during the appropriate intensity level of conflict. Friendly and opposing forces will be represented by individual vehicles organized into units up to battalion level.

The aviation support work station allows a minimum number of personnel to provide additional aviation assets through emulation. These assets include aeromedevac, air assault, air movement, special electronic mission aircraft, air rescue, and other special missions. It will provide the operator with one out-the-window view. The aviation emulation station can also simulate the other companies/troops within the battalion/squadron. It allows a minimum number of qualified personnel to control the movement of an aviation company-size element (attack or scout) and provides the operator with one out-the-window view from any aircraft selected. Two aviation emulation stations will be part of a company set.

The After-Action Review (AAR) subsystem provides the commander/trainer with a means to monitor, record, and play back the events that take place during a unit training session. The subsystem will record unit movement, weapons engagements, hits, kills, ammunition expended, communications conversations, combat support, and combat service support operations. It will provide an audio, video, and data printout record of the training exercise to assist the commander/trainer in preparation and delivery of his AAR.

AVCATT BASIC COMPANY SET

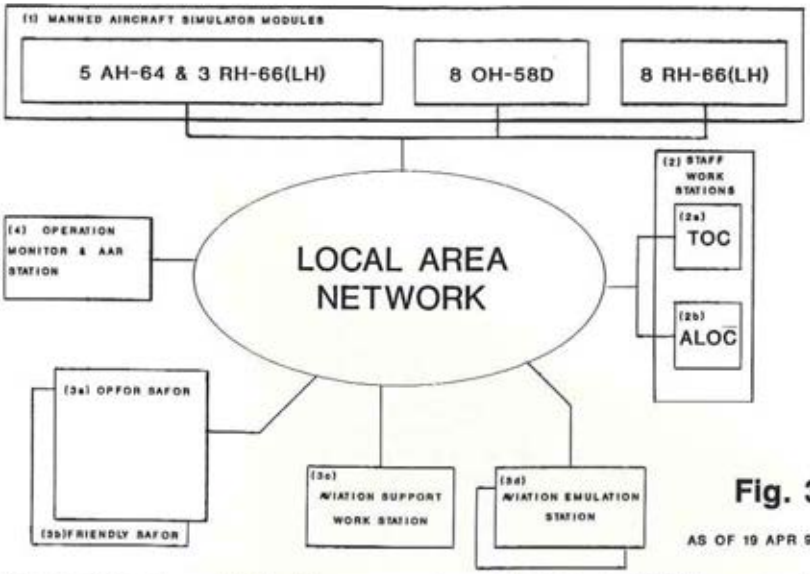

Fig. 3

AS OF 19 APR 91

AVCATT is a critical element of the future Aviation Combined Arms Training Strategy. It provides an effective media to bridge the gap between critical training needs and resources. Twelve of the fourteen critical tasks indentified in a recent aviation mission area Battlefied Development Plan (BDP) must be downloaded into simulation. As such, AVCATT provides the aviation commander with tools to train his unit in high payoff Mission Training Plan (MTP) tasks:

- at a cost that can be resourced;
- in the environment of his choice;
- in complete safety.

These tasks include, but are not limited to, air combat and anti-armor operations, suppression of enemy air defense, and aerial reconnaissance. AVCATT will offset limitations on the allocation and use of training ammunition. Multiple aircrews will be able to interact while engaging multiple targets using Hellfire missiles. The simulation will allow units to increase their weapon proficiency while saving actual ordnance for premier large scale training events. Use of aircraft laser rangefinder/designators will not be restricted. Lastly, AVCATT provides the commander flexibility in tailoring his training mission to the skills of his unit.

In the future then, simulations such as AVCATT will be a training necessity, not a luxury. Operation DESERT STORM was pulled together by the Army's leadership in a short period of time. The critical element of this success was the extraordinarily high state of training and readiness of forces available. Repeating DESERT STORM in the future may be possible only because of a simulation-based training strategy and early investment in simulation hardware and software. AVCATT will provide aviation commanders with units trained and ready to execute another DESERT STORM on any future battlefield. Although AVCATT will not be a complete replacement for training with actual equipment in the field environment, it will allow units to spend their field training dollars more wisely. AVCATT will be the classroom where company level warfighting skills are taught and the field will be the arena for perfecting and fine tuning those skills. IIIII

OPERATIONS:

U.S. PRECISION HELICOPTER TEAM

BY CAPTAIN T. COWART

FORT RUCKER, AL — The information below, concerning the United States Precision Helicopter Team (USPHT) has been extracted from the Memorandum of Instruction (MOI) published by the staff of the USPHT to assist in preparing for the team trials which will be conducted at Fort Rucker, AL, during 19-23 April 1992.

USPHT membership is open to all U.S. helicopter pilots, military or civilian. Up to eight crews consisting of a pilot and co-pilot/observer who will compete in the 7th World Helicopter Championships (WHC) in England in September of 1992 will be selected during the Fort Rucker Trials.

The United States Army serves as the executive agent for the Department of Defense on all matters pertaining to the WHC. The Helicopter Club of America (HCA) will sponsor the USPHT in the WHC. The United States Army Aviation Center (USAAVNC) will host the USPHT Trials and the USPHT staff will conduct all subsequent training for the selected team.

The designated pilot will perform all of the flying during the USPHT Trials and WHC competition. All designated pilots will be required to take an orientation flight on Saturday, 18 April 1992 to orient the pilots on local airspace requirements and procedures. Each civilian pilot will complete this flight in their own aircraft accompanied by an Army instructor pilot.

Aircraft flown in the USPHT Trials will be restricted to those aircraft authorized to fly with the pilot and co-pilot doors removed. The Army will fly either the OH-58 series of aircraft or the UH-1H during the USPHT Trials and USAAVNC aircraft will be available for use by Army crews. Civilian competitors must provide their own aircraft. In both the USPHT Trials and WHC, aircraft flight control augmentation/stabilization systems (i.e. SCAS, SAS and AFCS) as well as navigation systems (Doppler, Loran, GPS, etc.) will be disabled.

Competitors are responsible for arranging individual billeting. Military crews should contact the Fort Rucker Billeting Office, DSN 558-3780, or commercial (205) 255-3780. A list of local motels is also available from the USPHT.

Military crew requirements include: Individual Aircrew Training Folder, Individual Flight Records Folder, Unit Pilot-in-Command Orders, Current Medical Recommendation for Flying Duty, standard flight equipment, physical training attire. Units interested in participating in the USPHT Trials should select a representative crew and begin training for the competition. A member of the USPHT staff will be available 1 November 1991 through 15 February 1992 to conduct "on-site" briefings. Units interested in scheduling this briefing should contact CPT Jim Ludowese, USPHT S-3, DSN 558-3547/3548 or commercial (205) 255-3547/3548, and be prepared to provide a fund cite for USPHT staff visits.

CPT Cowart is with the ARNG Mutli Media Branch, Ft. Rucker, AL.

Civilian crews must coordinate overnight parking and refuel requirements with local airport managers. A list of local airports is available. Civilian crews must comply with the provisions of AR 95-2 for operating a civilian aircraft at a U.S. Army installation which is available at any Army Flight installation or activity.

Civilian competitors must provide the following information to CPT Ludowese not later than 1 April 1992: Name of crew members and organization, type aircraft to be flown, address and phone number for crews, original proof of insurance, name of flight insurance company, policy number, policy effective date, types of coverage and value of policy, anticipated arrival date, any assistance needed from the USPHT staff prior to arrival.

All crews (military or civilian) must be present for an initial in-processing briefing at 0900, 18 April 1992, Room 1, Building 5206 (Murphy Hall), Fort Rucker, AL. In-processing will begin at 0845 at which time a $10 per person cash entry fee will be collected. Uniform for the briefing will be flight suit. Crews will be automatically eliminated from the competition for failing to attend the initial briefing.

The USPHT staff is prepared to assist all competitors and is available to answer your questions. You may contact the USPHT at DSN 558-3547/3548 or (205) 255-3547/3548. IIIII

MAINTENANCE:

DESERT SHIELD/ STORM WRAP-UP

BY COLONEL GARY D. JOHNSON

ST. LOUIS, MO — "Going home!" These words brought joy to the participants in Operations DESERT SHIELD and DESERT STORM (ODS) as well as to all Americans. For those individuals responsible for maintaining the Army Aviation fleet, with the joy, came the realization of a major redeployment workload. Shortly after the successful conclusion of operations, units were instructed to prepare to deploy to their home stations. Maintenance emphasis shifted to the preparation and preservation of aircraft for shipment.

Earlier, AVSCOM had set-up in the ODS the Theater Aviation Maintenance Program (TAMP). TAMP was staffed by specialized military and civilian people to augment ODS maintenance units and expedite movement and repair of aircraft and parts. Considerable TAMP resources were consumed at the ODS Debarkation Ports, establishing what was probably the world's largest helicopter washing operation, as a first order of business. After cleaning and downloading of munitions and other required actions, the aircraft were sprayed with corrosion prevention compound and wrapped with a heat-to-shrink film for protection during the long voyage home.

After reaching Home Port, the ships were met by a cadre of AVSCOM folks, whose mission was to provide all possible assistance to other support elements preparing the aircraft to fly to their home stations. This included maintenance, engineering support, and the erection of a portable Clamshelter near one Home Port, for use as a maintenance shelter. Port teams also evaluated the effectiveness of our efforts in protective preservation and packaging at the ODS debarkation point.

However, only minimal maintenance could be performed on the aircraft until tools, aircraft logbooks, spare parts arrival, and unit personnel returned from their well-deserved leaves. During this period, AVSCOM was uncertain of the true condition of the aircraft subsequent to their use in an uncompromising desert environment.

This concern led AVSCOM to establish a "Special Technical Inspection and Repair Program" (STIR). A STIR Team was formed to perform an Airframe Condition Evaluation (ACE) and an Aircraft Analytical Corrosion Evaluation (AACE) on 60 selected aircraft returned from ODS, along with other proven inspection techniques. Aircraft evaluated were:

- 6 CH-47 Chinooks
- 20 AH-1 Cobras
- 12 UH-60 Black Hawks
- 10 UH-1 Iroquois
- 10 AH-64 Apaches
- 12 OH-58 Kiowas

These aircraft were examined at four CONUS locations to provide a cross-section of their true condition. The STIR program concluded that the only additional special maintenance necessary on the aircraft was a thorough cleaning and inspection and treatment for corrosion. This resulted in Technical Bulletin (TB) 1-1500-200-20-30, "DESERT STORM Aircraft Redeployment Cleaning Requirement", published on 10 June 1991.

COL Johnson is Director of Maintenance, U.S. Army Aviation Systems Command, St. Louis, MO.

STIR II

Having completed the initial STIR objective, a determination was made that an in-depth inspection to include teardown of selected components, could provide additional information of effects of the ODS environment on the items. On 30 July 1991, a STIR II Team deployed to Fort Hood, TX. As of this writing, an AH-64, an AH-1, a UH-60A, and a CH-47 helicopter have been inducted for team evaluation. The results from this evaluation will be used to determine the need for additional maintenance augmentation of field units.

Despite the known effects of sand and dust on turbine engines, it is important to know more. To that end, an engine

(continued on page 57)

AVIATION MEDICINE:

CURRENT RESEARCH EFFORTS AT USAARL

BY COLONEL DAVID H. KARNEY

FORT RUCKER, AL — The U.S. Army Aeromedical Research Laboratory (USAARL), one of 11 research laboratories and development activities of the U.S. Army Medical Research and Development Command, deals with Army Aviation's unique occupational problems and also applies its specialized research disciplines throughout other military combat systems and operations.

USAARL has three research divisions: Biomedical Applications Research, Sensory Research, and Biodynamics Research, that focus on six major thrust areas—acoustics, vision, crew workload and stress, life support technology, impact and vibration.

Researchers in the Crew Life Support Branch, Biomedical Applications Research Division (BAR), investigate problems relevant to the soldier's physiological condition and performance. They examine new methods for measuring physiological status, assess aviator motion sickness, evaluate effects of NBC protective gear on mission capability, and develop strategies for improving aviator safety, health, and effectiveness. During Operation DESERT STORM, laboratory personnel studied the effects on aircrew performance of various microclimate cooling ensembles as well as the effects of chemical agent pretreatment medications. Other projects study the combined effects of heat stress and chemical protective clothing and masks on aircrew performance.

Scientists assigned to the Crew Stress and Workload Branch, BAR, conduct research into aviator performance effects of chemical warfare antidotes; electrophysical indicators of fatigue; crew work/rest schedules; and performance assessment methodologies. The results of a study on the effects of atropine, a nerve agent antidote, on pilot performance have been documented and briefed to the operational community.

Researchers are also studying the effects of sleep deprivation on electroencephalogram (EEG) activity and are exploring coping strategies for night work and crew endurance using Night Vision Goggles (NVGs). Also, an investigation has been completed that establishes the sensitivity of pilot performance measures to low-level pharmacological stressors (prescription drugs). USAARL, through and with government contractors, is studying computerized tests, field-portable assessment devices, and EEG measures of fatigue. During Operation DESERT STORM, this branch assessed chemical defense stressors, work/rest schedules, physical training, and heat stress.

COL Karney is Commander, U.S. Army Aeromedical Research Laboratory, Ft. Rucker, AL.

Personnel in the Sensory Research Division conduct research in acoustics, vision, and sensory neurophysiology. Those in the Acoustical Sciences Branch perform laboratory and field studies to evaluate state-of-the-art hearing protection for soldiers for steady state noise sources, e.g. aircraft engines, and blast overpressure noises produced by large caliber weapons and rockets. This protection includes active noise reduction technology, talk-through ear muffs, and electronic in-the-ear protective plugs.

Visual Sciences Branch scientists conduct research on helmet-mounted displays, eye laser protection, night vision devices, contact lenses, and other vision protective devices. Sensory Neuroscience Branch researchers study how the brain processes visual information and how it is affected by chemical agents or agent pretreatment regimes. This research will provide critical insight into how to counter potential chemical threats like those anticipated during DESERT STORM. Researchers are also developing a mathematical human visual system model that will define the performance effects of aviation and battlefield systems on aircrew vision.

Scientists in the Biomechanics

Branch, Biodynamics Research Division, are involved in a multiphase project to produce new military standards for evaluating the health hazards of repetitive shocks experienced in tactical vehicles. As part of a research program focusing on helicopter pilots' performance degradation due to increased helmet weight, a study of recorded electromyographic (EMG) signals from neck muscles during simulated helicopter flight is being conducted. These EMG signals will be analyzed and correlated with measured fatigue and pilot performance.

Personnel in the Life Support Equipment/Crew Injury Branch study equipment used to protect aircrew members, maintain an epidemiological database of injuries incurred in aircraft accidents, and conduct tests and evaluations of aeromedical evacuation equipment. Life Support Equipment (LSE), such as flight helmets, restraint harnesses, and aircraft seats are recovered from aircraft mishaps by the Army Safety Center and evaluated by USAARL as to their performance or failure in preventing injuries during the crash sequence. The resultant injury database produces recommendations to enhance LSE crashworthiness, and improve fit, comfort, and protection.

Other research besides the Aviation Life Support Equipment Retrieval Program includes evaluation of production and developmental LSE for the RAH-66 Comanche program. The Test and Evaluation Program for Aeromedical Evacuation Equipment evaluates medical items for use on medical evacuation aircraft. This includes both laboratory and in-flight testing. Branch personnel also maintain the Aviation Epidemiology Data Register, a joint project with the U.S. Army Aeromedical Center. It is a computer database containing data from Army Aviation flight physicals. This unique information system provides the Army with physical and health history information on Army aviators, improves aircrew selection and retention standards, monitors the health of Army aviation personnel, and assists in improving the man-machine interface of current and future aviation systems.

A major collaborative effort being undertaken by USAARL and the USAF Armstrong Laboratory, Brooks Air Force Base, TX, is the Laboratory for Aerospace Cardiovascular Research (LACR). The LACR research related to the Army mission focuses on the effects on flight performance of sustained lower level G forces within the flight envelopes of current and future Army helicopters. Those forces may become significant in air combat maneuvers in aviators with various types of aeromedically waiverable cardiac conditions. The effects of sustained and intermittent lower level G forces on healthy aviator flight performance are also of concern. The research will provide improved knowledge of how the heart and cardiovascular system perform under lower level G stressors. That could allow a broadening of the Army's medical waiver policies as they relate to cardiovascular disease, thus permitting the retention on flight status of valuable experienced aviators who would otherwise be medically disqualified from flying. Basic research associated with the study is also developing new technologies for evaluating cardiac conditions and for monitoring combat casualties in the field and medical patients in the hospitals.

The USAARL staff continues to coordinate its research and represent the Army's aviation interests on the national and international scene through membership on the Tri-Service Aeromedical Research Panel (TARP), the Aerospace Medical Panel (AMP) of the NATO Advisory Group for Aerospace Research and Development (AGARD), and the multinational Aviation Standardization Coordinating Committee (ASCC), and the Technical Cooperation Program (TCP). The laboratory is also dedicated to the principles of Manpower and Personnel Integration (MANPRINT) and, as such, is ensuring the optimization of the aviator-RAH-66 Comanche interface throughout the developmental process. IIIII

Wrap Up

continued from page 55

assessment program kicked off on 16 August 1991. When overall condition of the engines from ODS has been determined, effective repair/recovery programs can be accelerated.

Let's continue the outstanding teamwork exhibited by the entire Army Aviation community during ODS and through the redeployment phase. Together, we can extend our victory in ODS to include controlling the effects of a harsh desert environment on our aviation fleet. IIIII

SAFETY:

SOLDIERS MAKE SAFETY HAPPEN

BY CW3 GARY D. BRAMAN

MANNHEIM, GERMANY — Upon joining the U.S. Army, enlisted soldiers are quick to realize that they will be required to perform a myriad of duties about which the local recruiter has failed to inform them. These duties range from performing the job they learned in Advanced Individual Training (AIT) to being on a detail for the company 1SG or the battalion CSM.

One duty that our unit's soldiers never expected to have assigned to them was the loading and off-loading of aircraft from Navy ships. They were Army stevedores!

The soldiers I am talking about are assigned to B Company, 70th Transportation Battalion (AVIM) in Mannheim, Germany. The battalion is located at Coleman Army Airfield (CAAF) and the company is an Aviation Intermediate Maintenance Company. The company is not only responsible for aircraft maintenance above Corps level, but is also responsible for fielding new aircraft as they arrive in the European Theater. This is how the soldiers in Company B became part-time stevedores.

Their first action as stevedores came in 1987. B Company was tasked with the mission of shipping the in-theater "C" model Chinooks back to the States for upgrading. Over a period of several weeks, blades were removed and the aircraft were covered in plastic shrink wrap. From CAAF they were towed to a dock area on the Rhine River and shipped by barge to the port of Rotterdam, in the Netherlands. B Company soldiers met the barges at Rotterdam, off-loaded the aircraft, and then immediately loaded them onto a Navy ship to be sent to CONUS for upgrading.

REFORGER was another exercise where the "stevedore" skills of B Company soldiers were put to use. As stateside units deployed to the European theater for the two week training exercise, B Company soldiers met them at the European port where they off-loaded the aircraft from the sea-going vessel. The mission continued as they assisted in the reassembly of the helicopters and delivered them to the maneuver area. Upon completion of the FTX, the same procedures and mission were executed, only in reverse. B Company soldiers assisted the unit in returning the aircraft to port where the aircraft were steam-cleaned, inspected by customs officials, and shrink wrapped. Shortly thereafter, the aircraft were loaded back onto a ship for return to their stateside duty stations.

CW3 Braman is Battalion Safety Officer, 70th Transportation Battalion (AVIM), Mannheim, Germany.

Since their first mission in 1987, the soldiers of B Company have loaded and unloaded over 1,000 helicopters, to include AH-64, UH-60, AH-1, UH-1, OH-58C, and OH-58D types from Navy ships. The most remarkable feat accomplished by these soldiers is that they completed their missions without damaging one aircraft or injuring one soldier. In addition, the soldiers drove in excess of 15,000 miles in mission support. They travelled in vehicles ranging from small utility vans to five ton tractors, with flatbed trailers loaded with equipment. They drove from Mannheim to ports in Antwerp, Belgium; Bremerhaven, Germany; and Amsterdam and Rotterdam, in the Netherlands.

The key to this amazing feat and remarkable accident record was the NCO. Prior to the execution of any portion of the mission, the NCOs briefed their soldiers on the job at hand and how it would be carried out. The NCOs conducted a prior "risk assessment" of the task to be accomplished. They asked themselves, "How could our soldiers be hurt while executing this task? What can we do to reduce the risks and prevent injuries?" After making the assessment, the NCOs briefed the soldiers on the mission, its execution, and associated hazards. The NCOs had set the standards and, in ad-

(Safety continued on page 63)

TEST & EVALUATION:

FULL MISSION SIMULATIONS

BY LIEUTENANT COLONEL JOSEPH E. PLANCHAK

ALEXANDRIA, VA — The appeal of advanced technologies as "Force Multipliers" has become readily apparent, and painfully so from some quarters, as a result of the experiences of the United States Military in the Southwest Asia theater of operations. The position that greater quantities of "low cost, low tech" weapons are better and more effective than fewer "high cost, high tech" weapons no longer has much credence in light of the dramatic successes of our forces during Operation DESERT STORM. The multitude of advanced technologies applied during the campaign has changed the way in which we view the modern battlefield. Old ideas of limitations in the operational environment due to lighting, battlefield smoke and haze, and weather conditions are no longer a severe limiting factor in our ability to mass military force where and when they are needed most.

The assumption, however, that advanced technologies give the force a marked advantage in the tactical environment can only be true *if* that technology can be readily applied in the field. No matter how advanced any particular technology is, if the soldier cannot use it to "put steel on the target" when and where it is needed most, that technology is useless in a tactical sense. The above discussion brings us to the purpose of this article, the development of advanced Army Aviation weapons systems and how best to achieve this.

Given the desired technical performance of a system (range, speed, accuracy, etc.), the most important contributing factor to a system's operational effectiveness (its "usability") is what has been called Human Factors Engineering, e.g. the *Man-Machine Interface*. This must be the *focus* of all future weapon systems development.

The primary *disadvantage* of the "high tech" solution to advanced aviation weapon systems development is the high cost of producing these systems. It is incumbent, therefore, upon the Army Aviation community (materiel developer, user community, evaluators and testers) to pursue development in the most efficient and cost effective manner possible. Due to time and funding constraints that are a reality of today's Army, Full Mission Simulations (FMS) seem to hold great promise for providing the required complexity and flexibility needed for early focus on this critical Man-Machine Interface aspect. Although the development of FMS simulators themselves is not by any stretch of the imagination cheap, the alternative (the development, fabrication, and testing of several different air vehicles for the same mission need) has been proven to be far more costly and time consuming.

LTC Planchak is Evaluation Division Chief, Aviation Directorate, Operational Evaluation Command, Alexandria, VA.

Full Mission Simulations offer several advantages over the more traditional way of developing systems.

- The simulated test article can be placed in several different "physical environments" without the high cost of moving an entire operation to a different test range or location.
- The "tactical environment" can be readily varied without the expense of holding large numbers of personnel and equipment in reserve.
- The scope and complexity of the "tactical environment" can be either expanded or reduced, depending on mission needs and test scenarios, with little or no effect on increasing the scope of the test in question.
- The operating characteristics of the simulated article itself can be readily modified, primarily through software changes, to accept identified design changes during the early development stages.
- The total system under development (man and machine) can be tested under "near real" combat stresses without risking the safety of the aircrew or an expensive, one of a kind prototype aircraft.

(FMS — continued on p.63)

BRIEFINGS

An eight month, $400,000 contract awarded by the **Aviation Applied Technology Directorate (AATD)**, Ft. Eustis, VA, to **PROAV International Aviation Services Corp.**, Ottawa, Canada, will provide helicopter Cable Warning Systems (CWS) and technical support for a U.S. Army field evaluation in Germany and Korea. The CWS functions as an alerting device when exposed to the magnetic fields generated by the flow of electric current. The evaluation should determine if the CWS provides the needed safety margins overseas, where power grid systems operate at a 50Hz frequency, as opposed to the 60Hz frequency normally found in the U.S.

Martin Marietta Corporation has been awarded a $300 million, 89-month contract by **Boeing Defense & Space Group's Helicopter Division** to complete development of the advanced night navigation and targeting system for the U.S. Army's RAH-66 Comanche helicopter. The Martin Marietta system will provide Comanche pilots with enhanced low-altitude combat capability during day or night and in adverse weather via high-resolution, TV-like imagery at ranges greater than currently possible. The longer standoff ranges will increase both pilot and aircraft survivability.

The **4th Annual Kentucky Vietnam Veteran's Reunion** will be held on 15-17 May 1992 in Frankfort, KY at the Holiday Inn Capitol Plaza. This reunion is an all services, all unit, all veterans from any war reunion. Those interested in attending should write to: LZ Bluegrass, Inc., P.O. Box 4884, Louisville, KY 40204.

Harris Computer Systems Division has announced the addition of three Vice Presidents of Business Area Teams for Simulation, Data Acquisition, and Secure Computing. **Dennis McWatters** has been added to the executive staff as VP, Data Acquisition Business Area Team. His last position was with Encore Computer Corp. **Charles R. (Rick) Maule** has been promoted to the position of VP, Simulation Area Business Area Team. Maule worked previously in development and marketing areas for the Computer Systems Division of Harris. **William J. Marlow** has been appointed VP, Secure Business Area Team. Marlow most recently held the position of VP, Sales.

New York State's veterans of Operation DESERT STORM are being asked to fill out a questionnaire describing their role in the Persian Gulf War. The questionnaire is one of the first projects of the **New York State Military Heritage Museum** recently organized to preserve and display military records and artifacts of New York's citizens. For more information regarding the veterans' questionnaires, membership options, and donations of any records or artifacts, write to: New York State Military Heritage Museum (NYSMHM), Ft. Orange Station, P.O. Box 6900, Albany, NY 12206-0900.

Elbit Ltd. of Haifa, Israel, has established a new U.S. counterpart, **Elbit Systems, Inc.**, to offer a complete line of vision technology to America. Elbit's products include Combat Vehicle Vetronics Systems, Advanced Avionics Systems, Night Vision Goggles/Heads-Up Displays, and Thermal Imaging products.

Aviation Systems Command has transferred the mission responsibility of its **Avionics R&D Activity (AVRADA)** from Ft. Monmouth, NJ to Central Electronics Command's R&D Center, effective 1 Oct 91. The transfer of mission will leverage the expertise within CECOM to greatly enhance electronic engineering support to aviation as well as focus CECOM's R&D program to resolve aviation issues. This management initiative will result in the establishrnent of the **Electronics Integration Directorate (EID)**. The EID's immediate mission will be to serve as the lead agency within the CECOM RDEC for the application and integration of electronic technologies to Army Aviation platforms. Also, a Project Manager for Avionics has been established beneath the Aviation Program Executive Office in St. Louis, MO, with a field office at Ft. Monmouth. The Project Manager Avionics in St. Louis is Mr. Larry Johnston, ATTN: SFAE-AV-VL, Commerical (314) 263-3505, DSN 693-3505.

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BRIEFINGS

The **7th Squadron, 6th Cavalry Regiment (ATKHB)** is currently scheduled to become the first U.S. Army Reserve unit to field the Apache. The expansion of advanced attack helicopters to the Army Reserves opens a new era of Army Aviation as well as creating new opportunities for soldiers with Apache-peculiar skills who are considering leaving the active component and becoming citizen-soldiers. Any individual with an Apache MOS and an ETS during FY92 who may be interested in joining this first of a kind unit should call Commercial (409) 539-4311, or write: Commander, 7th Squadron, 6th Cavalry Regiment (ATKHB), Rt. 22, Box 960, Conroe, TX 77303-2298.

The **Aviation Applied Technology Directorate (AATD)**, Ft. Eustis, VA, awarded a $352,999 contract to **McDonnell Douglas Helicopter Company (MDHC)** to develop an "Enhanced NBC Initiative" for the AH-64A Apache helicopter. Other Enhanced NBC Initiative contracts awarded are: $353,000 to **Sikorsky Aircraft** for the UH-60 Black Hawk; $453,673 to **Bell Helicopter Textron, Inc.** for the OH-58D and AH-1F; and $348,191 to **Boeing Helicopter Company** for the CH-47.

The **CAE-Link Corporation** announced a $24.5 million contract from the **Boeing-Sikorsky RAH-66 Comanche Team** for analysis and design of aircrew and maintenance training devices for the U.S. Army. The initial effort will focus on data gathering and front-end analysis for updating training device specifications for the RAH-66 Integrated Training System. CAE-Link will then develop engineering designs for Combat Mission Simulators (CMS) and Team/Combined Arms Trainers (T/CAT), as well as several maintenance trainers. They will also design systems for supporting training hardware, software, and courseware.

The **Army Otter and Caribou Association, Inc.** will be holding their 7th annual reunion in Hampton, VA, 6-9 August 1992. Former members of Otter or Caribou Army Aviation units who are not already affiliated with this Association can contact Bill Hooks at (800) 626-8194 or at P.O. Box 6091, Columbus, GA 31907-0073 for further information.

The **Ethanol Fuels for Aviation Consortium (EFAC)**, conceived in 1990, was founded to marshall the efforts of researchers and resources of government and industry into a unified quest to indentify, test, and commercialize the use of ethanol fuels in aviation. The organization is currently seeking to identify key individuals and institutions for participation in the consortial effort to establish research partnerships and industrial and agency linkages to effect more rapid introduction of the derived technology and to promote public awareness concerning the viability and safety of using ethanol fuels in aviation. During a recent trip to Ozark, AL, several EFAC representatives met with AAAA member **Edmund L. "Skip" Eveleth**, one of the research pioneers in aviation alternative fuels, to discuss the results of his extensive demonstrations of ethanol-based fuels in aviation reciprocating and turbine engines and to gain his support. Other prominent supporters of EFAC include Dr. Max Schauck of Baylor University who was a co-recipient of the coveted Harmon Trophy in 1991 for his 1989 trans-Atlantic flight in a single engine, pure ethanol powered fixed wing aircraft. For more information on EFAC and Mr. Eveleth's research, contact: Mr. Edmund L. "Skip" Eveleth, 320-G Willow Oaks Drive, Ozark, AL 36360. Phone: (205) 774-2417.

Announcing Electronic Communication Link to AVSCOM's Directorate for Maintenance

AVSCOM's **Maintenance Data Management Bulletin Board System** operates from 0800-0600 CST Monday through Friday, and 24 Hours Saturday and Sunday. Dial DSN 693-9057, or Commercial (314) 263-9057. The BBS provides easy on-line step-by-step New User registration, electronic data transfer, electronic message conferencing between registered users, and has SOF and ASAM messages available for downloading. For more details, call the System Operator at DSN 693-1955 or Commercial (314) 263-1955/3493.

Safety
(continued from page 58)

dition, continued to make ongoing reevaluations throughout the conduct of the mission. After commencement of the mission, the NCOs supervised the soldiers and enforced compliance with the standards they had established.

The soldiers, too, played an important role in achieving a zero accident rate. They accepted the standards set by their NCOs, were familiar with the hazards associated with their task, did not deviate from established procedures, and did not take short cuts. During the mission, the soldiers stopped the operation whenever they observed a potential hazard and reevaluated the execution process, making changes to reduce or eliminate the hazard.

This article is a tribute to the soldiers and NCOs of B Company, 70th Transportation Battalion (AVIM), for whom safety is a priority and soldiers and sergeants make safety happen.IIIII

FMS
(continued from page 59)

This "concept" was initially put to the test during the Demonstration/Validation (DEM/VAL) phase of the Light Helicopter (now RAH-66 Comanche) Program with a high degree of success, and will be further refined in the Full Scale Development phase during the Force Development Test and Experimentations scheduled to begin in FY93. This FMS (the DEM/VAL) highlighted areas of concern with mission equipment package architecture and provided valuable early feedback to the designers of the systems. The use of FMSs will potentially save a great deal of time and money that would otherwise be spent on design changes to actual hardware.

Although Full Mission Simulations will never, due to their inherent limitations, be a substitute for a full-blown operational test of a new Army Aviation system (the *real* proof-in-the-pudding), they can and will provide valuable early input to aircraft designers and Army force developers in the future. IIIII

A Year of Change
(continued from page 38)

tion). In essence, this article details the effort the Army and CAE Link, Binghamton, New York, underwent to provide a quick reaction mission rehearsal capability with a realistic database and a rich array of active threats for our Apache units deployed for Operation DESERT SHIELD/STORM.

In conclusion, our changing environment has brought corresponding changes in the way we train. Efforts to enhance aviation training capabilities are not limited to those programs listed above. PM TRADE is working on numerous programs that improve the realism and sophistication of simulations and training devices. Through our efforts and others, we are all working to decrease our training deficiency and improve combat readiness for the entire force.IIIII

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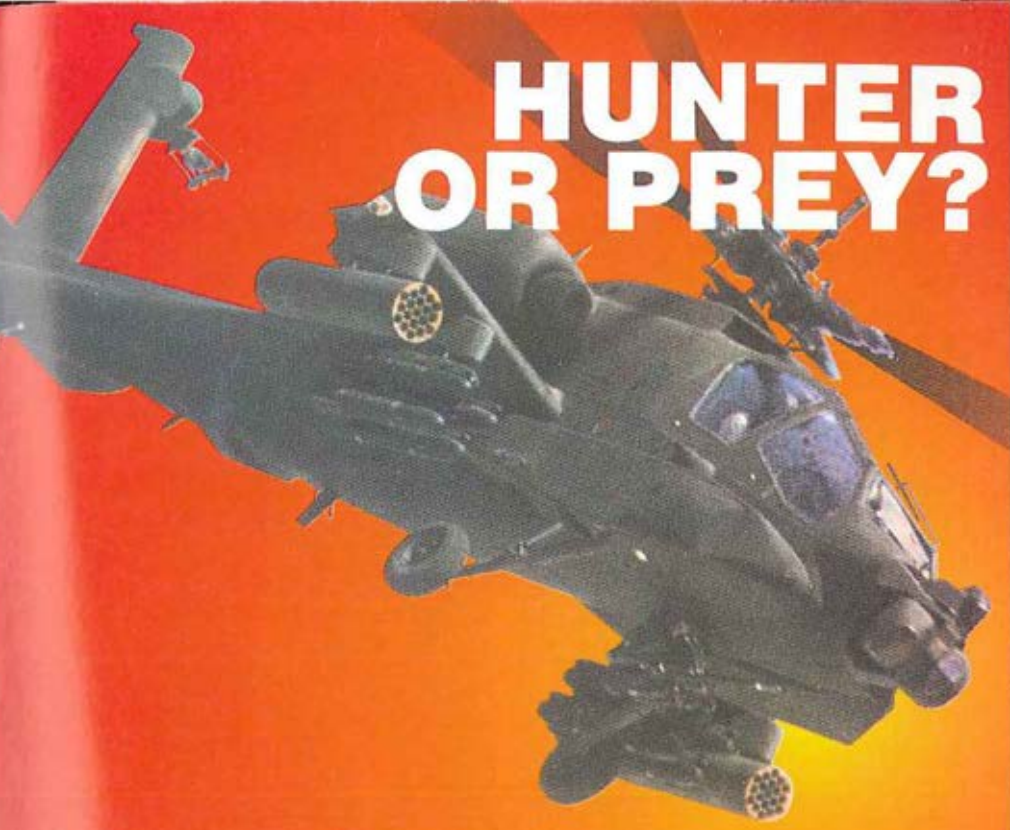

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Leavenworth	5
Talon	5
Greater Chicago Area	3

AAAA Chapters (25-115 Members)

Redcatcher	34
Wings of the Devil	24
Pikes Peak	16
Mukilteo	15
Indiantown Gap	11
Rhine Valley	10
Thunderhorse	9
Citadel	6
Jack H. Dibrell (Alamo)	6
San Jacinto	6
Checkpoint Charlie	4
Tarheel Chapter	4
Old Tucson	3

New Sustaining Members

DeSoto Hilton
Savannah, GA

The San Jacinto Chapter Summer Golf Scramble took place 28 July 1991. No word on who won, but we assume the biggest smiles did best! Standing, from left to right, are: Jim Halsell, MAJ(P) Michael R. Clifford, Domonic Pagliuso, Rose Garnto, CW4 Donald R. Garnto, Rick Knudson, SGT William S. Egan, CW4 Michael D. Wilson. Kneeling, left to right: CW3 Neil E. Whigham, MAJ(P) Jan S. Drabczuk, and Eileen Collins.

The Edwin A. Link Memorial Chapter recently presented a certificate and check for $12,000 from the AAAA Scholarship Foundation to Elizabeth Bellocchio, the top 1991 recipient. Below, from left to right: Mr. Dave Lunn, Sr VP; Mr. Randall Moore, VP Memb.; CW4 Bill Yarlett, Ret., Pres.; Mrs. Paul J. Bellocchio; Ms. Bellocchio; Mr. Bellocchio; MAJ Thomas E. Burch, Ret., Secy; and LTC George P. McGee, Ret., VP Programs.

AAAA offers $108,000 in 1992
Two scholarships now open to upperclassmen

BACKGROUND:

The AAAA Scholarship Foundation, a separate non-profit, tax-exempt corporation created to render financial assistance to selected members of the Army Aviation Association of America, Inc. (AAAA) and selected spouses, unmarried siblings, and unmarried children of current and deceased AAAA members, expects to make available $108,000 in assistance funds for the 1992 college-entry year.

SCHOLARSHIP GRANTS AND LOANS:

A minimum of thirty scholarships will be presented to entering freshmen — ranging from $1,000 to $12,000 grants given out as one, two or four year scholarships; five interest-free loans of up to $4,000 ($1,000 a year); a $4,000 scholarship ($1,000 a year) to an eligible applicant pursuing a four-year B.S. degree in an aeronautical-related science; and a scholarship of up to $3,000 available to students planning to attend St. Louis University.

In addition, one $2,000 scholarship will be "reserved" for selected spouses of AAAA members and two will be presented to upperclassmen ($1,000 a year).

AWARD PHILOSOPHY:

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

APPLICATION PROCEDURE:

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

ELIGIBILITY CRITERIA:

An applicant must be attending an accredited college or university full-time in the Fall of 1992. The AAAA member to which the applicant is related must have an effective date of membership on or before October 15 of the year preceding the year in which the applicant is seeking aid unless the member is deceased.

SELECTION AND NOTIFICATION:

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

Solicitation now underway for CY 91 AAAA National Awards:

NOMINATIONS DUE AT THE AAAA NATIONAL OFFICE ON OR BEFORE JAN. 15, 1992.

"Award Presentations"

Up to eight AAAA National Awards for accomplishments made during Calendar Year 1991 will be presented at the 1992 AAAA Annual Convention in Atlanta, GA. The individual AAAA National Award presentations will be made on Friday; the unit AAAA National Award presentations will be made on Saturday. Senior members of the U.S. Army will be invited to present the AAAA's top awards on both occasions.

"Outstanding Aviation Unit Award"

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

"ARNG Aviation Unit of the Year Award"

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

"USAR Aviation Unit of the Year Award"

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

"The Robert M. Leich Award"

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

"Army Aviator of the Year Award"

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

"Aviation Soldier of the Year Award"

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

"James H. McClellan Aviation Safety Award"

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

"Outstanding DAC of the Year Award"

Sponsored by Boeing Helicopters, 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 CY." Membership in AAAA is not a requirement. A candidate for this award must be a current Department of the Army Civilian.

Administrative Details

ACCOMPANYING DATA FOR INDIVIDUAL AWARDS: A standardized **"Nomination Form for Submission of All AAAA National Awards"** is the sole form utilized by the Awards Committee in its selection of annual AAAA National Awards Winners. Copies may be obtained directly 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 Submisson of All AAAA National Awards"** and the accompanying photo(s) must be received at the AAAA National Office on or before January 15. Please use stiffeners to protect the photo(s) being submitted. The receipt of each nomination and seconding nomination will be acknowledged by the AAAA. However, awards nominations materials - to include photographs - cannot be returned.

Top Guns

(as of 1 Nov 1991)

The member who sponsors the greatest number of new members during the contest year ending 31 December 1991 wins an all expense-paid trip to the AAAA Annual Convention, as well as a $300 cash award and receives a plaque at the AAAA Membership Luncheon.

CW3 Roger K. Garner..404
2LT Thomas Turman...232
CW4 Butch Daniel.....88
CPT Martin Carpenter...59
CPT William Davisson...56
CW2 Berend J. Voute....49
CW2 Gregory A. Wood...45
Ms. Janet J. Garmon....39
CW3 Kenneth Haynie....31
Ms. Susan Werkmeister28
CW4 J.D. Badgley.....22
Ms. Susan E. Barnes....21
CPT Thomas Brew, Jr...21
CPT Perry D. Collette....20
CW4 John Dixon, III....20
CPT Glenn A. Rizzi.....20
MAJ David D. Krieger...19
CPT Richard E. Arnold..18
LTC R. I. Gillingham, Ret.17
CPT Ralph Perez.....17
CPT Dempsey Solomon..16
Ms. Nancy Alexander...13
Mr. Joseph A. Caines....13
CW3 R.V. Guerrero, Jr..13
MSG John H. Bae.....12
2LT Paul A. Eno, III.....12
LTC M. F. McClellan, Ret.12
Mr. Billy Quintanilla.....12

Soldier of the Month

A Chapter Program to recognize Outstanding Aviation Soldiers on a monthly basis.

PFC William R. Riggs
Wings of the Devil Chapter
October 1991

At an 11 September 1991 Chesapeake Bay Chapter professional-social meeting, members were treated to a presentation on Aviation Soldier participation in Operation DESERT STORM by COL Rodney C. Lindsay (center left) and MSG Earle Prior (left) of the 29th Air Traffic Control Group, Maryland National Guard. Presenting an award to the speakers are Ms. Deborah L. Horne (center right), Chapter President, and MAJ Thomas G. Petrick (right), Secretary.

Below, COL John C. Maher (left), Commander, Aviation Brigade, 25th Infantry (Light) receives the Order of St. Michael Bronze Award from BG(P) Marvin L. Covault (right), Assistant Division Commander for Support, 25th Infantry (Light).

On 11 July 1991, the Savannah Chapter (formerly the Coastal Empire Chapter) reemerged on the AAAA scene. Pictured above are the new Chapter officers; they are, from left to right, back row: CPT Gerald Pearman (VP Prog); COL Burt S. Tackaberry (Pres); Susan K. Davis (VP, Corp. Aff.); CPT Kevin M. Woods (VP, Memb); MAJ Ralph G. Pallotta (Secy); and MAJ Gregory M. Williamitas (Treas). Left to right, front row: CSM J.C. Hart (VP, Enlist. Aff); LTC Thomas F. Stewart (Sr VP); and MW4 Robert L. Williams (VP, WO Aff). Not pictured is LTC Sidney L. Strickland, Ret., VP Retired Affairs.

AAAA CALENDAR

A listing of recent AAAA Chapter events and upcoming National dates.

November, 1991

✓ **Nov. 26.** The Long Island Chapter's Initial Activation Meeting. AASF 1 Hangar A, L.I. Memorial Airport, Ronkonkoma, NY

December, 1991

✓ **Dec. 5.** AAAA Aviation Trainer of the Year Award Presentation. AAAA Air/Sea Rescue Award Presentation, and AAAA ROTC Award Presentation, Ft. Rucker, AL.

✓ **Dec. 5.** Army Aviation Center Annual Christmas Awards Banquet. Fort Rucker Officer's Club, Ft. Rucker, AL.

✓ **Dec. 6.** AAAA National Executive Board Meeting, Fort Rucker, AL.

February, 1992

✓ **Feb. 1.** AAAA National Awards Committee to select CY91 National Award Winners.

✓ **Feb. 5-6.** 18th Annual Joseph P. Cribbins Product Support Symposium sponsored by the AAAA Lindbergh Chapter. Stouffer Concourse Hotel, St. Louis, MO.

April, 1992

✓ **Apr. 8-12.** AAAA Annual Convention, Georgia World Congress Center, Atlanta, GA.

Soldier of the Month (cont.)

PFC Andrew T. VanAmburg
Aviation Center Chapter
November, 1991

New AAAA Chapter Officers

Air Assault:
BG Thomas J. Konitzer (Honorary Pres); CPT Jane K. O'Connor (VP, Memb); LTC James L. Laughlin (VP, Prog); CSM Richard A. Howard (VP, Enlist. Aff); COL Joseph A. Fucci (Executive Vice President)

Checkpoint Charlie:
CPT Bruce M. Gillette (Sr VP); 2LT James G. Erbach (Secy); 1LT John D. Piccolo (Treas); CW3 Frank S. Cisneros (VP, Programs)

Fort Bragg:
CPT Jesse O. Farrington (VP, Memb); CSM John J. Mercer (VP, Enlist. Affairs)

Monmouth:
Mr. Edward L. Carnes (Secy)

Pikes Peak:
COL Palmer J. Penny (Pres); LTC David R. Reger (Sr VP); CPT Eric M. Nelson (Secy); LTC Billy J. McCollam (Treas); MAJ Wilfred F. Brown (VP, Memb); MAJ(P) Patrick Y. Dunn (VP, Prog); CPT Scott F. Netherland (VP, Memb, Army Space Command)

Wings of the Devil:
CPT David H. Alaniz (Treasurer)

The AAAA Joseph P. Cribbins Product Support Symposium

The AAAA Lindbergh Chapter annual Joseph P. Cribbins Product Support Symposium will be held in St. Louis on February 4-6, 1992 at the airport Stouffer Concourse Hotel. It will continue to emphasize readiness and support of the U.S. Army aircraft fleet with special emphasis on acquisition process and business opportunities.

The symposium will start with opening remarks by BG(P) Dewitt T. Irby, President of the Lindbergh Chapter and Mr. Joseph P. Cribbins, HQ DA. Government Keynote speaker will be MG Donald R. Williamson, Commanding General, AVSCOM and Industry Keynote speaker will be Mr. Edward J. Renouard, Executive V.P., General Manager of Boeing Defense and Space Group, Helicopters Division.

Industry/Government panels are planned for Wednesday afternoon and all day Thursday. A dinner on Wednesday evening will honor industries, individuals and the military through the presentation of AAAA Army Aviation Materiel Readiness Awards and the AAAA Outstanding Aviation Logistics Support Unit of the Year Award.

A series of panels are planned for morning and afternoon sessions on Thursday to present views on topics of interest from AVSCOM, Aviation PEO, Aviation Center and Industry perspectives. A luncheon will be held on Thursday with the Honorable Stephen K. Conver, Assistant Secretary of the Army (Research, Development and Acquisition), as the luncheon speaker.

The 1992 AVSCOM Competition Advocate's Shopping List (CASL) and Spare Parts Symposium will precede the AAAA Product Support Symposium at Stouffer Concourse Hotel. There will be an opportunity to obtain information about AVSCOM's CASL Program, Technical Data Packages, Overhaul, Source Approval Requests and other related subjects.

The CASL Workshops and Parts Symposium will commence at 0830 on Monday, February 3, 1992 and conclude at 1200 on Wednesday, February 5, 1992. AAAA Product Support Symposium attendees are encouraged to attend. For more information, contact Roger Boeckman at (314) 263-1712 or Judy Durbin at (314) 263-1046.

TUESDAY, 4 FEBRUARY 1992

1600-2030 Registration and Ticket Sales
1830-2030 Early Birds Reception

WEDNESDAY, 5 FEBRUARY 1992

1000-1630 Registration and Ticket Sales

AFTERNOON SESSION

1300-1315 Opening Remarks
1315-1345 Government Keynote Speaker MG Donald R. Williamson
1345-1415 Industry Keynote Speaker Mr. Edward J. Renouard
1445-1600 Desert Storm Lessons Learned Presentation and Panel
1600-1630 Q&A

EVENING SESSION

1800-1930 Reception
1930-2200 Awards Dinner and Presentation

THURSDAY, 6 FEBRUARY 1992

MORNING SESSION

0800-0915 AVSCOM Logistics Center
0945-1030 AVSCOM R&D Center
1030-1100 AVSCOM Acquisition Center
1100-1300 Luncheon Guest Speaker Honorable Stephen K. Conver

AFTERNOON SESSION

1300-1415 Aviation PEO
1445-1515 Army Aviation Modernization Plan
1515-1545 Q&A
1545-1600 Closing Remarks

1992 AAAA Joseph P. Cribbins Annual Product Support Symposium Advance Registration Form

STOUFFER CONCOURSE HOTEL — ST. LOUIS, MO — 4-6 FEBRUARY 1992

SPONSORED BY THE LINDBERGH CHAPTER OF THE ARMY AVIATION ASSOCIATION

ADVANCE REGISTRATION DEADLINE: 17 JANUARY 1992

FULL NAME: _____

RANK/TITLE: _____

COMPANY: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

OFFICE PHONE: _____ BADGE NAME: _____

IF YOU WORK FOR A DEFENSE CONTRACTOR ON A FULL-TIME, PARTTIME OR CONSULTING BASIS, YOUR ARE NOT ELIGIBLE FOR GOV'T/MIL REGISTRATION FEE, EVEN IF YOU ARE RETIRED MILITARY. AAAA MEMBERSHIP IS REQUIRED TO ATTEND THE AAAA PRODUCT SUPPORT SYMPOSIUM. NON-MEMBERS WILL BE CHARGED A $21 MEMBERSHIP FEE APPLIED TOWARDS A ONE-YEAR MEMBERSHIP IN THE AAAA. THIS REGISTRATION FORM & FEES LISTED DO NOT COVER THE CASL WORKSHOP 3-5 FEBRUARY 1992.

ARE YOU PLANNING TO ATTEND CASL WORKSHOP 3-5 FEBRUARY 1992? _____YES _____ NO

	4-6 FEB 92 REGISTRATION	5 FEB 92 BANQUET	6 FEB 92 LUNCHEON	5-6 FEB 92 PROCEEDINGS	1 YEAR MEMBERSHIP	TOTAL PAID
INDUSTRY FEES	_____ $175	(Included)	(Included)	(Included)	_____ $21	$ _____
GOV'T/MIL FEES	_____ $10	_____ $25	_____ $15	_____ $10	_____ $21	$ _____
SPOUSE FEES	N/A	_____ $25	_____ $15	N/A	N/A	$ _____

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

MAKE CHECK PAYABLE TO: AAAA PRODUCT SUPPORT SYMPOSIUM

IF CANCELLATION IS NECESSARY, REFUNDS OF REGISTRATION FEES WILL BE PROVIDED ONLY UPON RECEIPT OF:
WRITTEN NOTICE OF CANCELLATION — POSTMARKED NO LATER THAN 17 JANUARY, 1992

*** MAILING INSTRUCTIONS ***

PLEASE RETURN COMPLETED REGISTRATION FORM AND FORWARD WITH APPROPRIATE FEES MADE PAYABLE TO: **AAAA PRODUCT SUPPORT SYMPOSIUM, ATTN: SUSAN WERKMEISTER, TEXTRON LYCOMING, 500 NW PLAZA, SUITE 813, ST. ANN, MO 63074**

Inquiries should be directed to Susan Werkmeister at (314) 298-2786

*** HOTEL RESERVATIONS ***

TO MAKE YOUR HOTEL RESERVATION, **CONTACT THE HOTEL DIRECTLY NO LATER THAN 17 JANUARY, 1992 at: (314) 429-1100** STOUFFER CONCOURSE HOTEL, 9801 NATURAL BRIDGE RD., ST. LOUIS, MISSOURI 63134. In order to receive reduced rates, please refer to "AAAA Product Support Symposium" when making reservations. **Reservations received after 1/17/92 will be on a space available basis only.**

AN/ARC-217

HIGH HF STANDARDS FOR DEEP-STRIKE MISSIONS.

Now deep-strike missions by U.S. Army helicopters will benefit from new standards in HF radio performance.

These standards – ECCM/ALE capability – are available off-the-shelf today in the Collins AN/ARC-217 (V) High Frequency communications system. The ARC-217 is a derivative of the HF-9000 System, of which more than 1,000 systems are flying to date in applications worldwide.

Designed for reliable interoperable communications in hostile ECM environments, the ARC-217 sets new standards in mission reliability and mean time between failure.

Fiber-optic interconnects make the unit less susceptible to the effects of electromagnetic interference. The radio's embedded MIL-STD-188-148 Tri-Service compatible ECCM capability foils close-range ECM.

MIL-STD-188-141A Automatic Link Establishment (ALE) is also embedded in the ARC-217. This capability, integrated with either an effective and simple control or MIL-STD-1553B bus interface, allows the pilot to concentrate on his critical mission objectives instead of controlling the radio.

And the ARC-217 maintains the ability to communicate with fielded high-frequency communications systems deployed by other services, including the IHFR equipment utilized by ground troops.

The ARC-217 – nothing less than the new standard for a new generation of HF communications.

For more information, contact: Collins Avionics and Communications Division, Rockwell International, 350 Collins Road NE, Cedar Rapids, Iowa 52498. (319) 395-1600. Telex 464-435.

Rockwell International

...where science gets down to business