SPECIAL FOCUS: MAINTENANCE AND PRODUCT SUPPORT

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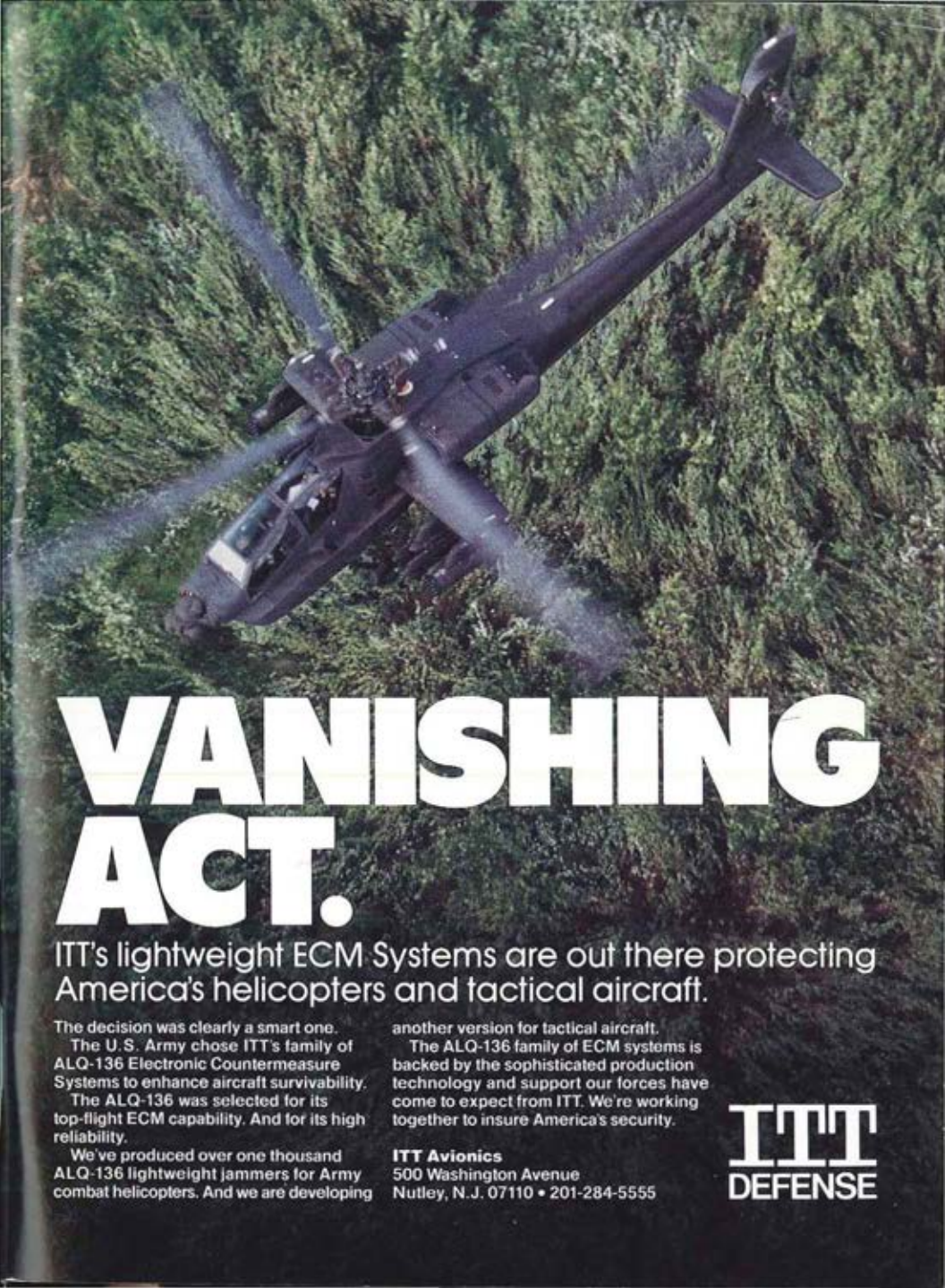

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DEFENSE

Weapon System Sustainment Management

By General William G. T. Tuttle

The ship carrying the entire ASL for the 24th Mech just broke down enroute to the Gulf . . ."; "We have a problem with heat and sand . . ."; "We can't afford the downtime associated with evacuating high payoff systems back to the CONUS sustaining base . . .";

"I need you to apply five major Depot level modifications to convert over 800 M1 tanks to M1A1 configuration . . . do it in-theater and don't take more than two months . . ." DESERT SHIELD/DESERT STORM provided the crucible where the concept of weapon system management was combat-tested, matured, and institutionalized.

What's changed since I introduced this management philosophy to you over a year ago? In a word, *Sustainment*. In my previous editorial, we discussed how the Army Materiel Command weapon system management team reacts to weapon-based systemic problems. The fundamental assumption driving the weapon system manager was that no matter how well engineered and tested a system may be when fielded, there will be reliability failures and/or maintainability problems. Therefore, the manager must be trained to identify systemic issues, marshal and lead a multi-functional team of engineers, users, depot repair experts, and contractors to solve these technically focused problems. In that editorial, I used the example of the Apache Action Team to drive home the point of how effective the weapon system management process had become.

GEN Tuttle was Commander, U.S. AMC, Alexandria, VA when this article was written.

I made the case that the formation of "Team Apache" as a multidisciplinary group representing all the "players" is the way we must work the system. But we must also learn the lesson that the process I described last year was basically reactive; requiring problems to bubble to the surface before the team of experts mobilized to work a system-level fix.

During wartime, there is a word to

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describe those individuals that use "combat" and "react" in the same sentence; it's "loser". With the commitment of American forces to the Gulf, we realized that a reactive management approach could not be effective.

As any logistician knows, anticipation is the key to success. Given the long lead times to move equipment and supplies from the CONUS sustaining base, we had to adopt an aggressive, proactive approach as we looked across the entire spectrum of readiness drivers; anticipating the combat consumption, equipment failures, diagnosis challenges, repair, and return to duty rates for the mix of systems we had in the Theater of Operations. As a result of the constrained deployment schedule and stressed transportation network, we could not arbitrarily adopt what would normally be called a PUSH philosophy. That approach could result in unwanted/unneeded parts cluttering the system.

Instead, we had to prepare appropriate packages which considered all of the requirements, and send them forward only upon receipt of coordinated requisitions. This caused us to expand the focus of the weapon system manager from engineering to sustainment while keeping an eye on the readiness "bull's-eye". Team Apache did this job superbly.

Management Responsibility

The lesson is, why not do the same "anticipation" management in peacetime? The answer should be obvious. Each Commodity Command has certain weapon systems that they work as the AMC "lead"; as the formal weapon system manager. In general, the Commander of the Commodity Command is the weapon system manager for these systems and is the person I expect to pull together all system-related issues, regardless of who has to actually work the problem based on technical expertise. In short, management responsibility is fixed; there is unity of command. Working for the Commander is the actual Weapon System Sustainment Manager (WSSM), a full time individual whose mission is to manage the matrix team assigned to supporting his or her system.

For example, all aviation systems are managed by AVSCOM. But working for AVSCOM on the armament subsystems as a part of the matrix team is AMCCOM or MICOM, while CECOM handles the night vision and command and control subsystems. If there is a problem with the Apache night vision system, I look to AVSCOM for a solution, not CECOM.

Prior to DESERT SHIELD, this concept was not fully implemented as our peacetime focus emphasized engineering issues which could be easily stovepiped under a technical expert. As a result of this, the WSSM and the Commodity Command sometimes did not feel an "ownership" responsibility for technical issues outside the command.

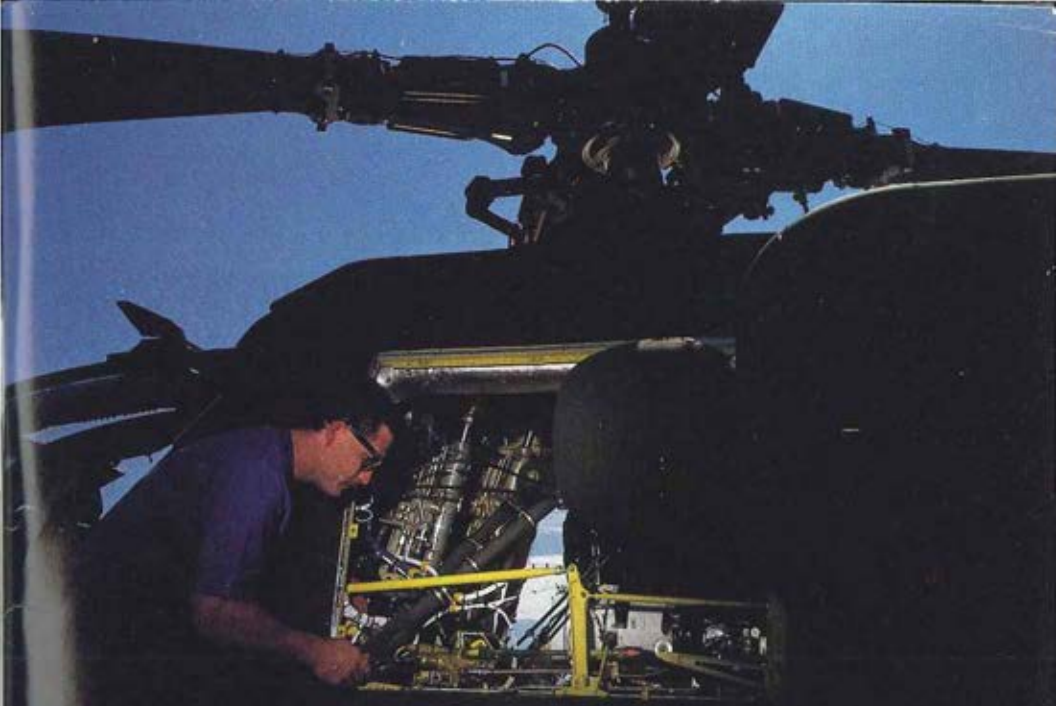
Sustainment

Early in DESERT SHIELD, this had to change as the emphasis shifted from engineering to sustainment. Certainly engineering issues have a bearing on the readiness of a system. All of us appreciated the potential impact of the Gulf's harsh environment on complex, high-tech equipment. But we are not talking about isolated problems that could be stovepiped into a single technical area; the problems came at us fast and furious. The only way to manage coordinated, integrated solutions that maximized readiness by "fixing" the highest priority problem first was to make the WSSM adopt a total system perspective. The WSSM had to be able to look across all of the readiness challenges and manage the development of quick, effective solutions given constrained dollars and transportation assets.

Therefore, we had to remind the WSSMs that they really did have total responsibility for the entire readiness condition of their weapon system. If there was a problem with a subsystem managed by a different Command, it was the WSSM's action to mobilize the matrix team to solve that problem.

As I mentioned earlier, anticipation is key to success. The best action team in the world is useless if they are not used or are used to solve the wrong problem ... or if

(WSSM — continued on page 66)



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Maintenance Challenge

By Major General John D. Robinson

We face two major challenges in Aviation maintenance. The first is to capture and document what we've learned as a result of Operation DESERT SHIELD/STORM (ODS). The second challenge is to effectively capitalize on the appropriate elements of our ODS experience in an era of force downsizing, reduced budgets, and changing strategic focus. The first challenge — discovering the "best" lessons from ODS — must be overcome by dialogue and research between the field, the school, and industry. The second challenge — putting those lessons to good use — may require hard decisions on how to change our current structures and procedures.

What did we learn in the desert? In the broadest terms, we learned that many accepted peacetime procedures and structures were inadequate in wartime. The logistics strain of supporting a large aviation fleet in a contingency taught us new ways of doing business, and provided insights to the direction of the future. What follows are the good points — and the bad — of our desert experience, and my views on what should be done.

AVSCOM and MG Donald R. Williamson, working closely with the Deputy Chief of Staff for Logistics, did more to ensure the success of aviation than any other single factor. Parts hotlines, theater rebuild facilities, high priority parts delivery, and in theater contact teams all contributed to our success. When the regular maintenance and logistics structure of the Army sputtered, AVSCOM/DCSLOG was there to fix it. The use of "on call" contract support to shore up many aspects of our theater-level maintenance structure worked well and we should explore this technique further. The concept of buying support structures "off the shelf" during wartime means that we can tap into a tremendous wealth of experience without having to pay the manning "bills" in peacetime. However, we must not lose sight of the fact that it is during peace that our soldiers gain the experience needed for war.

"Desert Express" (another AVSCOM first) attacked the theater-wide problems of Aviation repair part visibility and distribution. Special cargo aircraft — initially commercial "express mail" carriers — departed daily from CONUS locations loaded exclusively with high-priority repair parts. As the Army shrinks in size, and fields smaller numbers of modernized systems, the obvious parallels between our wartime need for "Desert Express" and the established commercial need for equivalent express-mail services grows stronger. Intra-theater airlift of repair parts is a critical part of this concept which must also be addressed.

The Aviation Support Battalion (ASB) concept worked well during ODS. The ability

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.

to rapidly upload and move all the support required by an Aviation brigade — maintenance, medical, logistics, etc. — is crucial in a fast-paced offensive action. The maintenance "flow" of the two brigades that enjoyed a full-up ASB was better at the end of the war than it was during DESERT SHIELD! Support on an area basis in an offensive war does not work. If you don't own it — you don't get it. The ASB is a critical part of Aviation's future, and we're working to get it in place.

The ingenuity and dedication of the Aviation Soldier was crucial to our desert success. Crew chiefs and maintenance technicians worked long hours for months at a time, maintaining complex aircraft in the most grueling environment imaginable. During this period of force reductions, we've got to create an environment of support and mentorship for these outstanding soldiers and their families — strengthen their commitment to service, and ensure they know just how important their efforts are to the overall success of the branch. We must ensure continued growth in the technical proficiency of our aviation soldiers by providing challenging training in all aspects of a soldier's duties. Currently, we're in the process of readjusting some of our old personnel policies in order to allow more "stripes on the flightline" and to provide a more viable career path for Aviation maintenance officers. The end result will be a more capable aviation soldier, and an improved warfighting capability.

Despite the many challenges that we faced, it's obvious that our *Modernization Policy* has paid off. ODS recorded combat availability rates that astounded the critics, and witnessed many missions with every single assigned aircraft participating. Without our modernized fleet, we could not have fought effectively at night, or in the environmental extremes that characterized desert flying. We've learned scores of lessons on how to keep modern aircraft operational in this environment, and we're applying them to the existing fleet and our future programs.

The negative parts of our desert experience — things that impeded operations — need to be captured as well, so that we may avoid them in the future. We witnessed long-established maintenance procedures and structures, designed for a different war in a different place, that often did not function as advertised. We're trying to solve many of these problems through the Aviation Systems Program Review (ASPR) at the Department of the Army level.

Distribution of Repair Parts

Red-tagged Aircraft-On-Ground (AOG) parts were stranded in up to 5,000 "frustrated" MILVANS sitting on the ramp at Dhahran. Units had to send teams of individuals to rummage through the frustrated cargo. Critical parts were stranded on stateside ramps until full pallet loads were built up. Eventually, this resulted in the creation of "Desert Express", which helped reduce the problem, but never completely eliminated it. At the heart of this matter is the intrinsic difference between the "bulk pipeline" concept, in which the overwhelming mass of logistics is delivered to a theater, and a high-priority "demand-pull" system that quickly delivers critical low volume repair parts. Future logistic doctrines must stress the difference between these two systems. As mentioned earlier, one potential solution might be the creation of a military "mirror image" of commercial express mail services that handle the high priority movement of critical parts.

Low Density Maintenance Functions often failed. Battlefield oil sampling and reporting was difficult. Calibration of TMDE was not given appropriate emphasis. Most units had no commercial power available, and had to rely exclusively on unit generators. As a result, 60% of our generators were down all the time — the current family of generators cannot be run for 5 solid months when exposed to this type of environment. We badly need a standard battlefield maintenance information reporting system, as well as adequate command and control systems for

(continued on page 70)

Army Aviation Hall of Fame to Induct Ten New Members


MG Beatty


SSG Kerr

The balloting has been completed for the 1992 AAAA-sponsored Army Aviation Hall of Fame. Inductions are to be held at the Hall of Fame Induction Luncheon, Thursday, April 9, 1992 at the AAAA Annual Convention in Atlanta, GA. The following ten inductees have been elected by those AAAA members with two or more years of current consecutive membership as of July 1, 1991. Currently, there are 63 members in the Army Aviation Hall of Fame which is physically located in the Army Aviation Museum at Ft. Rucker, AL. Complete descriptions of the new inductees' achievements will appear in the May 31, 1992 issue of ARMY AVIATION Magazine.


CPT Brake


LTG Mackmull

1992 INDUCTEES

MG George S. Beatty, Jr., Ret.
Savannah, GA
CPT William P. Brake
(Deceased)
MG Benjamin L. Harrison, Ret.
Belton, TX
COL Frank L. Henry
(Deceased)
CW3 Jon A. Iseminger
Vicenza, Italy
SSG/CPT James T. Kerr, Ret.
Oklahoma City, OK
LTG Jack V. Mackmull, Ret.
Mt. Pleasant, SC
COL Nelson A. Mahone, Jr.
(Deceased)
LTG James H. Merryman, Ret.
Springfield, VA
MAJ Marie T. Rossi
(Deceased)


MG Harrison

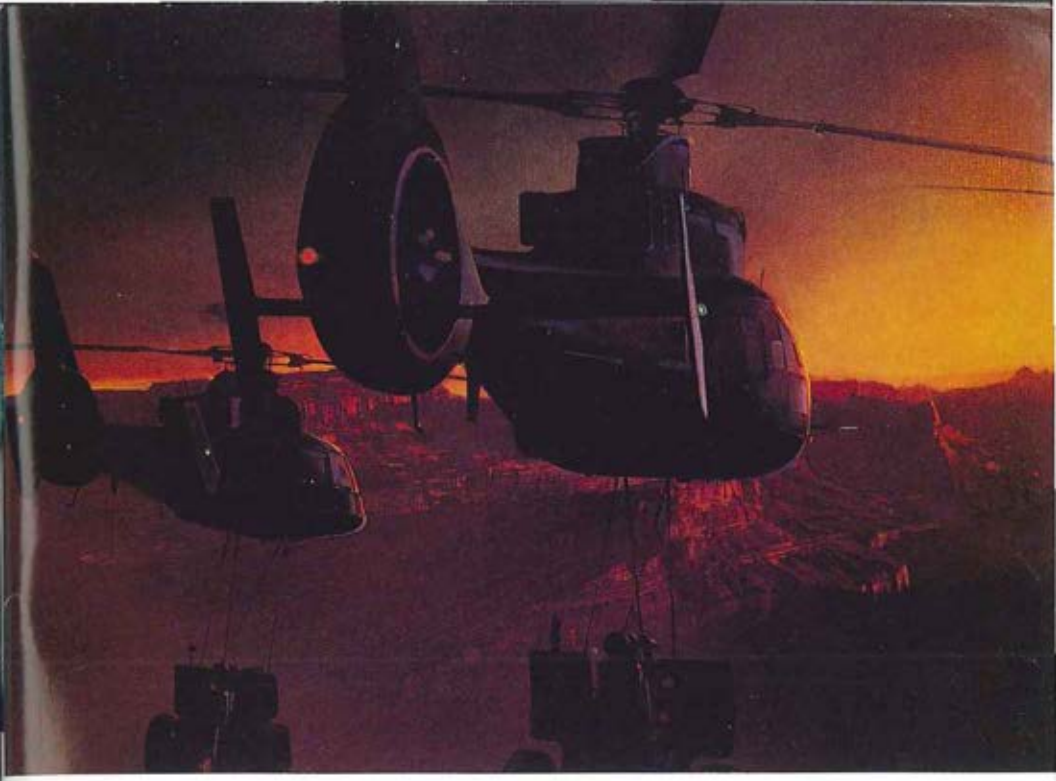

COL Mahone


COL Henry


LTG Merryman


CW2 Iseminger


MAJ Rossi



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The Army must soon choose between the old and the new for its light utility helicopter. By choosing a non-developmental item (NDI), the Army can obtain an operationally superior, cost-efficient fleet that will serve its forces well into the future.

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LTV Aerospace and Defense aerospatiale IBM LHTEC

L T V : L O O K I N G A H E A D

Product Support

By Mr. Joseph P. Cribbins

I'm looking forward to the 18th Annual AAAA Product Support Symposium, 5-6 February 1992 in St. Louis, MO. As always, this event, sponsored by the AAAA Lindbergh Chapter, will be a valuable opportunity for us to focus on the critical areas of product support and aviation logistics. In these times of dwindling resources, performing these functions effectively and efficiently is of paramount importance. The only way to achieve this is constant reevaluation, and the healthy exchange of innovative ideas, and where appropriate, implementation of them.

This symposium provides aviation logisticians from government and industry a dynamic forum for the exploration of current support challenges. It also gives the Army Aviation community a vehicle for communicating our needs directly to industry. This year's symposium is particularly valuable, because it will also give us the opportunity to recognize our friends in industry for their enormous contribution to Army Aviation in Southwest Asia.

Mr. Cribbins is Chief, Aviation Logistics Office, ODCSLOG, Washington, D.C.

Army Aviation during Operations DESERT SHIELD/DESERT STORM was an unqualified success. In the words of our former Chief of Staff of the Army, GEN Carl E. Vuono, "Army Aviation was central to the combined and joint success of DESERT STORM."

We enjoyed record high readiness rates while operating in the harshest environmental conditions on Earth. All told, almost 1900 aircraft flew more than 180,000 hours, while maintaining a Mission Capable readiness rate of 85%; an accomplishment that would have been thought to be nearly impossible before the war.

This was truly a logistics war; support and sustainment made it work. In the forefront were the many highly innovative initiatives by AVSCOM. Initiatives that were so successful they will become a way of life. There were stellar performers on the

(continued on page 70)

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We Won With a Winner

By Colonel Gary D. Johnson

This report summarizes the totally successful support in the most demanding operation ever undertaken by the U.S. Army. The focus of this effort was for deployed soldiers, Department of Army civilians, contractor personnel, and those who remained in CONUS whose critical support never waivered—"No mother's son or daughter should face an Iraqi T-62 or T-72 tank in an offensive maneuver."

Initial AVSCOM Support

Actual support by the Army Aviation Systems Command (AVSCOM) began with the deployment of an AVSCOM representative in August 1990. He utilized a nine-person maintenance ready reaction team augmented by a group of contractor technicians to assist in off-loading and assembling arriving Army aircraft. This small group of people grew to 838 personnel and became known as the Theater Aviation Materiel Program-Southwest Asia (TAMP-SWA). The TAMP mission was to:

COL Johnson is Director of Maintenance, U.S. Army AVSCOM, St. Louis, MO.

- Assist units in their deployment to SWA.
- Support a predicted 49% increase in operation tempo.
- Overcome an extended logistics pipeline.
- Resolve technical and environmental issues associated with desert operations.
- Sustain Army Aviation during a mid-intensity conflict and assist units during redeployment at the conclusion of hostilities.

Operational Concept

Execution of the TAMP mission necessitated a three-phase concept of operations:

Phase 1—Deployment

- concentrate on processing arriving aircraft and assisting units with port operations and their movement to the tactical assembly areas;
- installing urgent modifications necessary for successful operations in a desert environment;

Directorate for Maintenance

U.S. Army Aviation Systems Command
4300 Goodfellow Blvd.
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St. Louis, MO 63120-1798
DSN: 693-XXXX
COMM: (314) 263-XXXX

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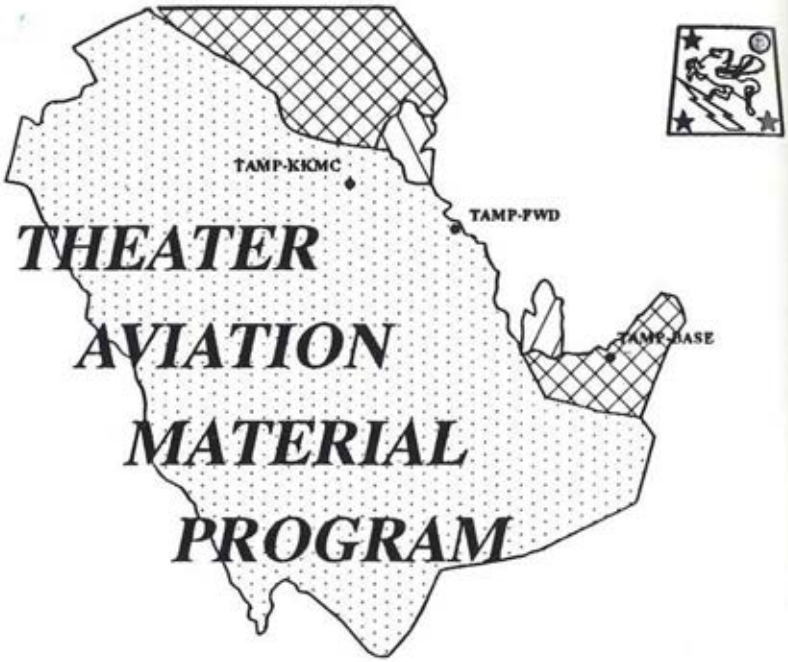

THEATER AVIATION MATERIAL PROGRAM

- Establishing technical support via AVSCOM Logistics Assistance Representatives (LARs) and Contract Field Service Representatives (CFSRs);
- developing a National Inventory Control Point (NICP) for supply operations;
- develop capability to perform depot-level repair capability for components and the airframe while simultaneously providing backup maintenance support to non-divisional AVIM battalions.

Phase II—Sustainment

Emphasis shifted to repair of damaged aircraft, the retrograde of unserviceables, and the availability of maintenance and supply support to deployed units. The maintenance support forward philosophy was achieved through the organization of 12-person contract teams pushed to each of the non-divisional AVIM battalions. This freed soldiers from within those battalions for forward deployment in support of each division. In short, approximately 90% of the worldwide inventory of critical aviation supplies, to include intensively managed items, were prepositioned in the Theater of Operations.

AVSCOM was postured to provide aviation supply and maintenance support during a potential protracted conflict with designed-in flexibility to allow for a quick crossover from sustainment to Phase III Redeployment.

Phase III—Redeployment

After cessation of the recent hostile events, a new phase of effort was entered into by the TAMP, a welcome reversal to what the TAMP was doing so well. This new phase was centered around:

- the recovery and retrograde of crash/battle-damaged aircraft and components, along with port operations;
- daily maintenance, supply, and technical support operations continued not only for units still deployed in tactical positions, but

to units that withdrew to Tactical Assembly and Redeployment Areas;

- as aircraft arrived in one of two Final Staging Areas, units were assisted by TAMP with washing and customs and agriculture inspections;
- when aircraft arrived at the port, they came under total AVSCOM control for disassembly, preservation, shrink wrapping, and ship loading.

From the onset, AVSCOM envisioned that the TAMP would have to operate in at least two areas:

- TAMP Forward—located at Damman, Saudi Arabia, achieved operational capability in mid-August. This facility peaked in size and capability in February with the assignment of 23 military, 12 Army civilians, and 542 contractor personnel.
- TAMP Base—located in the United Arab Emirates, achieved operational capability in early September. This facility peaked in size and capability during the beginning of Calendar Year 1991 with 19 military, 15 Army civilians, and 83 contractor personnel.
- TAMP KKMC—as hostilities threatened, it became apparent that another TAMP location would be required. It was at this time that TAMP-KKMC was established 620 kilometers to the northwest of TAMP Forward in January 1991. Initial operating capability was achieved in early January and peaked in size and capability in March with 60 military, 5 Army civilians, and 99 contractor personnel. Initial capability included 174 Rapid Exchange (RX) items, technical support, and maintenance augmentation. It grew to include application of modifications (MWO), classification, retrograde, and ultimately became the crash/battle-damaged airframe theater collection and evacuation point.

Major Accomplishments

The TAMP's influence on aviation logistics support within the theater was not limited to merely providing increased numbers of personnel for maintenance

support or filling supply requisitions from prepositioned assets. Numerous innovative and proactive measures were executed by the AVSCOM TAMP in an effort to take the initiative and ensure success of Army Aviation during Operation DESERT SHIELD/STORM/FAREWELL. Listed below are only a few of the more significant accomplishments by the AVSCOM team:

Rotor Blade Erosion Control Program—this was a two-pronged AVSCOM attack at extending the life of rotor blades installed on helicopters operating in the desert. Initially, a special paint was applied to the rotor blades upon their arrival, which was later changed to an erosion-resistant tape applied to the leading-edge of the blade. With protected blades, aircraft achieved indefinite operating hours, whereas unprotected blades averaged only 50 hours before removal.

Air Filtration Systems for Turbine Engines—the Saudi Desert took its toll on turbine engines. AVSCOM accelerated procurement and installation of an objective air filtration system. 251 systems were installed, thereby extending the operating hours of some engines from about 20 hours to 200 hours after modification.

Engine Service Center—The Engine Service Center was designed to provide quick turnaround of engines for cleaning and repair as a result of erosion from desert operations. Approximately 546 engines went through the center, of which 400 were repaired and returned to service. The center also responded to technical calls from the field which minimized unnecessary engine removals and "on-wing" repairs.

Clamshell Shelters—aviation units did not possess an adequate shelter in which to perform maintenance in a harsh environment. AVSCOM purchased and initially push-shipped more than 30 Clamshell shelters for use by deployed units providing aviation soldiers a relatively clean and temperate area to perform aircraft maintenance on a 24 hour basis.

NICP Operations—as the lead AMC activity for aviation weapons systems management, AVSCOM's goal was to sequentially establish a 30/60/90 day Battlefield Spares stockage level, and a 30 day AIMI stockage level at a forward location. This was to reduce the supply pipeline from 12,000 miles to 1,000 kilometers allowing high-priority parts requests to arrive in Saudi Arabia within 12 hours. More than 30 days of spares were achieved prior to cessation of hostilities.

Aircraft On The Ground (AOG)—AVSCOM set up a 24 hour AOG call-in program that was designed to rapidly respond to aviation units in need of high-priority replacement aircraft parts. Wholesale supply transactions were done in near real time using a number of expedient measures, i.e.:

- Premium National Guard aircraft flights from supply depots to air terminals in CONUS and subsequent transports to Saudi Arabia via the USAF Desert Express. The intra-theater distribution system was generally responsive using Camel Express Army CH-47D, USAF C-130, and Army C-23B Sherpa aircraft to deliver AOG parts to the Corps Support Area.
- The Connecticut National Guard Aviation Classification Repair Depot (AVCRAD) was activated and partially deployed 100 soldiers to augment the AVSCOM effort in classification, preservation, and shipment of unserviceable aviation components. The AVCRAD also provided battle damage assessment and repair teams that could be employed forward in the Theater. The AVCRAD's C-23B Sherpa aircraft was employed to fly high-priority/critical aircraft parts and components to sustain the warfighting fleet. The remainder of the AVSCOM personnel reinforced the Depot System Command depot level overhaul capabilities at their home station. The AVCRAD's contribution filled a critical logistics support void.

Special Repair Activities (SRAs)—six SRAs were deployed to TAMP-BASE to provide contractor depot level support for technically advanced systems (generally electronic) with unpredictable failure rates. 1,565 components were inducted into the SRAs, of which 1,023 were repaired and returned to service.

(Winner — continued on page 40)

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New Equipment Training

By Emmitt P. Rodriguez

Where does the training that every Army maintainer and operator receives originate? If you said from a dedicated New Equipment Training organization, you are correct! The Aviation Systems Command (AVSCOM) New Equipment Training (NET) Division currently maintains a TDA of 46 NET Managers. These managers monitor the activities and budgets of 84 New Equipment Training Plans (NETP) encompassing new, modified, or existing aircraft systems from the UH-1 Huey to the state-of-the-art RAH-66 Comanche helicopter. Figure 1 shows the extent of NET training classes conducted by AVSCOM since 1976.

After the Operational Requirements Document (ORD) is written, NET personnel start the initial review process to determine who and what will be required to operate and maintain the equipment. Once a system moves into the Demonstration and Validation Phase, NET prepares the Qualitative and Quantitative Personnel Requirements Information (QQPRI) document that determines personnel qualities and quantities for staffing throughout the Army. Additionally, during Demonstration and Validation, NET researches test equipment, special tools, support equipment, and begins to determine training requirements.

Mr. Rodriguez is a New Equipment Training Manager, U.S. Army AVSCOM, St. Louis, MO.

Developer/Monitor

As the new system moves into the Engineering and Manufacturing Development Phase, NET will develop and coordinate Statements of Work (SOWs) for training contracts. Also at this time, the contractor initiates his Logistics Analysis of the system and begins development of a training plan. NET becomes the prime monitor of this training plan, along with the respective Training and Doctrine Command (TRADOC) service schools, ensuring that the contractor's plan meets the needs of the

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PEATS helps verify repair effectiveness with "before-and-after" diagnostics, thereby enabling selective preventive maintenance. PEATS also helps identify engines that cannot be economically repaired in the field.

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- UH-60
- OH-58
- CH-47
- AH-1
- UH-1

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NET CLASSES CONDUCTED

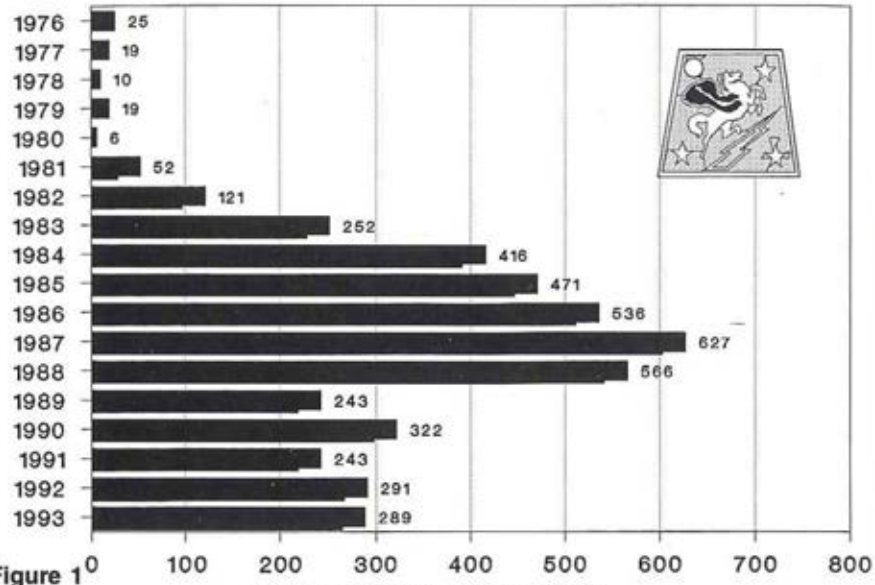

Figure 1

1992 and 1993 are Projected Totals

NUMBER OF PERSONNEL TRAINED

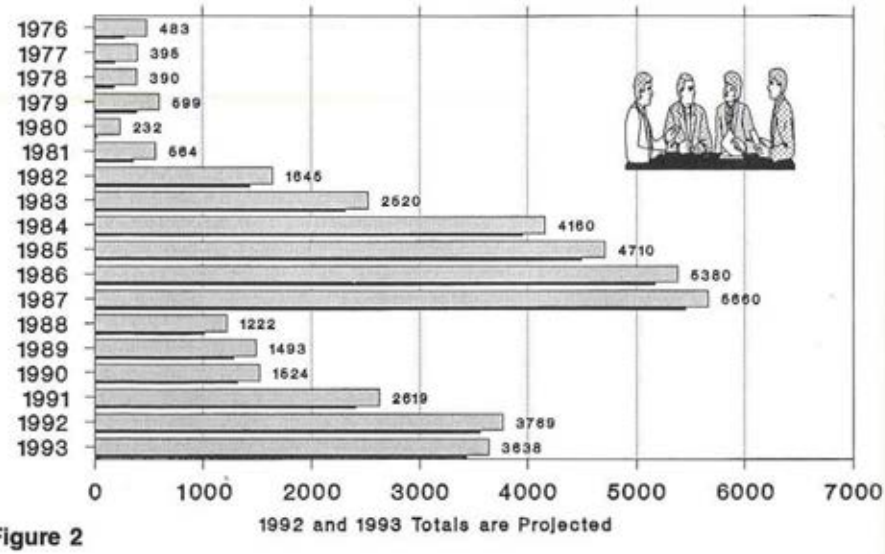

Figure 2

1992 and 1993 Totals are Projected

schools and can be used by New Equipment Training Teams (NETT) for initial equipment fielding.

NET Plan

While the contractor is developing his training plan, the NET develops what is known as the New Equipment Training Plan (NETP). An NETP consists of information relating to personnel requirements, basis of issue data, technical manuals, training schedules, and deployment of criteria for NETT. It also forms the basis for all funding requirements. During FY 1991, the AVSCOM NET Division managed a total training budget in excess of $5.7 million for new and/or modified aviation systems and related support equipment.

NETT is used when the TRADOC schools cannot produce trained personnel to meet First Unit Equipped (FUE) requirements. NETT can also be used when product improvements are made to an existing system. NETT instructors are usually trained by the contractor developing or improving a system by a process known as Instructor and Key Personnel Training (IKPT). TRADOC service school personnel attend IKPT and eventually staff the NETT under the direction of NET.

Once the NETT is trained, NET coordinates unit training with the commands receiving new or modified materiel. This coordination is through the New Materiel Introductory Briefing (NMIB). This briefing communicates NETT training goals and requirements such as types of training to be presented, training prerequisites, course lengths, classroom requirements, flying hours, or anything else that may impact the unit or quality of training.

The NET manager coordinates and finalizes travel lodging and clearances and monitors the performance of the NETT. As shown in Figure 2 , 33,594 people have profited from AVSCOM's NET training since 1976.

To fully benefit from the technological advances of future weapons systems, NET's challenge will be to offer operators and maintenance personnel advanced training processes. It is well documented that noncurrent fielding of weapons and training systems is a deficiency. Today, the Army training community is developing training systems during the Engineering and Manufacturing Development Phase concurrent with the weapons systems. Development of user training requirements in the ORD facilitates and enhances development of training programs.

Future training systems will move even further into the "computer age". The incorporation of interactive technologies and embedded training, utilizing the "on board" diagnostics resources to interact with training system computers, will reduce training device requirements. With the advent of "high tech" weapons systems, there is a definite and growing need for skilled, highly trained soldiers. Realizing this, NET will continue to be instrumental in providing these training resources to the Army of the future. IIIII

"With the advent of 'high tech' weapons systems, there is a definite and growing need for skilled, highly trained soldiers".

Automated Technical Manuals

By Warren J. Schnell

Daily we are bombarded with the advantages of the computer revolution. One television spot assures us that they can transmit the Encyclopedia Britannica anywhere in the Nation in a matter of minutes. Our papers scream at us with the latest price breakthrough, promising to deliver for only $1,499 at 0% interest the latest clone with VGA monitor, 30 megabyte hard disk, and software.

Subjective Benefits

If we put the hype aside and get away from the sales promises, we can assess what is reality. Undoubtedly, the computer has affected us all; in some ways, we are far better off in terms of convenience and real added ability. The handy automatic banking teller has made money management much more effortless, and computer graphics have greatly improved motion picture special effects, thus allowing us to enjoy what can never be seen in real life. It is somewhat more subjective as to the benefits of computerized phone solicitation and credit banks.

Mr. Schnell is Chief, Technical Publications Division, AVSCOM, St. Louis, MO.

I think that we have all seen several phases in the adaptation of the computer to our everyday worlds. At first, a skeptical public was presented with the PC which moved computing from the world of the programmer and the exclusive empire of mainframe computers to our desk tops. The result has been immediate and overwhelming. The PC has been a "force multiplier" in terms of the office work force. Management, seeing a good thing, immediately dictated the automation of nearly everything. It was anticipated that the increases in productivity would continue merely because work was run through a microchip. This has given birth to some of the worst applications of technology for the sake of technology. In some respects, we have set about to automate for the sake of

automation without considering the value of the original process.

ETMs

In the early phases of Electronic Technical Manuals (ETMs), the concept was to present the existing page-oriented data on a computer screen. The goal was first to automate, secondly to eliminate the expensive warehousing of paper, and to somehow reap the benefits of automation for the soldier. Some thought this could be paid for by diversion of printing and warehousing expenses. Our initial attempts were somewhat flawed in that the user's needs should have come first. It is wrong to assume that existing technology is bad merely because it is old and difficult to manage. Unfortunately, management problems seem to thrive regardless of the media use to deploy the data.

Paper manuals have been widely used since the late sixteenth century. They do some things very well that cannot be overlooked in our rush to adopt new technology. First, once they are published, they require no further maintenance until the time of the next update. Second, paper manuals are immune to electrical shortages and a dirty environment. They can go with the unit without consideration of the difficulty of the environment. Third, accessibility is understood virtually by everyone.

Computer architecture need not be explained. Although the publication warehouses are impressive, as a result of their sheer size, paper manuals are relatively cheap to print. The entire Army Aviation printing budget, to include reprinting existing manuals, is less than $3 million per year.

Automated manuals provide the image of the latest technology. Unfortunately, much of the equipment we see advertised is not deployable and cannot be maintained indefinitely in an environment such as we found in DESERT STORM. Additionally, electronic equipment used to read ETMs add an additional maintenance requirement upon the user. A deployable PC is quite expensive, as is the development of the software required to run the device.

Should we automate the technical manual? Objectively, the very simple answer is no. Automation of the existing paper technical manual does little more than convert the technology of the failed microfiche experiment of the 70s to electronic media. This is automation for the sake of automation and not the user. On the other hand, if we look at the unique capabilities of the computer to sort, locate, and assemble data, we are presented with a new world of possibilities.

A Relational Data Base

We shouldn't automate the existing concept of data, after but looking at user needs, create a new technical manual. With the development of the RAH-66 Comanche, AVSCOM and the Boeing Sikorsky RAH-66 Team are striving to redefine that baseline.

The Comanche manuals will be a relational data base; in other words the procedure will be assembled in order to meet the requirement or inquiry. The soldier will be provided a number of paths to access maintenance or operational tasks. If the request is in the form of a trouble code from the on board diagnostics, the actual corrective measures will appear on the screen along with the related logistics procedures to update the aircraft logbook and requisition parts. There will be no referencing to other sources. The emphasis is on the user in returning the aircraft to a flight status.

As this program continues to develop and is submitted to a full field trial, we will use this medium and others to keep you informed of our progress.

Epilogue

The reason to automate is not necessarily for cost savings or the elimination of existing management problems. The reason is to provide the user with a new force multiplier to better operate and maintain equipment with diminishing resources. If this is done properly, cost savings can be achieved, not through the diversion of printing funds, but through the reduced cost of weapons system ownership. IIIII

PEATS: On-Wing Diagnostics of Helicopter Engines

By William S. McDonald

The major deployment of Army Aviation elements to Southwest Asia (SWA) extended logistics lines to the point that repair of items forward was not only a goal, but a necessity. In no other helicopter component was this as true as with turbine engines. In the days leading to the air war and later the ground war, the major antagonist was damage brought around or induced by the environment.

Sand Ingestion

The rapid degradation in engine performance came as no surprise to units like the 3rd Armored Cavalry Regiment (ACR) which had deployed to SWA from Ft. Bliss, TX. The 3rd ACR had contended with similar conditions during past normal training sessions. The primary effect of sand ingestion to the engine is in compressor erosion and "glassing" in the Hot Section. Compressor erosion significantly reduces the engine stall margin, which has caused several drivetrain torque reversals.

Mr. McDonald is Chief, Maintenance Engineering Division, AVSCOM, St. Louis, MO.

"Glassing" has a tendency to reduce cooling of the air flow and cause hot spots in the engine turbine section. Experience gained through the 3rd ACR showed that the normal engine Health Indicator Test (HIT) and engine topping checks were not always adequate to assess engine power and stall margins. A diagnostic tool called the Portable Engine Analyzer Test Set (PEATS) has been used to great advantage at Ft. Bliss, TX for analyzing T-53 engines on both the AH-1G and the UH-1 helicopters.

PEATS

The PEATS is designed to be a rapidly-installed diagnostic tool which is capable of measuring engine gas path parameters in flight. PEATS is also used to troubleshoot problems and isolate causes of problems to engine component or aircraft interfaces.

This amounts to a test cell run while the engine is on-wing. The time invested to install, test fly, and remove the PEATS is typically three hours. When compared with the eight hours necessary to troubleshoot the Cold Section module of the T700 engine, a thorough engine performance diagnostics run will prove to be a man-hour saver. An operational cost saving will occur through the replacement of engine parts rather than complete engine assemblies.

PEATS Versatility

PEATS is programmed to simultaneously record values of up to 15 engine parameters to calibrated accuracies greater than possible with cockpit instrumentation. These parameters are recorded either on command, when set values are exceeded, or at set time intervals depending on the operator's selection. A great advantage to automatic recording of engine performance parameters is the elimination of errors induced during the manual recording. Further, the validity of parameter correlation is enhanced because values are measured simultaneously. This direct recording of data eliminates errors induced by interpolation gauge readings.

The use of graphs or manual calculations to reduce engine performance data is also eliminated. Engine performance models developed by the engine manufacturers are programmed into PEATS software.

These models have been adjusted to allow for engine installation gains and losses and allow performance to be traceable to engine design criteria. Historical tracking of engine performance is also possible by archiving a given engine's performance. Properly used, the archived data should greatly improve management of engine support requirements. By trending data and recording maintenance required to assure engine performance, better prediction of maintenance and parts requirements would be possible. Proper analysis will permit the isolation of environmental influences on engine performance and predict accelerated parts wear-out rates. This analysis will also support more intelligent repair strategies of engine maintenance. The level at which repairs are performed will be analyzed as well as the type of repair needed. This will determine which repairs can be performed forward of a depot to maximize engine use prior to overhaul.

FEDS/METS

As with any other management system, the data and its integrity is paramount with PEATS. The data gathered by PEATS is the same in most cases as that recorded by the soon to be fielded Flexible Engine Diagnostic System (FEDS). FEDS is an off-wing tester and is the replacement system for the Modular Engine Test Stand (METS) currently in use at several CONUS and OCONUS sites. The FEDS, among other improvements, incorporates automatic data collection of engine runs. Because of a common data collection acquisition system, data from PEATS can also be processed utilizing the FEDS Automated Engine Data Acquisition Test System (AEDATS). This gives the potential of complete engine performance data tracking between overhauls. This also opens the possibility to identify

potential engine components for improvement in design and quantify costs savings to be gained.

REDD

Because data is taken automatically through the full operating spectrum on both FEDS and PEATS, engine operation can be analyzed at power settings from start to maximum power available. All data points are corrected for ambient conditions and then compared to manufacturers' specifications utilizing Referred Engine Diagnostic Data (REDD). REDD provides a common baseline for all engines and has proven a repeatable method of analyzing engine performance since all data is traceable to known conditions and is measured with calibrated instrumentation.

Inflight data is recorded through the PEATS Data Acquisition Unit that is placed inboard during maintenance test flights. Flight data is transferred using a 128K static RAM module. Module data is transferred to a ground station, consisting of a PC-compatible computer with memory reader interface attached to its RS-232 bus connector.

Software necessary to manage and analyze the downloaded data is accessible through a menu-driven program resident in the PC. Standard output is either a high-powered summary or graphical representations of various performance parameter ratios across the engine operation spectrum.

A high-power summary is utilized to give a rapid assessment of the engine by comparing achieved performance with that specified for the compressor selection, gas producer turbine section, and the overall engine efficiency. The high powered engine summary is also used to isolate degraded performance to modules of the engine. The parameters used in the high-power summary are averages of values at high-power settings.

Performance measurements are represented graphically and compared with accept/reject criteria. When used in conjunction with the high-power summary, the precise characteristics of an out-of-tolerance condition can be evaluated. Also degradation trends can be monitored by comparing sequential evaluation flights.

Automated Fault Tree

Work is underway to translate out-of-tolerance parameters into an automated fault/diagnostic fault tree. When complete, the automated fault tree will identify the most probable assembly or part causing degraded performance. The benefits of the automated diagnosis will be twofold. First, maintenance actions will be directed to faulty components only, and secondly, replacement of serviceable components will be minimized. Properly used, directed maintenance actions by PEATS data will lessen maintenance time, minimizing unnecessary parts replacement.

With all good stories there is a down side. The PEATS initial buy is limited to eleven sets. Distribution of PEATS began in February 1991 and will continue through June 1992. While this distribution will be less than a formal fielding, PEATS will be fully supportable through onsite training and logistically supported through the prime contractor. With limited numbers, initial issue of engine analyzers will only be to:

- Ft. Campbell, KY
- Ft. Hunter-Stewart, GA
- EUSA (Korea)
- USAREUR (Europe)
- Corpus Christi Army Depot (CCAD), TX.

The PEATS Outlook

With successful initial use and improved engine support strategies utilizing PEATS, follow-on acquisitions will allow full fielding in support of all Army Aviation units. In the interim, support will become available starting in June 1992, through either of the following Engine Support Centers:

AVSCOM Engine Support Center
St. Louis, MO
DSN 693-1581

CCAD Engine Support Center
Corpus Christi Army Depot, TX
DSN 861-2651

PEATS is but one of AVSCOM's initiatives to enhance diagnostics. Through good feedback from the field user, enhanced diagnostics support for aircraft maintenance will become a reality. IIIII

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"Fix Forward": Aircraft Turbine Engine Repair

by

Robert E. Dean, Jr. and Jesse T. Gambee

The Department of Defense, Defense Management Report Decisions (DMRD) have directed that depot level repairables will be overhauled or repaired using stock fund money. These proposed funding changes, to be enacted in FY 92, will require operating units in the field to extract the maximum operating hours from a component before it is turned in for repair and a new or overhauled item is purchased from the Army supply system.

Fix Forward

The U.S. Army Aviation Systems Command's (AVSCOM) continued drive to increase the readiness of Army Aviation Units and these new funding changes have culminated in a maintenance concept known as "Fix Forward". Fix Forward is a concept of reevaluating the maintenance and repair of equipment at the Aviation Unit Maintenance (AVUM), Aviation Intermediate Maintenance (AVIM), and Depot levels. Reevaluated repairs for the purpose of this article are designated as Enhanced Intermediate Level Repairs (EILRs), are defined as a level of repair that requires specialized knowledge/skills and/or special tools, and can be performed in a field environment.

Mr. Dean is an Equipment Specialist, Directorate of Maintenance, AVSCOM, St. Louis, MO.

DESERT SHIELD/STORM

The effect of the Fix Forward concept was aptly demonstrated during Operation DESERT SHIELD and Operation DESERT STORM at Abu Dhabi, United Arab Emirates, and at the Theater Aviation Maintenance and Materiel Point Forward (TAMP-FWD), Dhahran, Saudi Arabia. Contractor personnel were performing

Mr. Gambee is an Aeronautical Egr, Directorate of Maintenance, AVSCOM, St. Louis, MO.

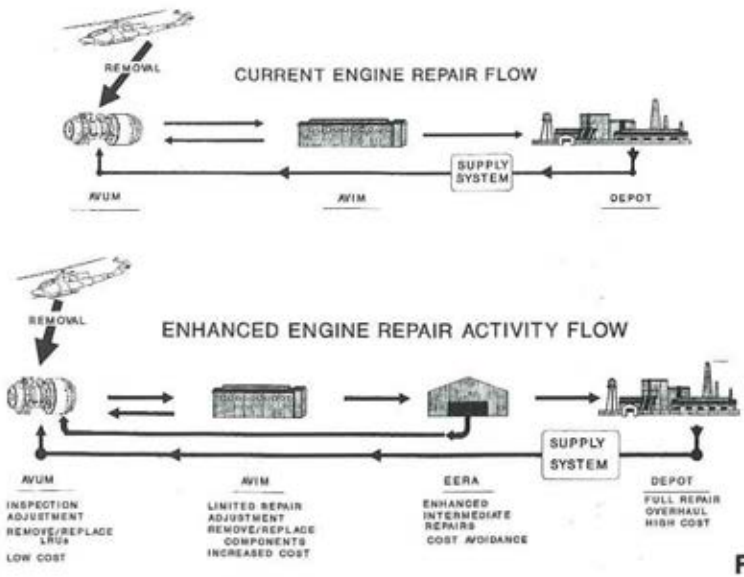

Figure 1

limited depot repairs to aircraft using in-country tooling and facilities. Turbine engines were inducted into these repair activities, repaired, and returned to supply for reissue, at a substantial reduction in downtime and increased aircraft readiness.

EERA

The Fix Forward concept as applied to maintenance and repair of turbine engines used in Army Aviation is embodied in the Enhanced Engine Repair Activity (EERA).

Figure 1 is a simplification of the old versus the new EERA repair process.

Under the new funding scheme, the return to depots of engines determined to be NRTS at the AVIM level will require the units to requisition from the supply system a new or overhauled engine—Total Cost=Cost of Engine - Turn-in Credit.

An EERA will allow units to receive a serviceable engine for the cost of repairs and labor. An additional advantage is increased readiness through reduction in repair cycles time.

EERAs are contractor-operated augmentations to Non-Divisional AVIM Companies. The EERAs are authorized to perform EILRS depending on their personnel skills and knowledge, tooling, and parts availability. These activities consist of small teams of highly-qualified civilian engine mechanics operating *as far forward* as practical. The limiting factors are the requirements of work facilities and available tooling. These teams perform a variety of repairs on all engines, including Auxiliary Power Units (APUs) in the Army inventory, which are utilized by their host unit.

The EERA concept was recommended in a supportability study in the third quarter of FY 88. The AVSCOM commander directed that this concept/strategy be implemented and tested. Ft. Campbell, KY was chosen as the test site. EILRS began on 1 October 1988. This same concept was then implemented in Korea in May 1989.

The repair sites were collocated and managed through existing maintenance support contracts. These activities were very successful, showing a 16 to 1 savings when comparing repair and return versus "Not Repairable This Station (NRTS)". The additional savings are primarily in reduction

of Transportation and Supply System and Depot overhaul costs. The current EERA program is a strategy designed to enhance Army Aviation readiness through combining Aviation Intermediate Maintenance (AVIM) level and EILRs of turbine engines to reduce aircraft downtime and expense to the user. This strategy greatly reduces premature retrograde of engines to overhaul facilities and maximizes engine Time Between Overhaul (TBO) hours by utilizing various levels of maintenance and EILRs to aircraft turbine engines. The objective of the EERA is to eliminate unnecessary and costly depot returns when faults exist on engines which could be repaired in the field utilizing EILRs. Engines that can be repaired on-site and put back in service on aircraft relieves some of the burden on an already overworked transportation and supply system.

The AVSCOM commander directed expansion of the EERA concept in July 1991. The expansions proposed are:

CONUS Active Army Sites:

- Ft. Hood, TX
- Hunter Army Airfield, GA
- Ft. Lewis, WA
- Ft. Carson, CO

National Guard CONUS Aviation Classification Repair Activity Depots (AVCRADs)

- Springfield, MO
- Groton, CT
- Fresno, CA
- Gulfport, MS

OCONUS Sites

- Germany
- Panama

METS/FEDS/CETS

Implementation of the expansion plan is dependent on availability of engine test facilities at the chosen locations. Availability of a Modular Engine Test Set (METS), a Flexible Engine Diagnostics System (FEDS), or a Compact Engine Test System (CETS) is a requirement for an EERA in order to perform controlled testing following repair. Current efforts to provide the required diagnostic and testing capabilities include the overhaul of the Mobile Engine Test Stand (METS) in Germany for near term expansion in FY 92. The Springfield, MO AVCRAD's Flexible Engine Diagnostics System (FEDS) will be operational in 2nd Qtr FY 92, allowing their METS to be inducted into overhaul for installation at Ft. Hood, TX. The Compact Engine Test System (CETS) that is being installed in Korea will allow its displaced METS to be overhauled and installed in Panama. The other expansion sites will receive a FEDS to provide engine test capability.

AVSCOM will retain management responsibility of the EERA program, and will continue to provide guidance to engine repair contractors operating under existing local contract sources. The EERA sites will require a METS or FEDS be collocated with or available to the host unit. The supported Commands will provide maintenance facilities and all organic equipment. Owning unit will pay for labor, repair parts, and testing of engines through a work order.

On-Wing Diagnosis

Current augmentations to the Fix Forward Engine concept is the evaluation of on-wing diagnostic equipment. The Directorate for Maintenance is in the process of evaluating equipment that will allow the diagnosis of engines at the unit level. On-wing diagnostics will allow units to determine if the engine problem can be repaired without removal and/or at their or AVIM level. This will allow quicker turnaround and a cost reduction in overhauled engines. As an additional advantage, on-wing diagnosis equipment will allow trending of performance degradation of an engine to allow units to forecast major maintenance and cost outlays. This trending can be supported with temporarily installed test equipment, however, permanent installation of flight data recorders would provide orders of magnitude improvement in our predictive abilities.

A Maintenance Goal

AVSCOM's Directorate for Maintenance is dedicated to providing the best resources and support to field aviation units. The EERAs, as the backbone of the turbine engine Fix Forward concept, will allow AVSCOM to provide a less costly alternative to depot overhaul for engines that can be repaired by the application of EILR procedures.

CCAD: Corpus Christi Army Depot

By Colonel Thomas E. Johnson

You would be hard pressed to find an Army aviator who had never heard of Corpus Christi Army Depot, commonly referred to as CCAD (see-cad); however, few aviators have had the opportunity to see CCAD in operation. The thousands of ferry crews who have delivered and picked up aircraft for the past thirty years have seen only a small part of this vast industrial complex. This article is intended to describe the capabilities of CCAD and the resources required to operate an industrial complex of this magnitude. **WARNING: If you do not like facts go immediately to another article, because it would be impossible to tell you what CCAD is all about without describing the enormity of the operation through numbers.**

The People

Dedicated and professional people are the heart of every great organization, just as they are at CCAD. CCAD employs more than 3600 Department of the Army civilians and only ten military personnel. The ethnic background of the workforce reflects the overall population of Corpus Christi with almost 60% of the force being Hispanic. The Depot is the largest industrial employer in South Texas and has provided jobs for thousands of people since 1961. We are very proud of our more than 670 handicapped employees who play a significant role in the Depot's success. Our workforce is experienced, with more than 15 years in the business. Hundreds of disciplines are represented throughout the workforce from the mechanic/repairman in the hangar, to engineers, chemists, and metallurgists. They are totally dedicated to their individual jobs and to the mission of the depot.

COL Johnson is Commander of Corpus Christi Army Depot (CCAD), Corpus Christi, TX.

Nonlinearity

CCAD is a HUGE place. As a new

Corpus Christi

COL Thomas E. Johnson

Commander
Corpus Christi Army Depot
X-3771

COL Christopher M. Guppy

Director
Maintenance
X-2434

LTC Peter A. Marchiony

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FAX: (512) 939-3039

"Most of the field knows CCAD through our [ACE] assistance teams which travel worldwide, often at a moment's notice, in support of unit needs".

commander it took me six weeks to see everything and I am still getting lost. We are spread over 200 acres of the Corpus Christi Naval Air Station; as such, our garrison support is provided by the Navy. Visitors normally associate CCAD with the five aircraft hangars located on the seawall of Corpus Christi Bay. This is only a minor part of the complex. We have more than 34 buildings. The biggest building houses the assembly/disassembly repair line and major component repair shops, and covers more than twenty-eight acres under one roof. It is an endless maze of offices and shops crammed with equipment ranging from fifty year old machinery which still runs strong, to state-of-the-art computer-aided systems required to repair the latest composite aircraft. An Automatic Storage and Retrieval robotic system automatically delivers and picks up repair parts from over 90 work centers located throughout the main building.

Big Business

The Depot's annual budget exceeds $350 million. More than half of that goes to civilian payroll. The rest goes to labor and direct materiel. We pay more than $6 million to operate the plant with electricity, steam and gas. Handling and removal of hazardous waste consumes another $2.5 million. Last year we spent $150,000 in light bulbs alone.

What We Do

Simply stated our primary mission is to overhaul and repair rotary wing aircraft and components. We do this for the Army, Navy, Air Force, Marines and other countries through Foreign Military Sales. During 1991, CCAD expended 4.2 million man-hours to overhaul or repair 348 airplanes, 1518 engines, and 46,635 components. In order to accomplish the primary maintenance mission we operate a supply operation which has more than 34,000 items in stock and which also serves as a wholesale distribution center for the retail supply systems worldwide. We train more than 2,000 Reserve Component and National Guard soldiers each year during their two week annual training, which sharpens their skills and provides us with additional manpower to do our job. Most of the field knows CCAD through our assistance teams which travel worldwide, often at a moment's notice, in support of unit needs. Each year we physically inspect thousands of aircraft to identify candidates for the overhaul program. Known as ACE (aircraft classification examination) teams, these are the guys with little hammers who can tell more about the health of an aircraft in 15 minutes than you or I could if we tore the bird apart.

CCAD's energetic workforce enables us to perform our mission exceptionally well. To better understand the extent of the diverse depot's capabilities, let's look at what happens to an aircraft which comes here for overhaul.

How We Do It

When an aircraft has flown for a few hundred hours, it becomes "tired". Electrical and hydraulic systems must be checked and repaired, and the fuselage, made of hundreds of sheet metal parts, must be examined. The engine, rotor blades, transmission, gearboxes, and dozens of smaller components require rejuvenation. Thousands of direct labor man-hours must be done by hundreds of people at CCAD in 90 different work centers. The repair bill will exceed three hundred thousand dollars, but this figure is only a small fraction of what it would cost the Army to buy a new aircraft.

During disassembly, over 400 aircraft

components will be removed. These are routed to "prime" shops which specialize in the restoration of a particular class of item to a serviceable condition. These prime shops might further disassemble the components, with assistance from the "process" shops such as cleaning, metal surface restoration, machining, and painting. These components may be as complex as a turbine engine, or even a twin-engine power-pack, with gearboxes that blend and route power to the rotor systems. When a component is overhauled, the disassembly extends even further. On any given day there are more than 40,000 pieces of aircraft in or moving between CCAD work centers. Thousands of these items are controlled through a multi-million dollar, state-of-the-art storage and retrieval system (ASRS). Automated guided vehicles provide a continuous flow of material between work centers and the ASRS. After assembly and painting, each aircraft undergoes thorough ground and flight testing.

When an overhauled Black Hawk or Cobra leaves CCAD, it is much more than thousands of parts that have been brushed, sanded, cleaned, scraped, welded, machined, stored, transported, painted, bolted, riveted and re-attached to the airframe. It is the main reason why enemy forces do not sleep well at night.

Preparing for Tomorrow

Currently our workload is centered around the old workhorses of the Army's rotary wing fleet: the Huey, Cobra and Kiowa. We are now capable of overhauling the Black Hawk and the CH-47D and are working hard to get ready for the Apache by 1994. This workload represents a major shift in our capabilities, as we prepare to meet the Army's needs of tomorrow.

There is no doubt that Corpus Christi Army Depot will be ready to accomplish its vital mission well into the 21st century. I invite you to visit us at any time. I would also be happy to speak at your AAAA Chapter meetings to tell your folks what CCAD is all about. It is a national resource of which all members of the Army Aviation team can be very proud. IIIII

Want To Improve Aircraft Readiness?

By Robert Howard

Probably the one thing most overlooked when maintenance managers (commanders, maintenance officers, first line supervisors) seek ways to improve aircraft readiness rates is the impact of Aircraft Ground Support Equipment (AGSE) problems. That's because we have lived with inadequacies in that area for so long that they are accepted as a "way of life."

Inevitably, aircraft readiness meetings, reports, and studies center on a need for more people in aviation maintenance units. But the well is dry. There are no more people.

Obviously, the goal of increasing numbers of people is to increase available productive maintenance manhours. Since we are not likely to get more people, such an increase can only be attained by increasing productivity of the existing force; that is, getting more *productive* manhours out of the people we do have. That's where AGSE comes in.

Most of us who have worked in maintenance have seen mechanics constantly pulled off one aircraft to push another in or out of the hangar; or witnessed several maintainers standing around waiting to use the *one* operational Auxiliary Ground Power Unit (AGPU); or spotted a mechanic hunting for *one* good set of ground handling wheels. All this in units that are each authorized a couple of tugs, several AGPUs, and six or seven sets of ground handling wheels.

Mr. Howard is Deputy Director, Directorate of Combat Developments, USAALS, Ft. Eustis, VA.

Aircraft Downtime

More than likely, most of that authorized equipment is stashed somewhere in the maintenance area, cannibalized to the bone. This situation is so common most people fail to see it for what it is: a tremendous waste of manhours caused by inadequate AGSE management, *which directly translates to increased aircraft downtime.* Across the Army, the impact on the overall aircraft readiness rates is substantial.

AGSE problems are far reaching, ranging from inadequacies and voids in overall logistical support systems, to management shortcomings at the first-line supervisory level.

Combat developers at the Aviation Logistics School, Fort Eustis, know maintenance units are having problems getting AGSE fixed and obtaining repair parts, and have been wrestling with the issue for some time. Before they can do much, the school needs help from the field.

For example, the feasibility of an MOS for AGSE maintenance and insertion of AGSE repair sections into aviation maintenance units is one option that merits assessment. Unfortunately, this option continually runs into a stone wall because maintenance units are not documenting AGSE problems.

Which equipment continually breaks down? *How many* manhours are being expended "out of hide" by aircraft mechanics in the repair of AGSE? *How many* productive manhours are being lost every day because AGSE does not work? Until such information can be quantified, proposals for resourcing a viable support system will continue to be shot down. As previously noted, most maintenance managers accept the situation as it is and try to work around it; thus, the information needed to gain high level interest—and resource support—is lacking.

Recognizing that imposing a dedicated AGSE manhour accountability and problem reporting system would be another burden on already overtaxed aviation unit maintenance managers—and responses would be minimal at best for that reason—the Aviation Logistics School is looking into initiating a field-wide study to garner the information needed to justify resources for resolving the issue. It would behoove every aviation maintenance manager in the field to give AGSE the same loving care that is accorded aircraft, and to inform the Aviation Logistics School through correspondence (USAALS, ATSQ-LCD, Ft. Eustis, VA 23604-5416) or (DSN 927-6841) of problems encountered in obtaining maintenance and supply support for this equipment.

Maybe AGSE doesn't have much luster. After all, an AGPU doesn't shoot at tanks; then again, neither does an Apache when it's sitting in the hangar. IIIII

Winner
(continued from page 18)

This concept was totally effective, proving that existing contractor capabilities could rapidly be put into place and have a positive impact on mission capable rates of support weapons systems.

Rapid Exchange (RX)—the RX program was to provide, on a direct exchange basis, serviceable for unserviceable components repaired by a depot facility located within the theater. 174 components were designated for "RX" and were stocked at the TAMP-KKMC for rapid exchange with customer units in need of the component.

2410 Hotline—the 2410 Hotline provided immediate access to historical data on Time Between Overhaul (TBO) and finite life components. This service minimized premature removal of items prior to conclusion of their usable/safe life limits solely because historical data on the component was not available to the operating unit. More than 947 requests for data were processed by the 2410 Hotline resulting in a cost avoidance of over $12.1 million.

Port Operations—the mission of port operations was to assist units during both deployment to and redeployment from the Theater. More than 200 aircraft were processed by the TAMP before deploying units were able to assume this task. This operation enabled units to redeploy at an accelerated rate and allowed soldiers to return home at the earliest possible date.

Maintenance Support—the TAMP concept of aircraft maintenance support was to provide repair capabilities as far forward as possible using contract personnel, realizing that there are limits to the dangers they can be exposed to. It was felt that the development of structured teams to augment non-divisional AVIM battalions could accomplish this goal by freeing those AVIM soldiers to provide on-site support to divisional units.

Complementing this support method, a variety of quick change assemblies, such as engines, were developed and pushed forward to provide ready access for hard to get items. Feedback from supported units indicated these items had a positive impact on mission capability rates, especially on the rates of tank-killing helicopters.

New Equipment Fielding—AVSCOM was responsible for fielding numerous items to aviation units deployed in Saudi Arabia. Some of the many items fielded during Operation DESERT SHIELD/STORM were:

- Aviation Vibrator Analyzer
- Damage Assessment Repair Kit
- Air Blasting Equipment
- Portable Washing Maintenance Ladders
- Lightweight Camouflage Cover
- Portable Cold Water Pressure Wash Sys.
- Portable Compressed Air/Vacuum System
- Nitrogen Generator Cart
- Oxygen Analyzer
- Transparency Finishing Kits
- Air-To-Air Stinger, OH-58C
- Range Extender for OH-58C
- Shop Vacuums
- Interim Unit Maintenance Aerial Recovery Kits
- Internal Slingable Unit Ship/Storage Containers

Aviation Survivability Equipment (ASE)—the Program Executive Office (PEO), Aviation located at AVSCOM, in concert with AVSCOM, was responsible for fielding, training, and supporting new or improved pieces of ASE throughout the Theater of Operations. More than 1,500 items of ASE were installed on more than 1,200 Army aircraft in less than five months. As a result, no Army aircraft was lost due to hostile fire from radar/optical guided enemy weapon systems.

Without AVSCOM's innovative and proactive support of operations in Southwestern Asia, Army Aviation would not have been capable of achieving the exceptionally high degree of success as was experienced. Never has the aviation logistics system been tasked to instantaneously support a 49% increase in operational tempo through a 12,000 mile pipeline, in one of the harshest environments in existence. These challenges were met head-on by a team of task-oriented professionals dedicated to Army Aviation logistics and support of the aviation soldier in the field. These professionals made a difference! IIIII

Deep Attack and the Counter-Artillery Battle

by

COL Kief S. Tackaberry, LTC James A. Kelley
and CPT Thomas M. Muir

The Battle Command Training Program (BCTP) WARFIGHTER Exercise was the training highlight of the 7th Infantry Division (Light) during FY 91. The achievements of the Division during this exercise were largely due to the near flawless synchronization of cross-FLOT deep attacks against the enemy's overwhelming number of artillery assets. This article outlines the division's concept of deep operations for a Light Infantry Division, the decide-detect-deliver methodology, command and control structures, and the sequence of events that led to the neutralization of the enemy artillery and eventual destruction of over five-plus enemy divisions during the four day exercise.

The scenario for the 7ID(L) Warfighter 91 was a mid-intensity conflict fought in a contingency area. The sheer numbers and ranging capabilities of enemy artillery assets limited the ability of the Commanding General to maneuver his forces and threatened the very survival of the Division. Success for the Light Infantry Division lay in seizing the initiative early by unhinging the enemy's center of gravity—his artillery assets. Later, the Division would infiltrate through the enemy's security zone and simultaneously attack across the breadth of his main defensive belt to secure key terrain and allow for the forward passage of friendly forces to continue the fight.

COL Tackaberry is Commander, 7th ID(L) Aviation Brigade, Ft. Ord, CA.

Initially, the two enemy divisions facing the 7ID(L) were defending in successive belts and had several days to prepare their positions. They had pushed their rear, divisional, and corps artillery groups (RAGs, DAGs, and CAGs) forward to provide overwhelming long range fires to support the continuity of the defense.

LTC Kelley is Executive Officer, Aviation Brigade, 7th ID (L).

These artillery assets were well integrated into the defensive plans and fires and were protected by a mixture of ADA systems, ranging from SA-7s/SA-14s to ZPU-4s and S-60s. The enemy artillery threatened the survival of the 7ID(L) since they could outrange our artillery. A METT-T analysis indicated that the 7ID(L) go beyond current doctrine to win the counter-artillery battle. To win the counter-artillery battle, the Commanding General had to successfully conduct deep operations. The process for the deep operations was to use dispersion, concentration of forces, decisive engagements, redispersion, and reconstitution to establish the conditions to win the close battle. The CG decided that the best course of action was to mass artillery, USAF BAI assets, and attack helicopters in a synchronized deep attack to destroy the enemy's artillery assets before the light infantry forces began their infiltration attacks.

Concept of Operation

The mission was simple and concise in nature, yet complex in execution. "Aviation Brigade attacks 042100 Aug 91 to reduce enemy RAGs and DAGs vic EA DUKE." The CG was relying on the Aviation Brigade, in highly synchronized deep operations with DIVARTY and USAF BAI assets, to win the counter-artillery battle and allow for freedom of maneuver for close operations during Phase II. "My intent is to focus on NVG operations to maximize surprise and enhance our survivability. We will synchronize J-SEAD, artillery fires, and USAF BAI to mass fires for the deep attack." Success for the Aviation Brigade during Phase I and Phase II was defined by the Division Commander as the reduction of enemy artillery to 25% strength prior to the commitment of the Division's other maneuver brigades.

The concept for the deep operations was to develop a detailed Intelligence Preparation of the Battlefield (IPB) using all Divisional and Corps assets available to support a decide-detect-deliver methodology. The deep attacks were a joint operation combining all of the battlefield operating systems, 20 to 30 kilometers beyond the FLOT, into a single offensive force.

CPT Muir is Brigade S-3, Aviation Brigade, 7th ID(L).

IPB

Intelligence Preparation of the Battlefield (IPB) for deep operations focused on developing courses of action for *deciding* to attack deep. Named and Targeted Areas of Interest (NAIs and TAIs) were forwarded as Requests for Information (RFIs) to Corps to *detect* the locations of enemy artillery groups and to further refine the high-payoff target lists. Finally, we identified trigger events and developed a decision support matrix which synchronized forces at H-Hour to *deliver* overwhelming combat forces deep to destroy enemy regiments and artillery RAGs and DAGs during the dark of night and amid the confusion of the initial artillery general preparation of the battlefield.

Intelligence assets used to support our IPB came not only from divisional units, but from Corps and Echelons Above Corps (EAC). These additional assets, to include national technical means, had the ability to range deep beyond the FLOT and to accurately target the enemy's artillery groups. We also developed a battlefield calculus to estimate combat power ratios which the Commanding General used during his decision process (see Figure 1).

Command and Control

Command and control for the deep attack was centralized at the Division Main CP. The Aviation Brigade Commander made the decision early on to co-locate the Brigade TAC CP with the DMAIN during the Decide and Detect phases of the deep attacks. This allowed for interface with the joint targeting cell, Division FSE, ALO, A2C2 element, and the G-2. The CG commanded the division's deep attack from the DMAIN. The Aviation Brigade Commander planned to command from a UH-60A going cross-FLOT during the Deliver phase of the deep operations.

From planning through execution, detailed coordination of the employment of Battlefield Operating Systems (BOS) in a joint operations environment was fundamental to mission

accomplishment. The division joint targeting cell was the focal point for gathering all BOS managers and was key to coordinating and integrating all systems into the scheme of maneuver and fire support for the deep attack. The G-2, through his ability to manage the intelligence collection effort, enabled the joint targeting cell to accurately fix enemy artillery groups, especially their long-range 170mm howitzers. From coordinated IPB products, we established Commander's Critical Information Requirements (CCIRs) which enabled the CG to make time-sensitive decisions to engage high-risk, high-payoff targets. Warfighter 91 challenged the CG to fight a numerically superior enemy across the entire width and breadth of the battlefield, bridging the gap between current and future doctrine to synchronize deep operations at division level.

Synchronization

The joint targeting cell met in the DMAIN at 1400 and 0200 hours daily and projected operations 36 hours in the future to synchronize attacks with the nomination of targets for the Air Tasking Order (ATO) cycle. The first priority for the joint targeting cell was to develop high payoff target lists based upon IPB and current and future operational requirements in accordance with the principals of METT-T. We used targeting spread sheets to prioritize targets throughout the division's area of operations. Based on desired effects on high payoff targets, we developed time lines for engagements and synchronization matrixes.

Synchronization of the deep attacks was imperative to the success of the mission. Assets were aligned against required tasks in conjunction with other combat systems and parallel tasks. The synchronization matrix (Figure 1) was an ideal tool to assist our efforts.

We developed several time lines based upon the possibilities of reengaging RAGs and DAGs not previously reduced to 25% strength. We coordinated the time lines with the joint targeting cell and deconflicted both fires and

DEEP BATTLE
SYNCHRONIZATION

Figure 1

ELEMENT	OBJECTIVE/FOCUS	WHO	HOW	WHEN	INTERACTION/ CONNECTIVITY
G2 INTEL	INTEL EXCHANGE AND COORDINATION	CORPS/DIV G2 CORPS MI BDE DIV MI BN	SELECT CORRECT SENSORS/EMPLOY PROPERLY AT CORRECT TIME	CONSTANT	INTEL SYS - ALL LEVELS
WEATHER		G2/BCE/USAF ALL	ATOC/CORPS HQ MSE	CONSTANT CONSTANT / WHEN REQ	JFACC/ARMY REQs ALL AIR/GND
G3 PLANS OPS	SYNCH SCHEME OF MANEUVER WITH AIR CAMPAIGN	BCE	LOCALE WITH USAF - TACC/ATOC	CONSTANT	AIR/GND MANEUVER ALL LEVELS
FSE	EFFECTIVE, TIMELY AND ACCURATE ARTY FIRES	G3 A2C2 BCE FSE	MSE LO	AS REQ	ALL AIR/GND UNITS IN AO
AVN BDE	ROUTES/ALL FROM CORPS REAR TO FAA ROUTES/ALL FROM FAAs TO EAs AND RETURN (HAs/ACPs/BPs)	A2C2 BCE FSE	INFO FROM UNIT INFO TO USAF INFO TO BCE/A2C2	H-24	COMPLETE AIR AND GND CONNECTION TO UNITS
G4	SYNCH FUEL/AMMO REQs ACCELERATE PARTS AND SUPPLIES RELATED TO AIRCRAFT REPAIR			H-96 (STARTS)	
USAF	BAI/AI TARGETS AIRSPACE	W/BCE G3 A2C2	MSE LO	CONSTANT/ATO (ACO) CYCLE	ALL AIR/GND

airspace through the Division FSE and A2C2 elements.

Battlefield Air Support (BAS)

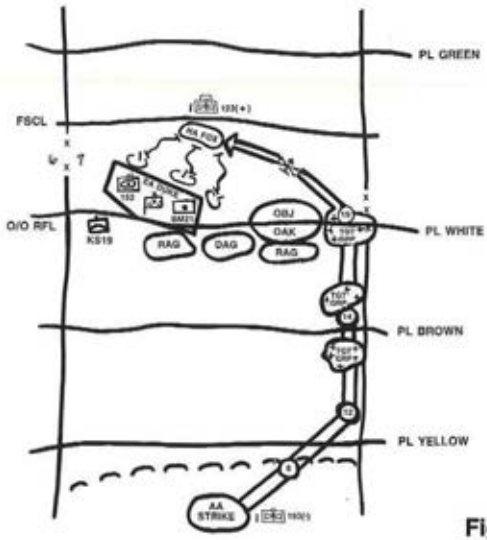
One particular challenge was the integration of joint fires into engagement areas to complete the destruction of the RAGs and DAGs. Doctrinal definitions of Close Air Support (CAS) and Battlefield Air Interdiction (BAI) did not adequately address the type of synchronized-joint fires necessary to achieve the desired effects on deep targets. We needed to mass both attack helicopters and USAF assets at the decisive time and place; synchronizing both timing and weapons effects. The types of controls and timing needed to synchronize the deep battle were in keeping with the definition of Battlefield Air Support (BAS) described in the December 91 edition of the TAC/ALFA Bulletin. We established a Heliborne Forward Air Controller (H-FAC) with the aviation brigade airborne command post to control synchronized BAS fires. Our concept was for BAS to strike a sector of EA DUKE (see figure 2) with cluster munitions following the first engagement of the attack helicopters. This would strike the enemy while he was in the process of displacing, thereby maximizing mobility kills prior to the second engagement by attack helicopters.

Electronic Warfare

The Aviation Brigade Air Liaison Officer (ALO) served as the focal point for integration of USAF Electronic Warfare (EW) assets into the deep attack. Although Corps denied our initial requests for EF-111 and F-4G assets, we adjusted our timing of the deep attacks to fly under the cover of pre-planned Corps-level offensive EW operations which would provide us residual EW support. We specified EW targets in our BAS nominations and included the organic EH-60 assets in our offensive EW plans. This would require EH-60s to fly cross-FLOT with the attack helicopter battalions during the deep attacks to focus Electronic Counter Missions (ECM) operations to protect our air corridors, particularly at FLOT penetration points. By correlating the Division and Corps USAF taskings/request timelines with our events sequence, we decreased the risks associated with the deep attacks.

Army Airspace Command/Control

We used an innovative technique to synchronize Army Airspace Command and Control (A2C2) with the deep attacks.



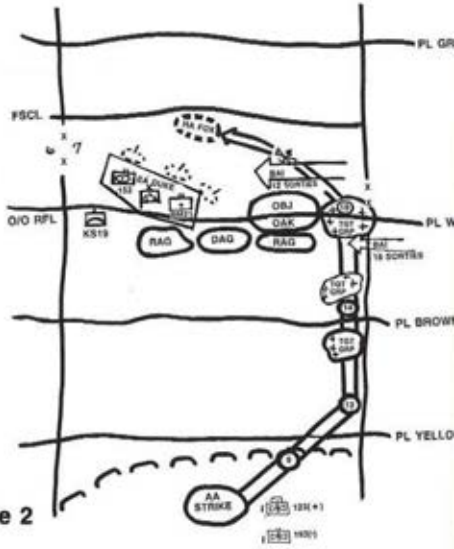


Figure 2

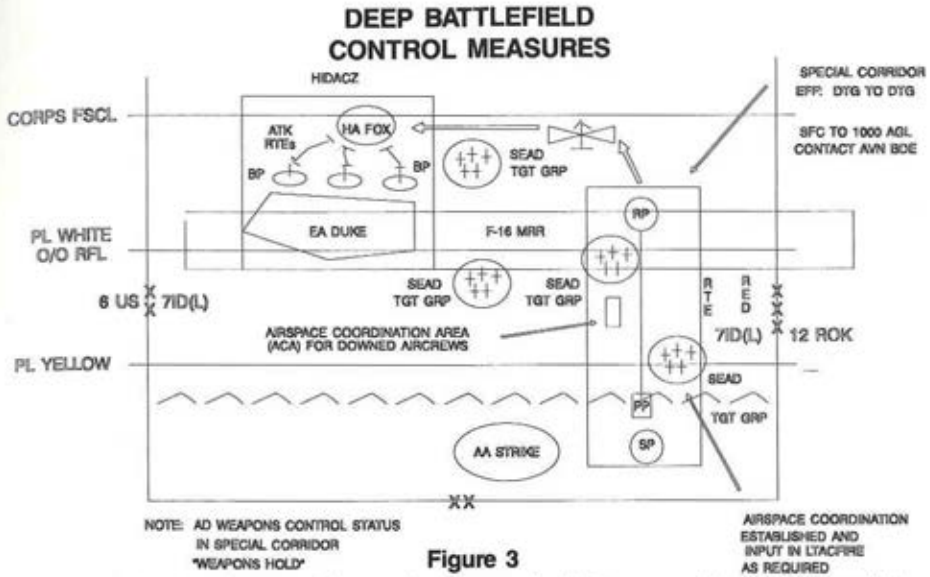


Figure 3

Figure 3 depicts the airspace corridors and fire support coordination measures developed to sequence fires and protect the attack battalion as it crossed the FLOT. We had previously developed and published airspace corridors which traversed the entire battlefield from the Division Support Area (DSA) forward. The Division FSE and the Aviation Brigade FSO developed SEAD/J-SEAD target lists to support the corridors based upon a thorough analysis and targeting of suspected and known enemy ADA locations. The G-2 and Aviation Brigade S-2 provided suspected S-60 and KS-19 sites based upon enemy Flat Face and Fire Fan radar activity. We would then update the SEAD/J-SEAD target lists as intelligence required. The Division G-3 Air would then activate corridors as necessary to support our deep operations. The SEAD/J-SEAD fire support requirements would have previously been entered in the LTACFIRE system and would only require minor modifications due to changes in the enemy situation or specific flight routes.

Execution

After conducting a thorough mission analysis and briefing our plan to our subordinate commanders, we were ready to execute what was to become a series of deep night attacks that effectively confused and paralyzed the Warfighter OPFOR. The counter-artillery battle began with a general preparation of the battlefield by all available Divisional DS, GS, and GSR battalions and batteries. This included indirect fires to destroy templated and identified RAG and DAG locations within range of our artillery. Under the cover of our massive preparatory fires, we fired the initial SEAD for the corridors to be used in a few hours by the attack helicopter battalion. We additionally fired SEAD to support our efforts in the Division's deception operations. We had assembled a small force of UH-1s with PsyOps loudspeaker teams to simulate a UH-60 air assault forward to the FLOT along the Division left flank, portraying that the Division's main effort was in the West. The OPFOR believed the deception.

Intelligence assets, including LRSU teams inserted by UH-60s 48 hours prior to the attacks, confirmed the location of the RAGs and DAGs. The G-2 additionally integrated Q-36 radars to located RAGs and DAGs as the enemy attempted to counter our massive

artillery prep. The division committed both of the OPCON OH-58D aircraft from Corps to confirm the exact location of the RAGs and DAGs and to recon our flight routes, holding areas, and company battle positions. As the OH-58Ds identified targets along the flight routes, we immediately handed the SALUTE reports to the Assistant Fire Support Coordinator (AFSCOORD) and G-2 collection manager. The AFSCOORD then allocated/shifted forces to deliver effective and accurate indirect fires to destroy identified targets. The Aviation Brigade FSO had additionally provided the OH-58Ds with a Quickfire channel for transmission of Copperhead missions to maximize the laser designator systems available to the Division forward of the FLOT. Once the OH-58Ds had positively identified the RAG and DAG locations, the CG decided to commit the attack helicopter task force (four attack helicopter companies) along the eastern corridor to cross the FLOT at designated passage points at F-Hour.

Figure 4 depicts the timing of the deep attacks once we reached the trigger event. The SEAD was initiated 15 minutes prior to the attack helicopter task force crossing the FLOT. Although the enemy correctly identified the massive air movement, he incorrectly assumed that it was an air assault conducted to support the Division's main efforts in the West.

The primary engagement area was 18-25 kilometers beyond the FLOT and out of range of all but Multiple Launch Rocket System (MLRS) batteries. These MLRS assets provided preparatory fires on the holding areas and battle positions. BAI sorties and MLRS also hit the engagement areas just prior to the arrival of the OH-58Ds. Upon arrival of the OH-58Ds in the battle positions, the division established a Restricted Fire Line (RFL) south of EA DUKE and a Restricted Fire Area (RFA) encompassing the attack helicopter battle positions and engagement areas to protect our aircraft from friendly indirect fires.

Effective SEAD fires quickly overwhelmed the enemy ADA forces and the attack task force reached the deep holding areas and battle positions untouched. Attack helicopters arrived in the battle positions at

AVIATION BRIGADE DEEP ATTACK PHASE I

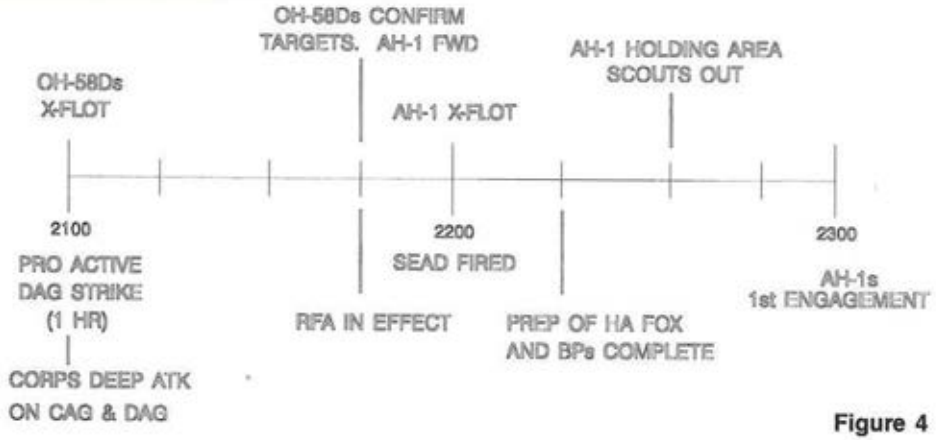


Figure 4

H-Hour and conducted a battle handover with the OH-58Ds already on station. Once in position, the attack helicopters conducted a massed attack to destroy enemy RAGs and DAGs. After all ammunition was expended, the attack helicopters were to sequence back to the holding area where cache UH-60 aircraft had been prepositioned with additional Hydra-70 2.75" Multi-Purpose Special Munitions (MPSM) and TOW munitions. The OH-58Ds remained on station to keep eyes on the enemy artillery units as they attempted to displace. The OH-58Ds proved to be the ideal system for long range night reconnaissance, using FLIR to identify targets up to 10 kilometers away.

We sequenced the second of our BAS strikes to hit the engagement area during the break on station of the attack helicopters. The H-FAC provided final control for the BAS assets as they dropped cluster munitions, seeking to destroy displacing enemy forces or to achieve mobility kills. Fire support provided J-SEAD fires for the BAS assets as they ingress and egressed the engagement area.

Second Attack

We had planned for a second engagement in EA DUKE by attack helicopters to complete the destruction of the enemy artillery forces. This proved unnecessary based upon our initial battle damage assessments. A re-attack would have resulted in increased risks to keep our forces cross-FLOT for an extended period of time. The CG made the decision to egress back to friendly lines after the first engagement and to not re-arm deep for a second engagement as planned. Pre-planned SEAD fires led the task force along a second corridor on the eastern flank and the OH-58Ds trailed the task force to call Copperhead fires to complete our destruction of enemy ADA assets and to designate for targets of opportunity.

Upon completion of the rearward passage of lines, we sequenced into multiple rearm and refuel sites and completed our restoration efforts while we awaited the Commanding General's decision to re-attack. The following is a listing of our CCIRs to conduct a second deep attack in one night.

Aviation Brigade — CCIRs

Commander's Critical Information Requirements:

1. Have we met the mission cirteria (reduction %)?
   - Reduction of artillery to 25% strength.
   - Confirm battle damage assessment.
2. Have we reduced the effectiveness of his ADA assets?
   - SEAD/J-SEAD Fires
   - Offensive Electronic Warfare
3. Do we have adequate hours of darkness remaining for a cross-FLOT attack?
4. Do we have sufficient fires (artillery and BAI) to provide adequate SEAD/J-SEAD coverage and synchronize fires on the objective?
5. If we meet all 4 criteria — high risk
   If we meet 2 or less of the criteria — recommend that we do not attack 2d time cross-FLOT

The CG decided against conducting a second deep attack due to the increased risk to his decisive maneuver force, the attack helicopter battalion. We had planned several branches to conduct the second attack including attacking with a second attack helicopter battalion that was being used to conduct rear operations and as the aviation brigade reserve.

Sustainment was based upon normal resupply systems. We moved FARPs closer to the FLOT to support a quick turnaround should a second attack be required. We additionally used UH-60s forward OPCON to the attack helicopter task force to sustain the operation while cross-FLOT. This included a Jump FARE system capable of sustaining the OH-58Ds and providing emergency refuel if attack assets needed a few gallons of fuel for the return cross-FLOT flight. We provided each attack company with a cache UH-60 carrying Hydra-70 and TOW munitions, as well as armament personnel to assist in rearming forward in the holding areas.

Lessons Learned

The Division's deep operations were an unqualified success. A Light Infantry Division won the counter-artillery battle against a superior force using the future AirLand Battle doctrine as modified for execution at division level.

We effectively reduced enemy artillery to 25% strength during our deep attacks. This enabled the Infantry Brigades to conduct infiltration attacks through the enemy's general security zone. We had disrupted the enemy's center of gravity and destroyed the continuity of this defense through bold and audacious deep attacks. Although the enemy would later attempt to reinforce his artillery and his defensive belts, we continued our deep attacks on successive nights and caught him while he was displacing assets forward.

The Division continually used the decide-detect-deliver methodology to conduct deep operations. The focal point during all deep operations was the joint targeting cell. The Aviation Brigade was the division's maneuver brigade for Phase I and II of WARFIGHTER 91, with decisive results. The Aviation Brigade also played a key role in the success of the counter-artillery battle by providing the Division FSE with over 200 spot reports during four days of operations.

Intelligence is critical to developing and updating both high payoff target lists and for SEAD. OH-58Ds were essential for our deep operations, particularly at night. Their FLIR system, combined with a laser designation capability, ensured the destruction of the RAGs and DAGs. The integration of the Aviation Brigade TAC CP with the DMAIN was vital to synchronizing operations and conducting parallel planning for future deep attacks. It additionally provided the G-2 and Division FSE with access to the Aviation Brigade Command and O/I nets, thereby allowing them to have instantaneous spot reports of enemy activity during the execution of deep operations.

The Aviation Brigade S-3, FSO, and ALO were critical members of the Division joint targeting cell. Key staff officers must coordinate early on in the planning process if all players are to implement the commander's intent in a coordinated effort. The Aviation Brigade also provided Liaison Officers (LNOs) to all of the maneuver brigades and the three Divisional Command Posts (DMAIN, DTAC, and DREAR) to better integrate Army Aviation in the division's scheme of maneuver for all areas of the battlefield (deep, close, rear, reserve, and security).

The technique of pre-planning corridors forward of the Division rear boundary proved invaluable to future operations. The corridor system allowed us to develop a detailed plan for SEAD fires and to distribute necessary fire support coordination measures to every Division and MSC Command Post. The corridors were then activated as necessary to support specific aviation operations. We developed corridors based upon our initial METT-T analysis and updated the SEAD plans and corridor activations based upon changes in the enemy situation. Several of the corridors corresponded with Minimum Risk Routes (MRRs) and Low Level Transit Routes (LLTRs) used by the USAF, allowing us to develop J-SEAD and EW plans to support the overall attack.

Summary

Deep operations can be decisive for Light Infantry Divisions. WARFIGHTER 91 established the Aviation Brigade as the combat maneuver force staffed and equipped to execute decisive deep operations for the 7th Infantry Division (Light). We can create conditions for close combat operations by destroying the enemy's ability to bring his indirect fires to bear. We can seize and maintain the initiative while disrupting the enemy's decision cycle. We can create the conditions under which Light Infantry can defeat a numerically superior force while minimizing friendly losses. As the Army transitions to AirLand Battle Future, the opportunities that such exercises as BCTP provides will further help refine the way that we in the Lightfighter Division fight. IIIII

Lessons Learned

By Lieutenant General Harry W. O. Kinnard, Ret.

The following is excerpted from LTG Kinnard's address at the December 1991 AAAA Morning Calm Chapter Christmas Ball in Korea. LTG Kinnard was an Assistant Division Commander of the 101st Airborne Division, Commander 11th Air Assault Division (T), CG 1st Cavalry Division (Airmobile) and CG of Combat Developments Command before retiring in 1969.

I dislike living in the past, but do feel that important lessons can be learned from examining it. I'll begin in an era long before most of you were born, WWII. A quick look at the L-4 Cubs used for artillery observation and liaison is quite instructive, especially in contrasting their characteristics with those of the Army Air Corps (which became the Army Air Force and then, in 1947, the United States Air Force). First, the Cubs were an organic, integrated part of the Army units to which they were assigned. They were based forward with their units and had very modest requirements for their landing strips. Their control was decentralized down to their parent units. Their missions were assigned by those units and were carried out with complete understanding of the operations of the units, since the pilots were themselves ground soldiers who fully understood ground combat. The Air Corps, by contrast, was under highly centralized control of an Air Corps Headquarters and "cooperated" with Army units when that could be accommodated within their own plans. Their permanent, fixed base requirements necessitated their basing far behind the Army units with which they "cooperated". Their pilots were aviators first and last, and, generally, had very limited knowledge of the details of ground combat. The lessons are quite obvious; let me just say it is important to remember that today's Army Aviation is descended from, and derives its philosophy, not from the Army Air Corps, but from those valiant little Cubs of World War II.

LTG Kinnard is a Past President of the Army Aviation Association of America.

Airborne Operation

Interesting lessons also can be gleaned from a look at some WWII Airborne Operations and at combat in an enemy's rear. For starters, let's consider an imaginary parachute operation.

My first assignment out of West Point was Company A, 27th Infantry, Schofield Barracks, Hawaii. If I had a lot more time, I'd love to describe the Army of that day with its polo, parades and police calls. But I must press on so I'll just say I was among those present in Hawaii when the Japanese made their infamous attack on December 7th, 1941.

I won't even summarize that awful day, but only want you to know that in our Divisional Journal for December 7th, there were more entries relating to the landing of Japanese parachutists than to any other topic. My company spent the entire night of the attack combing the hills behind Honolulu for Japanese parachutists reported to have landed there. There were none; nor were any of the many other reports of their presence correct. These were all the brain children of over active imaginations reinforced by a few actual parachutes worn by pilots bailing out of damaged aircraft.

My point here is the tremendous psychological impact of an enemy using the third dimension and landing in your rear. This was vividly brought home again in the Normandy Airborne landings in which I took part. I knew we were raising a lot of hell on the night we jumped into Normandy, but it was only years later, while instructing in airborne operations at the Armed Forces Staff College that I learned the full impact on the Germans. Their estimate of our numbers on the morning after we jumped in was about 91,000 parachutists; our actual number was about 13,000 — a sevenfold psychological impact. How's that for a combat multiplier?

I have dwelt on these operations in the enemy rear because the helicopter, properly employed, is a marvelous means of striking the enemy's vulnerable rear.

Howze Board

Time permits only the briefest mention of this historic board headed by GEN Hamilton Howze, but all Army aviators should make time to study it. Basically the board found that the time had come for Army units to employ aircraft as their primary means of moving and fighting rather than using aircraft in the supplemental roles they had played theretofore. They went on to recommend the testing of five new and very different Army organizations, all based on the concept of using aircraft anywhere and everywhere that such use promised improvement. General Howze referred to such new units as "Air Fighting Units." The final report of this board was not only bold and imaginative, it was also voluminous — the main report alone was a hefty 3,500 pages, but the one major conclusion was terse and emphatic — *"The board has only a single major conclusion, adoption by the Army of the airmobile concept — however imperfectly it may be described and justified in this report — is necessary and desirable. In some respects the transition is inevitable, just as was that from animal mobility to motor."* Imagine if such a board met today; its primary conclusion could well be that the replacement of tanks by helicopters is inevitable just as was the replacement of horses by tanks.

Only two of the new organizations which the Howze Board recommended were approved for testing, an Air Assault Division and an Air Transport Brigade. These two units wre activated at Ft. Benning on 15 February 1963 and I had the great privilege of commanding them during more than two years of long and arduous testing and development. Again I must just skim the surface to derive some lessons for today. A first lesson can be learned from the directive which launched the effort; then Chief of Staff Wheeler called me to his office and gave me my marching orders in these words: "Harry, we're going to test this air mobility idea to see how far and how fast the Army can go, and should go, and you're going to be the guy to do it". A wonderful mission type order with all the inferred latitude anyone could want. Then he went on to make my day even brighter by telling me I could pick a nucleus of people — officers, warrant officers and enlisted — to join my new enterprise.

So there were two lessons even before I reached Ft. Benning. For an important

project, particularly one to explore new ground, pick a man you believe in, cut him plenty of slack on how he will do the job and provide him with adequate resources, especially in good people. I stressed the latitude which General Wheeler gave me; I passed the latitude on, undiluted, to my people, and encouraged them in every way I could think of, to pass it down the chain of command together with stressing and encouraging initiative, imagination and the improving of every aspect of what we were doing, rather than continuing to do things because that's how they had been done before.

Another lesson for me was the pay off of instilling in every man the importance of what we were doing and his part in it. It's truly amazing how people blossom under such conditions. Then there were old lessons relearned, like the dividends of hard, realistic training, the value of mutual understanding of all units for each other, and the importance of endlessly practicing teamwork at every level from a single squad and chopper on up.

Developmental Training

Next I want to define and stress the importance of developmental testing. It was clear to me from the outset that we should do more than simply take the draft organization which the Howze Board had conceived, give it a trial run, and pronounce it good, bad or indifferent. Rather, I was sure our job was to try out the organization as proposed, find the flaws, fix them as best we could, try again, find new faults; fix those; try again and so on, for as long a time as we were permitted. This repetitive form of testing and improving I call developmental testing and I highly recommend it to you as a tool for improving any type unit, across the board, with respect to organization, doctrine, tactics, techniques and all the rest.

Future

Now, having dusted off some old lessons, let's move to more dangerous ground, a look at some key facets of our world today and some fearless forecasts as to where we're headed. I say fearless because predicting things to come has the advantage that nobody else knows for sure either.

First, our long, tough job of containing the Soviet Union has finally paid off. The amazing consequences, inside Russia, and worldwide, have produced a whole new ballgame whose ground rules, players and even the playing field itself are still evolving. One key point is already clear, wars didn't start with Communism and will certainly not disappear with its ending in the Soviet Union. I offer this evidence: just before we left home, I checked with ACSI, and learned there are some 39 active border disputes around the world, several of which involve actual combat. One needn't be a rocket scientist to see the potential for many more in our highly volatile world. Second, the United Nations has begun playing a much larger role in world affairs since the disappearance of the Soviet veto. For example, it has undertaken eight peace-keeping operations in the last three years as contrasted to only 13 times in its first 40 years. I believe it follows that many U.S. Operations will be under a U.N. umbrella, or, in any event, will be multi-national ones. Army Aviation is an especially useful force in such circumstances, providing a high-tech Army component apt to be missing in the armies of our allies.

Third, our country has a long history of weakening our defenses after our wars. Recently I looked up the size of our Army in all our major wars since the American Revolution, at peak strength and then three years later, and, by my figures, the average reduction from peak to three years later is 16.5%. We are now embarked on such a reduction, following the near disappearance of a Soviet threat. The currently programmed cuts may well not be the final ones, because our Congress has a new buzz phrase, "The Peace Dividend" over which they are already drooling as they visualize some juicy pork barrel. Even the cuts now mandated will take our Army down to 535,000, by 1995; our Army will then rank 7th in the world. It will be smaller than the armies of either North or South Korea, and

just ahead of Pakistan. If we are forced to make even further cuts, my hope and belief is that the Army will do so by cutting structure, while maintaining the quality we have attained and the war fighting ability of our remaining units. I also firmly believe Army Aviation will fare quite well in these cuts relative to the other branches.

Fourth, our economic picture: I'm not sure of the right word for our present economic situation (you know a recession is when you tighten your belt. A depression is when you have no belt to tighten. When you have no trousers to hold up, it's a panic). But whatever we call today's economy, it isn't good. The Administration and Congress are going through their normal hand wringing, and besides the extra impetus for deeper cuts in the defense budget, I foresee another emerging possibility that may impact the Army. One recent congressional trial balloon was a proposal for a major transportation bill that would address maintenance and improvement of our National Highway System and thus create jobs. It is quite possible that such a bill, and many more like it will take shape, not only to create jobs, but because many parts of our infrastructure have long needed attention.

If that kind of legislation does take form, I foresee the armed services, particularly the Army, being called on in a multitude of roles (as it was in the CCC Program during the Great Depression of the 30s). If so, Army Aviation may well find itself engaged in everything from anti-drug actions to ferrying work crews into forests or over other difficult terrain. If this happens we must give it our best shot, while keeping our warfighting capability shined up as best we can.

So much for that tiny snapshot of our interesting world: I'll move quickly through my last point — some bad news/good news points on Army Aviation. I'll start with the bad news.

First, I believe our true capabilities are still not fully understood and appreciated by our Army at large. We know how good and how important we are, but we have to do a better job of informing the entire Army of how best to use us. I believe some increased cross fertilization between aviation and the other branches, both formal and informal, would be very helpful.

Second, I feel Army Aviation is not getting its deserved, or even proportional, share of General Officer promotions. The principle reason, I believe, is the make up of selection boards. Of some comfort is the fact that this is being ever more clearly realized at the Army's top echelons and will, finally, I hope and believe, be corrected.

Third, we still need a good organic intra-theater transport to take the place of the Caribou which the USAF took from us. I don't know enough about the Sherpa, flown by the National Guard in DESERT SHIELD/STORM, to say whether or not it might be the answer. The tilt rotor "Osprey" now being developed for the Marines looks promising to me, if costs can be brought down.

Fourth, air-to-air capabilities are, in my view, still quite short of what we need. Fortunately, the Iraqis were unable to challenge us in this regard. We simply must have a strong air-to-air capability, plus the ability (with a little help from our friends) to suppress ground based anti-helicopter threats. These two capabilities are the price of admission to the ballgame, and they must constantly be improved to meet ever tougher threats. Moreover, these essentially defensive capabilities must not seriously detract from our overriding offensive priority — defeating or destroying enemy ground forces, whatever their composition or disposition.

Now, the "Good News" about Army Aviation. First, Army Aviation offers a real solution to a very old and difficult Army problem, namely the hard choices between heavy and light forces. Heavy forces are difficult and slow to deploy, but have good lethality once at the proper place. Light forces are somewhat the opposite, relatively easy to deploy, but less capable once in combat, especially against heavy enemy forces. In the past we have finessed this problem by tailoring forward deployed forces in the various theaters for their most likely threat, while tailoring a mix of heavy and light forces for our strategic reserves,

in the hopes that we would have the right mix for contingencies. This long standing problem will be compounded by force reductions which force us to take even greater risks in tailoring our forward deployed forces, and, even more so, our strategic reserves.

But Army Aviation, with the capabilities demonstrated in DESERT STORM, offers a real solution to this problem, since air fighting forces, like the 101st Air Assault Division or the 6th Air Cavalry Combat Brigade offer the highly desirable combination of being highly deployable (including self deployability in many instances) while possessing lethality equal to any challenge once in combat. To a lesser extent this is also true of all of our light divisions if their aviation components are properly equipped, manned and trained.

Second, AirLand battle, under whatever name we refer to it this week, is here to stay, and it is unthinkable and unworkable without Army Aviation. No other component of Army Forces has the speed, reach, ability to mass and disperse equal to Army Aviation. We alone can give our Army the capabilities for striking deep, protecting our own rear and turning inside our enemy's decision cycle. Books can be written about Army Aviation's place in the AirLand battle; suffice it to say it is indispensable.

Third, since future combat is likely to be fought in a coalition with one or more of our friends and allies, it is good to know that Army Aviation is likely to be the greatest need of our allies and thus our most valuable contribution to the overall force mix. Fourth, in non-combat activities, either in the CONUS or overseas, Army Aviation can play key roles that are totally unsuitable for other Army units. Examples are anti-drug surveillance or enforcement in our country or feeding the Kurds in Iraq.

Fifth, we have some wonderful equipment now, with fewer gaps and deficiencies, and more in the wings, like Comanche and Longbow, which we all hope one day will make us even better.

Last, and probably most important, are the wonderful people of Army Aviation. You have become the branch of choice for all modes of acquisition, and it shows in the superb quality of today's people in Army Aviation. Because of this quality, I firmly believe that in any upcoming riffs the attrition among aviators will be much less than in the other combat arms.

Conclusion

Army Aviation has come a tremendous distance and acquired enormous capability. Even so, it still has much latent, undeveloped potential which you and your fellow Army aviators must discover, demonstrate and develop. Our Army and Army Aviation will continue to operate in a volatile and often hostile world and with reduced resources. The great capabilities which Army Aviation has acquired over the last several decades, and those which you have added, and will add, are destined to make a vital contribution to the Army's ability to meet all challenges, ranging from civic action to various intensities of combat. In a very real way, the future of our Army, in my opinion, is Army Aviation; you can make it so — it's up to you — go for it!! IIIII

Night Vision Safety

By Captain Ray Tinkler

I would be preaching to the choir to say our night operational capability has increased substantially over the years. More and more flight hours are used toward night vision device currencies and mission training. Because of our recent successes, night missions have increased but unfortunately, so have accidents.

What are the planning considerations for night operations? What are the factors incorporated into the risk assessment and how are they evaluated? Sometimes it depends on who you talk to. The Instructor Pilots and Pilots in Command will quote items out of TC1-204 as they were trained, along with items gained through their experiences. The commander on the other hand, considering the above, will also look at mission accomplishment, METT-T and priority of the mission. We know where responsibility for risk assessment lies—with the commander.

CPT Tinkler is an R&D Coordinator at the Night Vision and Electro Optics Directorate.

Working with the U.S. Army Safety Center as an advisor in accident investigations, I focus my attention strictly on night vision performance and the hardware. The goggles are recovered from the accident and sent to the Night Vision Electro Optics Directorate (NVEOD) for technical analysis. The analysis determines, if possible, whether the goggles still perform to the required military specification. A copy of this report is then forwarded to the Safety Center. Some accidents are so severe, the goggles are not testable and there are no pilots to talk to about the goggle performance. Not just with fatal accidents, but with all accidents, a complete investigation is performed by the Safety Center. Assisting them, I look at the events, mission planning and considerations taken into account up to the time of the accident concerning projected night vision performance and factors included in the risk assessment. What I continually see is nothing new and would probably be considered common sense. The following discussions are some of the areas noted during accident investigations:

Illumination. Illumination levels seem to be constantly misunderstood in mission planning and risk assessment. Illumination data is usually obtained from Air Force weather, computer models, or by someone in the Tactical Operations Center (TOC) taking a look outside and equates to the amount of moon reflecting light. At a recent accident the crew had indicated on their risk assessment an illumination of greater than 80 percent. The attached weather brief indicated a broken and overcast ceiling. Obviously the cloud cover would restrict the moon illumination from reaching the earth, to what degree is difficult to say, but they would certainly not benefit from the illumination predicted. The risk assessed for the mission was indicative of 80 percent illumination, but the poor contrast resulting from the low illumination actually present contributed to the aircraft impacting the ground. The weather was as predicted, bringing down light levels. The risk assessment did not match actual conditions.

Equipment. Three other aircraft accidents involved helicopters impacting the ground or objects in level attitudes. What was noteworthy was none of the accident aircraft had radar altimeters installed. TC1-204 recommends radar altimeters when operating in low illumination which was the case in these accidents. Had the crews been able to monitor radar altitudes, it would have been possible they would have maintained terrain and obstacle clearance. The aircraft are not required to have the equipment, but the lack of recommended equipment is another variable in the risk assessment.

Remaining with equipment, it is required that to fly at night, a visible horizon or operable attitude indicator be available. We know that night vision devices can see through light obscurations and sometimes can lead to inadvertent Inclement Meteorological Conditions (IMC). We are trained how to spot the cues that we are possibly encountering IMC, halos, lack of shadows, etc. and practice inadvertent IMC procedures. Why would we then not weigh the risk of allowing a crew to fly with night vision goggles, in weather conducive to fog or light rain, when they did not have an operable attitude indicator to allow inadvertent IMC procedures if IMC is encountered? This occurred in a recent accident, when it was believed the crew possibly entered IMC conditions without an attitude indicator. Some units have established local procedures restricting goggle flight without an attitude indicator.

FLIR. The Pilot Night Vision System (PNVS) on the AH-64 works in a wavelength outside that of image intensifiers or goggles. Their system is not dependent on ambient light but temperature differential of objects. Apache pilots, particularly those that have operated in Europe, have experienced less than ideal FLIR imagery due to specific patterns of weather that reduce the temperature differential necessary for good imagery. Computer models are available and are being used to predict imagery through Delta T predictions, but the accuracy of the models remains uncertain.

In another accident, this one in Europe, an AH-64 struck wires. The unit had been training for several days and the weather had been consistently cold and dreary. The pilots interviewed after the accident discussed, during mission planning, the fact they would probably obtain poor FLIR imagery because of the recent weather pattern. There was no risk assessment item on FLIR imagery in the unit, not unusual at all. It is difficult to predict imagery even with computer modeling. What the unit did have was experienced PNVS aviators who realized what the weather was doing to the system and made a very accurate prediction of the imagery they encountered that night. As subjective as it may be, an experienced pilot can include relative information into the risk assessment analysis.

These are certainly not all the factors to be considered in mission planning nor all the considerations for a commander making decisions. These are the observations of an aviator involved in the not so enjoyable task of visiting aviation units conducting night operations who have had a mishap and subjectively viewing, after the fact with 20/20 hindsight, those items that could have been overlooked that may or may not have contributed to an accident. IIIII

TRAINING:

DES TRENDS

BY COLONEL DONOVAN R. CUMBIE &
MAJ(P) WALTON C. CARROLL, JR.

FORT RUCKER, AL — Fiscal Year 91, to risk an understatement, was a banner year for Army Aviation and the Directorate of Evaluation and Standardization (DES). In excess of 150 team deployments were completed to assess, assist, and provide subject matter expertise to aviation units on a global scope. Nearly 4,000 flight evaluations were administered with 6,465 hours flown encompassing all Army airframes and all conditions including combat. The purpose of this article is to highlight trends noted during these visits and to indicate where we have incorporated lessons from Operation DESERT STORM in our "areas of interest" for FY 92.

A change in our assessment focus, from the traffic pattern to the tactical arena, began in FY 91 and will continue in FY 92. An encouraging upward trend in individual aviator proficiency was noted as the year progressed, resulting in an overall DA pass average of 89.5% in flight evaluations for the FY.

Battle rostering has proven to be a positive addition to unit crew selection and qualification programs. The technique was a noted common thread among strong crew selection programs. Units are making a concerted effort to select and train the best crews based on experience and documented capabilities. Battle rostering is not a scheduling constraint restricting who could fly with whom. It is, instead, the hallmark of a trained crew properly prepared for Mission Essential Task List (METL) missions. It also proved to be an effective tool for focusing training resources toward specific METL task training.

NVG maintenance, Commander's Task List (CTL) development, and unit environmental training programs have been FY 91 areas of interest showing marked improvement during the FY. USAAVNC MSG 221530ZMAR91 consolidated all NVG maintenance message traffic and eliminated many conflicting and confusing requirements. Although unit level NVG maintenance has shown great improvement, Direct Support and General Support maintenance still poses a challenge. We intend to continue our NVG maintenance emphasis in FY 92. Command development of CTLs based on the unit METL was an additional program strength. The METL defines important tasks, which the commander's task list then translates into training requirements. Increased interest in environmental training during FY 91 resulted in a proliferation of programs. Great programs were noted at Ft. Carson, CO and at the National Guard Bureau's High Altitude training site.

The "Areas of Interest" letter for FY 92 was published on 1 October 1991. Additional copies are available upon request (DSN 558-3504). Several areas represent significant departures from previous years, and these new functional areas represent additions to our assessment methodology.

Operation DESERT STORM taught us that our tactical approach assessment must continue with increased emphasis on crew capabilities. Individual aviator capabilities remain an important element to gauge program effectiveness in the instructor arena, but crew performance has proven to be the bridge between individual qualification and METL capabilities.

For FY 92, the DES team has added a fourth element of assessment—Aeromedical. This element complements the existing areas of aviator standardization, maintenance test pilot standardization, and air traffic control. This new element will assess unit aviation medicine programs in the areas of clinical and non-clinical support to the aviation community. Early returns indicate great benefits in these areas.

Nonrated crewmember programs will also receive greater

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COL Cumbie is Director, Directorate of Evaluation and Standardization, Ft. Rucker, AL.

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OPERATIONS:

FLEXIBILITY

BY COLONEL E.E. WHITEHEAD AND
CAPTAIN MICHAEL D. LUNDY

GIEBELSTADT, GERMANY — Flexibility has been the watchword for the "Wings of the Marne" Brigade this year. With operational commitments in Saudi Arabia, Turkey, Southern and Northern Iraq, Cyprus, and Germany, we have adapted and excelled as only an Army Aviation Brigade can.

With the onset of Operation DESERT SHIELD, we were tasked to send the OH-58D Kiowa Warrior platoon to support the 2nd ACR. The platoon deployed in early December and quickly integrated into the Regimental Order of Battle. The OH-58Ds added a much-needed reconnaissance and fire support capability to the Regiment. The platoon proved its worth by firing over one-third of all the 2nd ACR's artillery missions during the Regiment's movement to contact forward of the VII Corps.

Also, as a result of deployments to DESERT SHIELD, the Assault Company (H/3rd Aviation) was tasked to support the Beirut Embassy. The mission called for NVG/overwater trained crews to fly daily supply missions into the embassy compound. Hotel Company supported the mission with 25 personnel and four UH-60s from the Island of Cyprus.

As DESERT STORM came to a successful conclusion, world attention quickly focused on the Kurdish plight in Iraq. Operation PROVIDE COMFORT was to quickly become the largest humanitarian relief effort in history. Armed Forces from twelve nations along with numerous private organizations began the arduous task of saving the Kurdish refugees. On 16 April, the Brigade was alerted for immediate deployment to Northern Iraq. We were to become the air component for Joint Task Force

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CPT Lundy is OH-58D Platoon Leader/CBTF Executive Officer, 4th Aviation Brigade, 3d Infantry Division, Giebelstadt, Germany.

Left to Right — CPT Michael Lundy, COL E. E. Whitehead, LTC John Kidder, Allied Ground Force Commander. Photo taken at Sirsenk Airfield, Iraq with local Pesh Merge Leaders

Bravo, one of two Joint Task Forces formed to provide humanitarian relief and relocation of the refugees. It was apparent the "Wings of the Marne" soldiers were going to play a major role in the operation.

Between 17 and 24 April, the Brigade conducted two self-deployments. Initially, six UH-60s self-deployed from Germany to Diyarbikir, Turkey. Upon arrival four days later, they immediately began flying humanitarian relief missions. On 24 April, 18 AH-64s and three UH-60s began the farthest self-deployment of an Apache battalion in history. The deployment covered over 3,000 miles through five countries in four days. It marked a significant milestone in Army Aviation history and proved Army Aviation can project power on a global basis.

As the AH-64s arrived in Zahko, Iraq, the Brigade began conducting armed reconnaissance missions in support of the Coalition Ground Forces. The objective was to clear a 2,500 square mile security zone in Northern Iraq, which would facilitate the resettlement of the Kurds back to their homes. The zone was quickly cleared with no major incidents.

In addition to operational missions, the Brigade took advantage of the outstanding training environment. We conducted CSAR missions with the Navy SEALs, CAS/JAAT missions with the Air Force and Navy, along with numerous air insertion missions utilizing the Coalition Infantry Forces during the quick reaction drills.

With the successful resettlement of the Kurds to their homes, the Brigade assumed a new mission. The two previous Joint Task Forces were deactivated, and a new Combined Brigade Task Force was formed on the Brigade Headquarters. The CBTF became a 3,000 man, Coalition/Interservice Task Force composed of the "Wings of the Marne" Brigade, six Coalition Infantry Companies, and a Forward Support Battalion. The mission was unchanged. The CBTF continued to perform security and humanitarian relief in Northern Iraq.

At the conclusion of operations in early October, the Brigade had flown in excess of 12,000 hours in less than six months. In addition, the Brigade successfully integrated six Coalition Infantry Companies and formed a Forward Support Battalion, capable of sustaining and maintaining the Task Force.

As the year ended, the Brigade was faced with another challenge. We were declared a CFE unit and the headquarters is currently relocating to Ft. Bragg, NC.

This year has been a fitting conclusion for the "Wings of the Marne" Brigade. As we transition to becoming Airborne aviators, we're sure next year's watchword will remain "flexibility."

Wings of the Marne! IIIII

DES
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visibility during FY 92. As critical members of the crew, this increased emphasis is viewed as a logical progression toward the desired end state of trained and combat-ready aircrews capable of performing the unit METL missions.

If you need assistance, don't hesitate to call DES (DSN 558-3504). Every month the directorate fields literally hundreds of calls for technical evaluation, assistance, or subject matter expertise support. The knowledge and experience of our team is always available. Don't be surprised when our next visit takes the new approach discussed above. Copies of our checklists (used during all visits) are available upon request. We are truly coming to help you—the members of our Aviation Branch. IIIII

PERSONNEL:

NONMEDICAL ACTIONS

BY CAPTAIN SAMUEL D. TORREY

ALEXANDRIA, VA — In the February 1991 issue of ARMY AVIATION Magazine, we stated that there were two actions that should be extremely important to all aviators and flight surgeons since they affect our entitlement to receive and accept Aviation Career Incentive Pay (ACIP). They are medical and nonmedical actions. In that article we discussed medical actions: temporary suspensions, disqualifications, and requalifications. In this article I will discuss nonmedical actions: temporary suspensions, disqualifications not resulting from Flying Evaluation Board (FEB) actions, and requalification. A thorough discussion can be found in Chapters 3 and 4, AR 600-105, Aviation Service of Rated Army Officers.

Although this office serves as the final approval authority for voluntary disqualification and requalification actions for active Army and USAR aviators, we do not serve as the final approval authority for FEBs. The general court-martial convening authority is the approving authority for FEBs. We serve as the final repository for the original approved board actions and execute the directives of the approving authorities.

Temporary suspension is required if a commander intends to request an FEB. Any commander in the chain of command may impose a nonmedical suspension up to 30 days. Separate battalion commanders, brigade commanders, and above have the authority to temporarily suspend officers up to 180 days. Suspensions will never be ordered as a disciplinary action, but for example, for one or more of the following conditions: lack of proficiency--to include failure to meet Annual Proficiency Readiness and Test (APART) requirements, flagrant violation of flying regulations, undesirable habits or character traits, and insufficient motivation. The commander is also required to notify the officer and the local finance office in writing to terminate ACIP. Commanders authorized to impose the suspension may remove the suspension and restore the aviator to aviation service and restart ACIP.

Disqualifications

If the temporary suspension exceeds 180 consecutive days the officer is no longer professionally qualified for aviation service and is disqualified. This results in the following:

- Termination of ACIP
- Termination of authority to pilot Army aircraft
- Termination of Total Operational Flying Duty Credit (TOFDC)
- Termination of time creditable towards aeronautical ratings
- Potential branch transfer or functional area single tracking when applicable

For flight surgeons disqualification results in termination of:

- Duty as a flight surgeon or practice of aviation medicine
- Time creditable towards aeronautical ratings.

There are three kinds of nonmedical disqualifications: FEB, voluntary, and branch transfer or functional area single track.

Voluntary

I will not discuss FEBs in this article, Chapter 4, AR 600-105 provides detailed information regarding FEBs. Officers may request voluntary disqualification with waivers of FEB when the actions are clearly in the best interest of the Army. These requests are submitted through the chain of command to PERSCOM (TAPC-OPD-D) on DA Form 4187 and must clearly show beyond a reasonable doubt that an FEB would recommend disqualification. If we approve it, they will be permanently disqualified from aviation service. We will publish orders with an effective date of the day the officer signed the DA Form 4187 requesting disqualification.

The other nonmedical disqualification results from an officer branch transferring or single tracking in a functional area, whether voluntarily or involuntarily.

Requalification

Officers can request requalification and restoration to aviation ser-

(Actions — contined on p. 61)

CPT Torrey is an Aviation Mgt Officer, Officer Distribution Division, PERSCOM, Alexandria, VA.

TESTING:

AVIATION TECHNICAL TESTING

BY COLONEL JOHN F. HAGEN

FORT RUCKER, AL — What are systems testing, airworthiness testing, lead-the-fleet testing, and icing testing? They are each a form of technical testing conducted by the U.S. Army Aviation Technical Test Center on prototype or production aircraft.

In essence, technical testing provides data to measure technical performance or capability of an aircraft against contract specifications, requirements stated in a requirements document, airworthiness requirements, or other technical objectives. More simply stated, technical testing validates that an aircraft meets its technical requirements. Technical tests are designed to expose the aircraft to stress levels representative of the operational environment and to the limits of the operational envelope.

The U.S. Army Test and Evaluation Command (TECOM), a major subordinate command of the U.S. Army Materiel Command, is the primary technical tester for the Army. At nine test centers located throughout the United States, TECOM conducts technical testing on Army equipment ranging from combat uniforms to aircraft.

Technical testing of aircraft is the special expertise of the U.S. Army Aviation Technical Test Center (ATTC). Headquartered at Ft. Rucker, AL, ATTC plans, conducts, analyzes, and reports on technical tests of Army aircraft and associated systems. In addition, ATTC provides aircraft testing and test support to customers both in and outside the Army. Regardless of customer, all testing conducted by ATTC is overseen by TECOM headquarters.

The principal customers of ATTC are, naturally, the Program Executive Office (PEO), Aviation and the U.S. Army Aviation Systems Command (AVSCOM). Currently, ATTC is planning for or conducting tests on every major aircraft system within the PEO. Every Army aircraft in current operational use has undergone testing by ATTC.

Technical test capabilities at ATTC include systems testing, airworthiness testing, lead-the-fleet testing, and icing testing. Testing is conducted by a team of highly skilled test pilots and experienced test engineers and technicians.

Systems testing is a primary function of ATTC's Flight Systems Test Division at Ft. Rucker. Systems which ATTC tests include weapons, aircrew life support equipment, aircraft survivability equipment, and integral aircraft components. Systems testing focuses on system performance and integration of the system into the aircraft. In conducting systems testing, ATTC documents the technical characteristics of the system, assesses the impact of the system on the overall operation of the aircraft, and evaluates the reliability, maintainability, logistics supportability, human factors design, and system safety characteristics of the system. Some examples of systems which have recently been tested by ATTC are Air-To-Air Stinger (ATAS), aircrew integrated helmet, AN/AVR-2 laser detecting set, and UH-60 pitch-change-link rod-end bearings.

COL Hagen is Commander, U.S. Army Aviation Technical Test Center, Ft. Rucker, AL.

Airworthiness testing is conducted by ATTC's Airworthiness Qualification Test Directorate (AQTD) at Edwards AFB, CA. This type of specialized testing is performed by trained engineering test pilots on highly instrumented aircraft. Airworthiness testing focuses on the aircraft's flight characteristics and performance throughout its flight envelope in such areas as level flight, hover, climbs, descents, and maneuvers. Recently, ATTC has performed airworthiness testing on MH-60K, MH-47E, and OH-58D aircraft. ATTC maintains fully-instrumented UH-60A, AH-64A, UH-1H, and AH-1F aircraft at Edwards. These aircraft are available to quickly respond to AVSCOM's requirements for safety-of-flight related airworthiness testing.

Lead-the-fleet testing, conducted at Ft. Rucker, provides Reliability, Availability, and Maintainability (RAM) data on aircraft at flying hour rates greater than that which occurs in operational units. Flight profiles are controlled and repetitive. They are established on the basis of projected field usage in terms of flight maneuvers and loads. Lead-the-fleet testing provides an early indication of maintenance problems and assessment of proposed solutions. It also provides a means of "piggybacking" separate tests to avoid costs that would be accrued if individual aircraft were used for each test. Currently, the CH-47D, UH-60A, UH-60L, AH-64A, UH-1H, AH-1S, and OH-58C are in lead-the-fleet testing.

Icing testing is conducted offsite at Duluth, MN. Weather conditions during the months of November to March in this area are ideally suited for this type of testing. The manner in which ice accumulates on the aircraft in flight is documented, and the functional characteristics of anti-icing and deicing equipment are evaluated. Testing is performed in either artificial or natural icing conditions. Artificial icing conditions are generated by ATTC's Helicopter Icing Spray System (HISS) which is carried in a CH-47D helicopter. This type of testing provides the data required by AVSCOM to release Army aircraft for flight in icing conditions.

Testing at ATTC in 1992 will continue to be challenging. Systems testing and lead-the-fleet testing will be conducted on the armed OH-58D. The AH/MH-6N will undergo airworthiness testing. Icing testing will be performed on the RC-12K. These tests, and planning for future testing of the RAH-66 Comanche, will provide ATTC the opportunity to continue demonstrating its technical testing competence for Army Aviation and to "Test Above the Best." IIIII

Actions

(continued from page 59)

vice provided they were not permanently disqualified as a result of an FEB or requested voluntary disqualification with waiver of an FEB. Officers may request requalification by submitting a DA Form 4187 through command channels to PERSCOM (TAPC-OPD-D). PERSCOM is the decision authority for requalification and the decision is based on the needs of the Army at the time of the request.IIIII

AWARDS AND HONORS

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

Initial Courses:

Class 90-23 UH-1 Track (29/5/91): 2LT David P. Lewis, Dist. Grad; 2LT John T. Millen, Honor Grad.

Class 90-23 UH-1 Track (29/5/91): WO Scott G. Curtis, Dist. Grad; WO Theodore E. Blackwood, Honor Grad.

Class 90-23 OH-58 Track (29/5/91): CPT Kendal K. Weidinger, Dist. Grad; 2LT Shawn D. Jones, Honor Grad.

Class 90-22 UH-60 Track (29/5/91): WO Charles K. Brown, Dist. Grad.

Class 90-21 AH-1 Track (29/5/91): 2LT Anthony L. Atwood, Dist. Grad; 1LT Joseph M. Lyles, Jr., Honor Grad.

Class 90-21 AH-1 Track (29/5/91): WO Steward B. Crooke, Dist. Grad.

Class 91-10 UH-1 Track (1/11/91): CPT Christopher A. Joslin, Dist. Grad.

Class 91-10 UH-1 Track (1/11/91): WO Lawrence G. Micklus, Dist. Grad; WOs David G. Zumbach, Jason L. Garr, Honor Grads.

Class 91-10 OH-58 Track (1/11/91): WO James B. Skillman, Jr., Dist. Grad; WOs John R. Yager, Mark J. Jurek, Honor Grads.

Class 91-9 UH-60 Track (1/11/91): 1LT Matthew E. Mattner, Dist. Grad.

Class 91-9 UH-60 Track (1/11/91): WO Daniel R. Christ, Dist. Grad.

Class 91-8 AH-1 Track (1/11/91): WO Daniel E. Templeton, Dist. Grad.

Class 91-12 UH-1 Track (4/12/91): 2LT Julie A. Eberle, Dist. Grad.

Class 91-12 UH-1 Track (4/12/91): WO Thomas W. Bamford, Dist. Grad; WOs Nathan C. Wriston and Jeffrey J. Groke, Honor Grads.

Class 91-12 OH-58 Track (4/12/91): 2LT Thomas C. Kelley, III, Dist. Grad.

OPERATIONS:

APACHES IN THE WAR ON DRUGS

BY LIEUTENANT COLONEL JAMES E. SIMMONS

FORT HOOD, TX — The 3rd Squadron, 6th Cavalry Regiment, 6th Cavalry Brigade recently completed a 21 day operation in support of the United States Border Patrol. The mission, named Operation BUSH HOG, saw the first use of the AH-64A in a drug interdiction role.

BUSH HOG, coordinated through Joint Task Force 6 (JTF-6) and Project Alliance, was designed to interdict illegal drugs from entering the southern counties of Texas in the vicinity of Laredo. The operation resulted in the seizure of 400 pounds of illegal drugs, five automobiles, and the apprehension of some 400 illegal aliens attempting to enter the United States.

The 3rd Squadron, 6th Cavalry is an AH-64A-equipped attack helicopter squadron stationed at Ft. Hood, TX. 3-6 Cav is equipped with 18 AH-64A Apaches, 13 OH-58C Kiowas, and three UH-60A Black Hawks. The squadron routinely practices combat operations in support of III Corps and its subordinate divisions, including: zone, route, and area reconnaissance; screen, guard, and cover missions; movement to contact, hasty and deliberate attacks in support of close operations; and deep attacks to support III Corps deep operations. Many of the unit Mission Essential Task List (METL) training requirements were met in accomplishing Operation BUSH HOG.

LTC Simmons is Commander, 3rd Squadron, 6th Cav Regt, 6th Cav Bde, Ft. Hood, TX.

Planning for Operation BUSH HOG began in late July when the United States Border Patrol, Laredo sector, requested United States Army Forward Looking Infrared (FLIR) support to assist their agents in the interdiction of illegal narcotics entering the United States. The request was coordinated through Project Alliance in El Paso, TX. Project Alliance is a central coordinating agency for Drug Law Enforcement Agencies (DLEA) that staffs requests for military support. Project Alliance passed the request to JTF-6 in late July.

JTF-6 is a joint headquarters located at Ft. Bliss, TX to coordinate the employment of U.S. Military Forces in support of the President's War on Drugs along the southern border of the United States.

Once the 6th Cavalry Brigade received the mission, direct coordination was authorized between the staff at JTF-6, the USBP Laredo, and 3-6 Cav. Principal planning for the operation was conducted by MAJ Mike Hartman, the Squadron S-3, and Agent Don Teeple of the USBP, Laredo. The Joint Operations Order and Memorandum of Understanding for the operation was signed in Laredo on 30

TASK ORGANIZATION

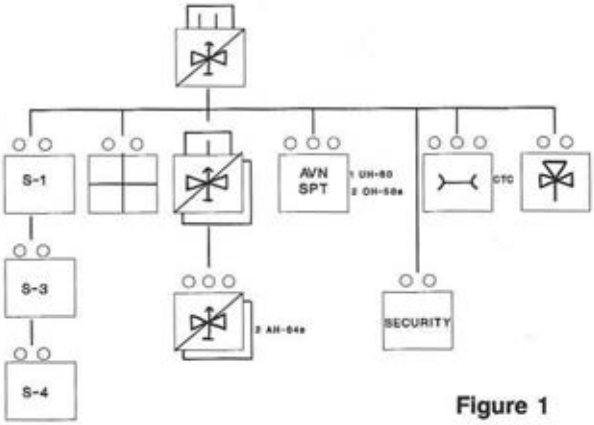


Figure 1

August by the Squadron commander, Chief USBP Laredo, Operation Alliance, and JTF-6.

The Squadron's mission was execution of day and night reconnaissance operations in the vicinity of known smuggling points in Dimmit, Webb, Zapata, and Duval counties, TX. 3-6 was asked to assist in the detection and monitoring of smuggling activity in the vicinity of border patrol check points and to report those activities to Border Patrol agents.

To accomplish the drug interdiction mission and two other important operations (REFORGER and OH-58 support to the 3rd Armored Cavalry Regiment), the Squadron task organized. The headquarters consisted of a command group, led by MAJ Bill Pardue, S-1 led by 2LT Jeff Rich, S-3 led by MAJ Hartman, S-4 led by CPT Dallas Moore, a communication section led by SFC Henderson, and a support platoon led by SFC Hall. The major maneuver elements of the Task Force were built around A Troop, led by CPT Dan Selph, and C Troop, commanded by CPT Roger Raney. AVUM maintenance was provided by D Troop, led by CW2 Jimmy Evans (See Figure 1).

The concept of the operation called for two troops to conduct multiple zone reconnaissance at night, using FLIR to detect individuals and vehicles attempting to evade U.S. Border Patrol stations 15 to 20 miles from the U.S./Mexican border (see Figure 2). Because the maneuver boxes for the operation were located a minimum of 20 flying minutes from the Forward Assembly Area (FAA Pig), the Squadron outfitted nine AH-64As with two 230 gallon wing tanks each. This gave the crews better than four hours of station time. This extra station time greatly increased mission flexibility and actually reduced total flight hours by allowing more time in the maneuver area and less flight time enroute to and from refueling.

Once the Squadron arrived in its designated maneuver box, they conducted normal zone reconnaissance operations. As targets were detected, mission commanders informed the Border Patrol Agents of target locations. The Border Patrol was responsible for all apprehensions. Since this was the first use of the AH-64A in the drug interdiction role, a great deal of coordination was conducted with the legal staff at JTF-6, Project Alliance, and the Border Patrol ensuring aircraft were being employed in accordance with U.S. laws and appropriate regulations. Considerable effort was also expended in ensuring our operations did not offend the government of Mexico.

The mission was successful. The Squadron flew in excess of 400 hours while meeting or exceeding DA requirements for operational readiness rates. The Squadron flew 98% of those hours under night vision systems or night vision goggles and continually detected targets without being detected themselves.

The training and procedures established by the Border Patrol and the 3rd Squadron were effective and can be applied to future operations. The 3rd Squadron, 6th Cavalry, is proud to have contributed to the nation's "War on Drugs". IIIII

United States/Mexico Border

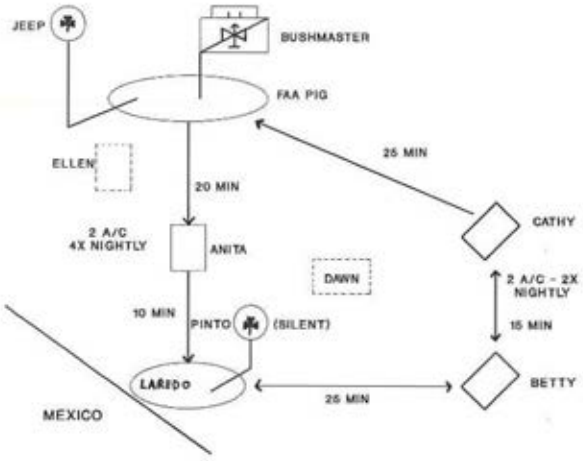


Figure 2

SAFETY:

1-212TH SETS SAFETY STANDARD

BY LIEUTENANT COLONEL HAROLD S. BARRETT

FORT RUCKER, AL — The 1st Battalion, 212th Aviation recently reached an impressive milestone, attaining 100,000 consecutive hours of accident-free flight. In one of his final acts as Commanding General of the Aviation Center at Ft. Rucker, AL, MG Rudolph Ostovich, III recognized this outstanding achievement by presenting the battalion with a certificate commemorating the event in a ceremony held at Lowe Army Heliport on 17 July 1991. As Commander, I accepted the award on the battalion's behalf, which accomplished this feat from November 1989 to June 1991.

Speaking to a contingent of the battalion's aviators and members of the local press, MG Ostovich praised the 1-212th for its safety record, specifically noting that virtually all of it was built while flying in some of the riskiest possible flight modes. The 1-212th mission is to train Initial Entry Rotary Wing (IERW) student pilots and to conduct UH-1 instructor pilot training. Based at Lowe AHP (properly billed as the "World's Busiest Heliport"), the battalion continually operates on a round-the-clock basis, flying approximately 300 hours in a 24-hour cycle, or about 10% of the entire Army total for the same period. The Battalion's IPs regularly teach emergency procedure training, terrain flight skills, night flying and night vision goggle qualification, and advanced combat skills, to include rappelling, slingloads, and multi-ship operations.

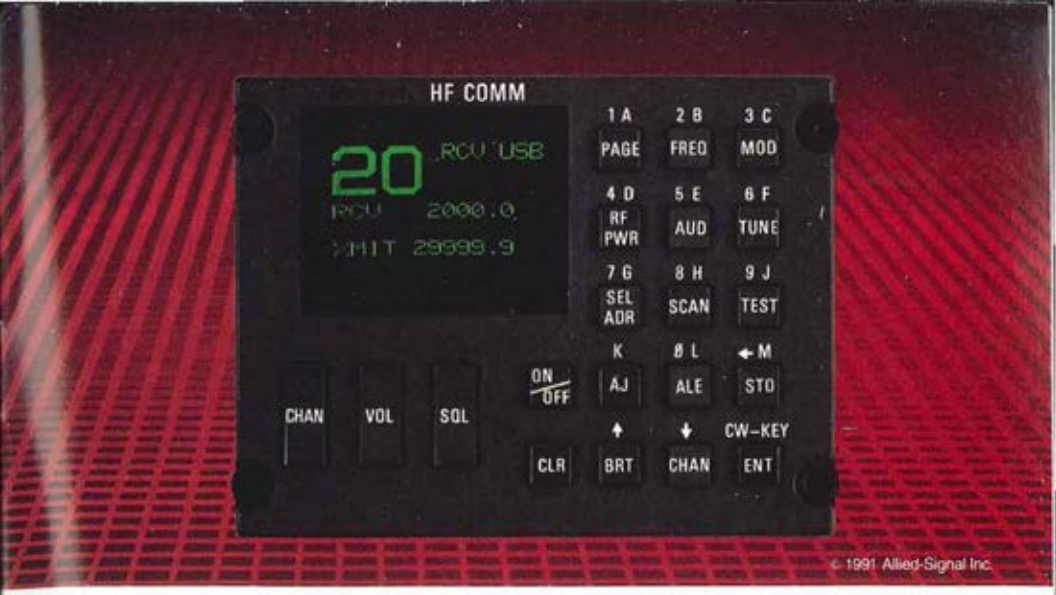
This sort of accomplishment was particularly satisfying to the soldiers, as every member of the unit was a contributor. The record was not gained without some extraordinary effort and a few harrowing experiences, however, as there have been several engine failures and numerous other in-flight emergencies.

Two IPs have been nominated for Broken Wing awards during this time frame; one involving a night engine failure was recently approved, while the other is still pending.

The last accident involving a 1-212th aircraft occurred with two solo students on board (neither was injured, except for their pride). Prior to that incident, the battalions had amassed an Army record of over 296,000 accident-free flight hours.

With that historical example in mind, the 1-212th continues to administer quality flight training to future aviators in the safest manner possible, adding to its own remarkable record on a daily basis. IIII

LTC Barrett is Commander, 1st Battalion, 212th Aviation Regiment, Ft. Rucker, AL.



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Currently in service with the U.S. Army and Navy on seven different rotary and fixed-wing aircraft types, including EA-6Bs and VIP VH-3s, the AN/ARC-199 has also been selected for the USMC OV-10 and follow-on vertical lift requirements. And a variant of the AN/ARC-199, the ARC-200, is flying in the USAF F-16 ADF, as well as in export versions of the F/A-18.

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WSSM
continued from page 6

the solution is delivered a week after the decision must be made (or the ship sails from port). Drawing from Sun Tzu, "Know your enemy and know yourself, and in 1,000 battles you will never be in peril," we had to have good logistics intelligence to support our forward focused decision process.

In our case, the "enemy" was the environment; the "enemy" was the anticipated usage rates, the projected failures, the estimates of combat damage. We could not allow the logistics system to fall behind the needs of the combat commanders. The logistics system had to be transparent, seamless, and never an issue in the combat operations.

Once we "peaked" the WSSM and the matrix team, we had to set up a system to get the required intelligence so the WSSMs could make good, proactive decisions and anticipate requirements for each weapon system in-theater.

Unit Readiness

Out walking point for the WSSM and performing the "logistics reconnaissance" were the Logistics Assistance Representative (LAR) and Logistics Assistance Officer (LAO). These highly skilled technical experts deployed and lived with their supported units from Day 1. Their mission? Unit readiness. As a result of their "bumper number"/customer focus and their direct link back to the AMC Commodity Commands (initially using existing phone lines and later via dedicated satellite circuits), we had real-time data on the readiness trends in-theater—what was failing, what field expedient fixes were working, and some good guesses as to what would go wrong (or right) next.

Based on the feedback through the logistics assistance channels, as well as proactive decisionmaking, the WSSM was able to assemble and deploy the right mix of technical experts, diagnostic equipment, and critical repair parts to the Gulf as part of the various Special Repair Activities. For example, when we began experiencing sand-induced problems with the Apache armament system, AVSCOM coordinated with DESCOM to get a team from Corpus Christi Army Depot (CCAD) on the ground to work the solution. Likewise, AVSCOM anticipated problems with the pilot night vision system given previous failure experience, and ensured that the right mix of technical experts from Martin Marietta deployed to the Special Repair Activity.

The Support Group

The LAR/LAO were good for intelligence and advice, but there are some problems that need more resources to solve. This is where the next member of the team played a critical role. The U.S. Army Support Group was created and manned by almost 3,000 AMC and Contractor personnel. The creation of the Support Group provided a field structure that would support and sustain the movement of diagnostic and repair expertise into theater. This gave us the ability to quickly repair and return to duty critical equipment in addition to putting the technicians on the ground where they could see what was happening; to be additional eyes and ears for the WSSM. As a result of this linkage, these experts provided exceptionally good projections of problems and requirements.

The result? Anticipation of failures, repair parts requirements, and the push of high-priority requisitions directly from the "factory to the foxhole" via Desert Express. The readiness rates we experienced in the Gulf were above expectations; running around 95% for ground and 80-85% for air systems.

Based on our experience and success in meeting one of the toughest logistics challenges ever posed, we are comfortable with the WSSM system and underlying philosophy. The management structure has been refined, responsibilities are completely understood, and the emphasis is where it should have been all along—sustain the system, not fix the "eaches". Team Apache, Team Black Hawk, Team Kiowa Warrior, and Team Comanche take the field every day, 24 hours, to support our Aviation units in maintaining readiness for the next DESERT STORM! IIIII

BRIEFINGS

The **Army Presidential Flight Association** will be holding their 4th biannual reunion at Ft. Rucker, AL, 11-14 June 1992. For additional information can call **Bob Quearry** at (205) 347-0310, or write to: 202 Coral Way, Enterprise, AL 36330.

Soldiers of the **159th Aviation Regiment**, stationed at Simmons Army Airfield, NC, brought Christmas a little early to the needy children of Sanford, NC. The soldiers spent several hours wrapping presents for the youngsters, and on 13 December 1991, flew a CH-47D Chinook to Kiwanis Park in Sanford to distribute the gifts. After all the presents were distributed, the town's residents were invited to inspect the aircraft.

A lightweight, battery-operated laser detector, designed to protect troops on the battlefield from possible attack by laser-guided weapons from friendly aircraft, is now in its final development phase at **Hughes Aircraft Company's Santa Barbara Research Center**. The high-sensitivity laser sensor, containing a single detection channel, is intended for high-reliability performance under battlefield conditions. It can sense the presence of a laser beam coming from anywhere within its hemispherical field of view, and activate transmission of an RF or electro-optical beacon to friendly aircraft for identification purposes.

The January 1992 issue of ARMY AVIATION Magazine incorrectly identified the recipients of the Air/Sea Rescue Award. They are, from left to right, CW3 Scott Berrier, awardee; MG Charles F. Drenz, Ret., AAAA National President; CW3 Julian Council, awardee; and Richard Murphey, District Manager, Lucas Aerospace.

50 YEARS OF ARMY AVIATION

SHOT DOWN IN NORTH AFRICA!

Less than five months after the birthday of Army Aviation on June 6, 1942, Army L-4 Cubs flew in their first combat missions in North Africa. Here COL John R. Bannister, USAR, Ret. (then a 2LT Artillery Liaison Pilot) tells about it:

"I was assigned to the 3d Infantry Division and after staging at Camp Pickett, VA, we embarked on the USS Ancon from Norfolk and landed at Fidela, French Morocco, on a small landing craft on November 8, 1942.

I'd gone ashore as advance party to secure a landing sight for CPT Ford Allcorn and Lts. John Shell and Paul DeWitt, the Class P-1 pilots who were to fly three L-4s off the deck of the USS Ranger and conduct artillery fire missions.

By D+1 I'd accomplished my mission and by Naval Shore Fire Control, I notified the aforesaid pilots to come ahead. They tried and two got through with CPT Allcorn being bravely shot down by our own Navy. Though wounded, he survived.

After all, a Piper L-4 screaming along at 65-70 mph at least 1,000 feet up would scare the pants off the Navy, not to mention three of them at once.

Assuming I qualify because I was the first Army Aviator (L-Pilot, Class P-2) in combat (as far as the European Theater was concerned, i.e., November 8, 1942) albeit a footslogger on the beach landing, I'd like to be considered for membership in AAAA's Cub Club."

— from the files of AAAA Archivist Arthur H. Kesten —

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Maintenance Challenge
(continued from page 9)

maintenance units. Individually, failures of these various support systems can perhaps be overcome. Collective simultaneous failure of these supporting systems, however, represents a significant hindrance to effective maintenance. These systems deserve renewed attention in the near term, so that future maintainers are not faced with these obstacles.

AVIM and AVUM Unit Design suffered from two primary shortcomings — insufficient transportation to move all the assigned equipment around the battlefield, and insufficient numbers of critical specialties. If our doctrine calls for fighting 24 hours-a-day, we must staff and equip these organizations for 24 hours-a-day operations. Additionally, the AVIM/AVUM support of the Armored Cavalry Regiment is largely inadequate. In the past, these structures (and others) have been "salami sliced" as bill payers in the larger force design process. Efforts are now underway to ensure that future unit and force designs have a support structure adequate to sustain the predicted wartime OPTEMPOs.

Experts at the Army Aviation Warfighting Center (Ft. Rucker and Ft. Eustis), AVSCOM, and across our industrial base continue to study the lessons from DESERT STORM. Twenty days in combat can often teach more than 20 years in garrison. We've got an unparalled opportunity at hand, the chance to apply these lessons throughout our Army. New logistics doctrine, new maintenance organizations, better materiel, all focused on the opportunity to increase our lethality, versatility, and deployability are on the way. Our charter must be to distill these lessons and continue the process of improvement throughout this decade. The future of Army Aviation and the combined arms team is at stake. IIIII

Product Support
(continued from page 12)

Army Aviation team which made this happen: our leaders, from Chief of Staff down, the green suit soldiers in the field, the first line aircraft systems, all backed up and completely integrated with large scale contractor support. This combination overcame the challenges of the desert and conquered the Iraqi Army. The Army Aviation team performed brilliantly throughout the Gulf war.

We had over 650 contractors deployed to Southwest Asia, supporting Army Aviation. These men and women were not confined to secure rear areas. They were deployed throughout the depth and breadth of the theater and were critical to the success of the aviation mission. Our soldiers and these contractor personnel are the real heros of DESERT SHIELD/STORM.

The contractors, as well as some 60 plus Department of the Army civilians and a number of military were employed in AVSCOM's Theater Aviation Maintenance Program (TAMP). You may recall that earlier in this article, I touched on the value of new ideas. The unparalleled success of AVSCOM's TAMP in Saudi Arabia and the United Arab Emirates is a striking example of business as usual and quickly executing a smart concept when the time is right.

The Army Science Board evaluated logistics support during Operations DESERT SHIELD/STORM and reported to me last October. In their report they openly state their "respect and admiration for the superb performance of the logistics community during the Gulf war." They commend the "refreshingly innovative approaches to difficult maintenance problems", cite the TAMP as a primary example, and conclude that "the professionalism of the Army's logisticians, uniformed and civilian, was evident and worthy of commendation."

We weathered the DESERT STORM in superb fashion. Weathering the storms that lie ahead will pose even greater challenges. The build down of the Army, budget reductions, a perception in the eyes of some that we may no longer have a major enemy, that national defense is not as important now that the Cold War is over, may prove to be much more of a challenge than the conflict in SWA. This year's symposium offers the opportunity to build upon the successes of our Gulf experience and to work together towards solving the complex challenges that we face in the future. IIIII

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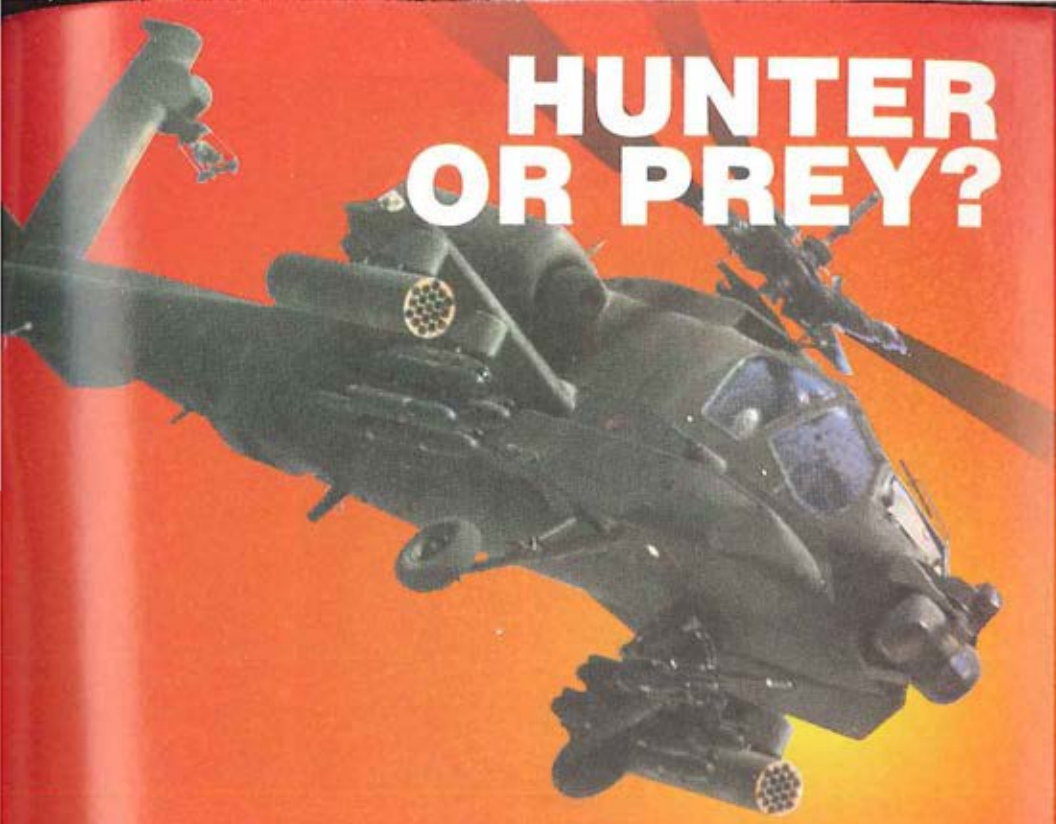

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Mr. Sung Taik Yeo
Mr. Duk Bin Yim
Mr. Sun Doo Yoon
Mr. Yong Koo Youn
PFC Clarence K. Young
PFC Rodney Young
SPC Michael S. Zinanni
SPC Dennis J. Zuger

NORTH TEXAS CHAPTER
DALLAS/FORT WORTH

Mr. Ray L. Beutel
Mr. Billy D. Chambers
Mr. John T. Comte
Mr. Fred A. Cullum
Mr. Bob King
Mr. Michael Robertson

OLD TUCSON CHAPTER
MARANA, AZ

WOC Richard R. Casper

PHANTOM CORPS CHAPTER
FORT HOOD, TX

CPT Richard A. Howell
SGT Gary F. Lester

1SG Phillip L. Newton
MAJ Ed R. Stephenson

RHINE VALLEY CHAPTER
MANNHEIM, GERMANY

SFC Damon O. Edwards
Mr. Peter M. Noyes

SAVANNAH CHAPTER
FT. STEWART/
HUNTER AAF, GA

Mr. Terry L. Bolling
CPT Timothy L. Childrey
SGT Marvin L. Meeks
Mr. Carlisle Vason

SOUTHERN CALIFORNIA
CHAPTER
LOS ANGELES, CA

Mr. Gilbert W. Speed

TAUNUS CHAPTER
WIESBADEN, GERMANY

CW2 Clair W. Smart

TENNESSEE VALLEY
CHAPTER
HUNTSVILLE, AL

Ms. Sandra H. Denton
Mr. Sy Peckins
Mr. Richard E. Turner

THUNDERHORSE CHAPTER
FULDA, GERMANY

1LT Douglas S. Miller

WASHINGTON DC
CHAPTER
WASHINGTON, DC

CW3 Mitchell A. Lannius
CPT John J. Maher, Jr.

MEMBERS WITHOUT
CHAPTER AFFILIATION

Mr. Dick Detra
Mr. Daniel J. Hawkins
CPT Scott A. Jacobsen
CW3 John Langione, Ret.
WOC Robert N. McClure
Mr. Robert G. Mencer, Jr.
SSG Paul Y. Soriano
Mr. James Stawitzky
Mr. Gordon L. Treichler
CPT Grant E. Zachary

ARMY AVIATION ASSOCIATION OF AMERICA (AAAA)

49 RICHMONDVILLE AVE., WESTPORT, CT 06880 • PHONE: (203) 226-8184 • FAX (203) 222-9863

Please check one: ☐ Change of Address; ☐ New Membership Application

I wish to join the Army Aviation Association of America (AAAA). My past or current duties affiliate me with U.S. Army Aviation and I wish to further the aims and purposes of the AAAA. I understand that my membership includes a subscription to the AAAA-endorsed magazine "Army Aviation", and that my membership will start on the subsequent first of the month. Contributions or gifts to AAAA are not deductible as charitable contributions for federal income tax purposes. Dues payments are deductible by members as ordinary and necessary business expenses.

Rank/GS Grade _____ First Name _____ MI _____ Last Name _____ Sex _____

Mailing Address _____

Mailing Address _____

City _____ State _____ Zip + 4 Code _____

Active Duty or Civilian Job Title and Unit or Firm Name _____

( ) _____ ( ) _____

Area Code Office Phone Area Code Residence Phone

Consent: ☐ I do ☐ I do not consent to the publication or release of the above information to third parties.

Signature _____ Date _____

Nickname _____ Spouse's Name _____

Date of Birth (Mo/Yr) _____ Social Security No. _____

AAAA ANNUAL DUES

Applicants other than those listed below:
( ) 1 yr, $21; ( ) 2 yrs, $39; ( ) 3 yrs, $57
Full-Time Students; Enlisted; WOCs; GS-8 DACs & Below; Wage Board 12 DACs & Below:
( ) 1 yr, $14; ( ) 2 yrs, $25; ( ) 3 yrs, $36
Add $5 per year if you have a foreign, non-APO address.
Add $15 if your check is drawn on a foreign bank.

☐ Check enclosed payable to "AAAA" or charge to:
☐ AMEX ☐ Diners Club ☐ Mastercard ☐ Visa

Card No. _____

Amt $ _____ Exp. Date _____

Signature: _____

Date: _____

Check (✓) Your Professional Qualification:

( ) Army Active Duty
( ) DA/DOD Civilian
( ) Army Nat'l Guard
( ) Army Reserve
( ) Army Retired
( ) Other US Military Service
( ) US Defense Industry
( ) Consultant
( ) Publishing/Other Aero.
( ) Foreign Military Service
( ) Foreign Defense Industry
( ) Other _____

Are you a former AAAA member? ☐ Yes ☐ No

If yes, what year did you join? _____

Chapter Affiliation Preferred _____

Print Name of Recruiter _____

MSG Bae Does it Again— Third Year in a Row!

MG Benjamin L. Harrison, Ret., AAAA Senior Vice President and Vice President Membership, announced that MSG John H. Bae, Ret., Vice President Renewals, Morning Calm Chapter, ROK, has won the Calendar Year 1991 "Top Gun" award. This award is given annually to the member who sponsors the greatest number of new members during the contest year ending 31 December.

MSG Bae, who placed first last year with 309 members, continues his trend with an astounding 502 members in 1991. MSG Bae wins an expense-paid trip to the AAAA Annual Convention in Atlanta, GA, including airfare, hotel accomodations, registration, tickets to all social functions, and a $300 cash award. He will receive a plaque at the AAAA Membership Luncheon, 11 April 1992.

CW3 Roger K. Garner placed second with a 467 member effort; 2LT Thomas S. Turman produced 232; CW4 Butch Daniel had 88; CPT Martin T. Carpenter came through with 64; CPT William J. Davisson, 56; CW2 Berend J. Voute, 49; and CW2 Gregory A. Wood produced 45. All of the above are members of the Army Aviation Center Chapter at Ft. Rucker, AL.

1991 Chapter Membership Contest

At the close of the Calendar Year 1991, the following AAAA Chapters had achieved the following standings in the "Chapter Membership Enrollment Program":

"AAAA Chapter" category (25-115): The Redcatcher Chapter, Nurnberg, Germany, won with a net gain of 26 members. Wings of the Devil Chapter, Ft. Polk, LA, came in second with a net gain of 21, placing Thunderhorse Chapter, Fulda, Germany, in third position with a gain of 16.

"Senior Chapter" category (116-230): Ft. Bragg's Iron Mike Chapter led the way with a net gain of 21 members. In second place was Hanau Chapter, Hanau, Germany, with 18 members. Third place saw the Leavenworth Chapter, Ft. Leavenworth, KS, with a net gain of 2 members.

"Master Chapter" category (231 or more): Army Aviation Center Chapter, Ft. Rucker, AL, took first place with a phenomenal net gain of 1,013 members. Morning Calm Chapter, last year's Master Chapter winner, claimed second place with a net gain of 286 members. Coming in at third place was the Air Assault Chapter, Ft. Campbell, KY, with a net gain of 83 members.

The Presidents of the three winning chapters will receive plaques at the 11 April 1992 Membership Luncheon at the Annual Convention, St. Louis, MO.

New AAAA Chapter Officers

America's First Coast:
CW4 William R. Halevy (Pres); SSG Christopher Wolfla (VP, Memb. Enroll)

Black Knights:
CPT Michael S. Knapp (Secretary)

Corpus Christi:
COL Thomas E. Johnson (Pres); LTC Peter A. Marchiony (VP, Memb. Enroll); Lew Stoops (VP, Prog); COL Christopher M. Guppy (VP, Memb. Renew); Martha Colmenero (VP, Pub)

Greater Chicago:
LTC John A. Arends (VP, Programs)

Minuteman:
CW2 Timmy L. Tompkins (Pres); CW3 John C. Healey (Sr VP); SGT Carlos O. Ramos Rivera (Secy); CW2 Paul A. Albertson (Treas); MAJ Paul M. Stites (VP, Memb. Enroll); SGT Kelly R. Cole (VP, Memb. Renew); LTC William H. Smith (VP, Prog); CW2 Jerry M. Frey (VP, Pub)

Redcatcher:
LTC Kenneth D. Pankey (Pres)

Stuttgart:
CPT Jeffery Chaplin (Sr VP); CPT Joseph Creekmore (VP, Membership)

Talon:
MAJ Michael J. Captain (President)

Thunderhorse:
CW2 Steven D. Scott (Treas); SFC Randy S. Lucas (VP, Memb. Enroll); 1LT John Reynolds (VP, Memb Renew); SGT William E. Pearce (VP, Enlisted Affairs)

USAREUR Region:
COL Gregory T. Johnson (President)

AAAA NEWS

New AAAA Sustaining Members

City of Russellville
Russellville, KY

Clarksville Tire & Auto Center
Clarksville, TN

Conroy, Marable, Hoffman Real Estate, Inc.
Clarksville, TN

E.T.'s Barber Shop
Clarksville, TN

Farmers & Merchants Bank
Clarksville, TN

Jenkins-Wynne Ford
Clarksville, TN

Joy's Jewelers
Clarksville, TN

Key Airlines, Savannah International Airport
Savannah, GA

Kim's Custom Auto Trim & Muffler
Clarksville, TN

Logan Memorial Hospital
Russellville, KY

Maria's Ranch
Clarksville, TN

Oak Grove Animal Hospital
Oak Grove, KY

Packaging Mailing Services
Clarksville, TN

Ramada Inn, Riverview
Clarksville, TN

Ringgold Barber Shop
Clarksville, TN

Sound Shop
Clarksville, TN

Southern Deposit Bank
Russellville, KY

Spiceland's Auto Sales
Clarksville, TN

USPA and IRA
Clarksville, KY

Wal-Mart
Clarksville, TN

AAAA offers $108,000 in 1992 Two scholarships now open to upperclassmen May 1 Deadline

■■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:

The applicant must be attending an accredited college or university for Fall entry as a Freshman, Sophomore, Junior, or Senior as a full-time student. No recipient can hold concurrent AAAA Scholarships. 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.

DON'T GET SHUT OUT OF THE 1992 ATLANTA AAAA CONVENTION — APRIL 8-12

Delta Airlines has been selected as the designated carrier for the AAAA Annual Convention in Atlanta, GA.

The reduced fares to and from Atlanta will be 40% off Coach Class or 5% off the lowest Super Saver. These apply to advance purchase requirements of the applicable fare.

To make your seat reservations ($100,000 free insurance, convention mileage, seat assignments, boarding passes), call **Travelmation**, our official agency, or call **Delta** directly.

TRAVELMATION (800) 753-6661
—or—
Delta Airlines 1-800-241-6760
(Cite File #H0536)

The savings apply to reservations on Delta flights between Sunday, April 5 and Wednesday, April 15, 1992.

AAAA CALENDAR

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

February, 1992

- **Feb. 1.** AAAA National Awards Committee Meeting to Select CY91 National Award Winners.
- **Feb. 4.** Lindbergh Chapter Professional-Social Meeting. Stouffer Concourse Hotel.
- **Feb. 5-6.** 18th Annual Joseph P. Cribbins Product Support Symposium sponsored by the AAAA Lindbergh Chapter. Stouffer Concourse Hotel, St. Louis, MO.
- **Feb. 13-23.** Chesapeake Bay Chapter European Skiing Trip to Innsbruck, Austria.
- **Feb. 22-23.** Rhine Valley Chapter 10/20 Km march. Volunteers needed.

April 1992

- **April 8-12.** AAAA Annual Convention, Georgia World Congress Center, Atlanta, GA.
- **April 8.** AAAA National Executive Board Meeting, Georgia World Congress Center, Atlanta, GA.
- **April 9.** AAAA Scholarship Board of Governors Annual Meeting, Georgia World Congress Center, Atlanta, GA.

May 1992

- **May 7-8.** USAREUR Region Aviation Branch Ball and Professional Conference, Patrick Henry Village Officers Club, Heidelberg, Germany.

AAAA Honorary Members

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

BG Henry A. Kievenaar, Jr.
MG Barry R. McCaffery
BG Robert W. Roper
Savannah Chapter
MG William S. Chen
Tennessee Valley Chapter

2 for 1 Offer

AAAA now offers a two year membership for the price of one for all first-time new members.

Join the professionals! Join AAAA.

See membership application on pg. 76.

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