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AVIATION DIGEST

In this issue:

Division 86 ACAB

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Army Aviation Officer
ODCSOPS, Headquarters,
Department of the Army

★★
Major General James H. Merryman
Commander
U.S. Army Aviation Center
Fort Rucker, Alabama

★
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Deputy Commander
U.S. Army Aviation Center
Fort Rucker, Alabama

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Inside Back Cover: **ATC Action Line**

Cover: **Helicopter design and combat readiness, both characteristic of Army aviation's expanded role as a combat arm, is depicted through the various images on this month's cover. The lead story, prepared by Major General Merryman, begins on page 2 following General Starry's introduction. Cover art by Fred Martin**

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Missed your "S" Model Cobra Series Update? Write to us for your copy: Aviation Digest, P.O. Drawer P, Ft. Rucker, AL 36362.

Richard K. Tierney
Editor

The mission of the *U.S. Army Aviation Digest (USPS 415-350)* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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Articles, photos and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Fort Rucker, AL 36362.

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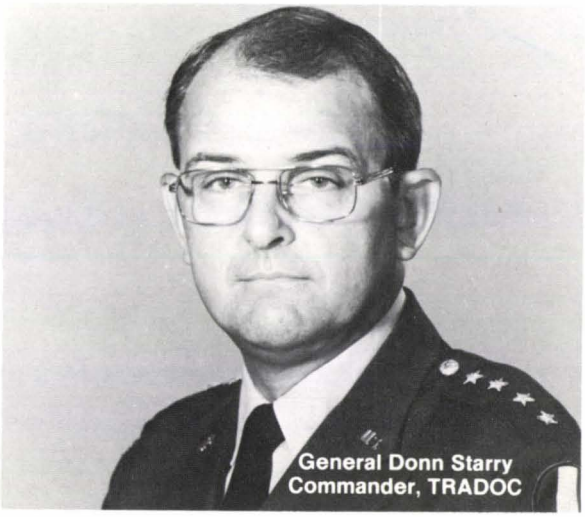
THE U.S. ARMY Training and Doctrine Command is involved in the most comprehensive force structure study in more than a decade. We call it Division 86 and it should have a significant impact on the Army into the next century. Division 86 is expected to yield several important products including a transition plan for the introduction of our new advanced systems, a basis for resource decision and a refined methodology for future force structure and force development. Thus far TRADOC analysis has centered on the heavy division; however, it also will include developing the force structure for the light division and the corps.

One of the objectives of Division 86 is to organize Army assets into the most capable fighting force for the 1980s. It will do this for aviation as well as the ground elements of the Army. An analysis of the roles that aviation will play as a result of acquiring systems with greater capabilities indicates that the current aviation force structure does not fully exploit new system capabilities. Further, the Army Chief of Staff's recent decision on the commissioned aviator career pattern and the establishment of aviation as a combat arm dictates that the Army must modify aviation force structure if Army commissioned aviators are to have the same career opportunities as commissioned officers of other combat arms and aviation elements of our other military services. The following article discusses this new proposed organization.



General Donn Starry
Commander, TRADOC

AIR CAVALRY ATTACK BRIGADE

Division 86's Aviation Organization

Major General James H. Merryman
Commanding General
U.S. Army Aviation Center and Fort Rucker
Fort Rucker, AL

The Air Cavalry Attack Brigade (ACAB) is designed to maximize the capabilities of aviation within the division. In addition it will provide a future for the commissioned aviator by giving him a career pattern similar to the other combat arms and aviation organizations of the other military services.

DIVISION 86 force structure design is a challenging task considering the complexity of the battlefield and the introduction of numerous new high technology systems. The U.S. Army Aviation Center (USAAVNC) is deeply involved with the other participants in analyzing in detail the battlefield of the future and refining divisional organizations designed to fight on that battlefield.

The Aviation Center is working directly with the Armor Center, the Infantry Center, the Transportation Center, the Intelligence Center, and other aviation doctrine and service support organization proponents to design the best possible force structure. The Combined Arms Center at Ft. Leavenworth, KS, is conducting the force structure tradeoff analysis to help balance the division force.

Even before Division 86 was fully under way, new organizational ideas for future aviation force structure were emerging. In an interview printed in the *Aviation Digest* (November 1978), General Donn Starry, Commander of the Training and Doctrine Command, said, "I don't know whether we can afford to have both air cavalry and attack helicopter units. I tend to believe what we really ought to do is build our aviation units with enough scouts and attack helicopters so that we can tailor them—task organize for a cavalry type mission, then, later employ the unit as an attack helicopter unit by reconfiguring ordnance loads and task organization.

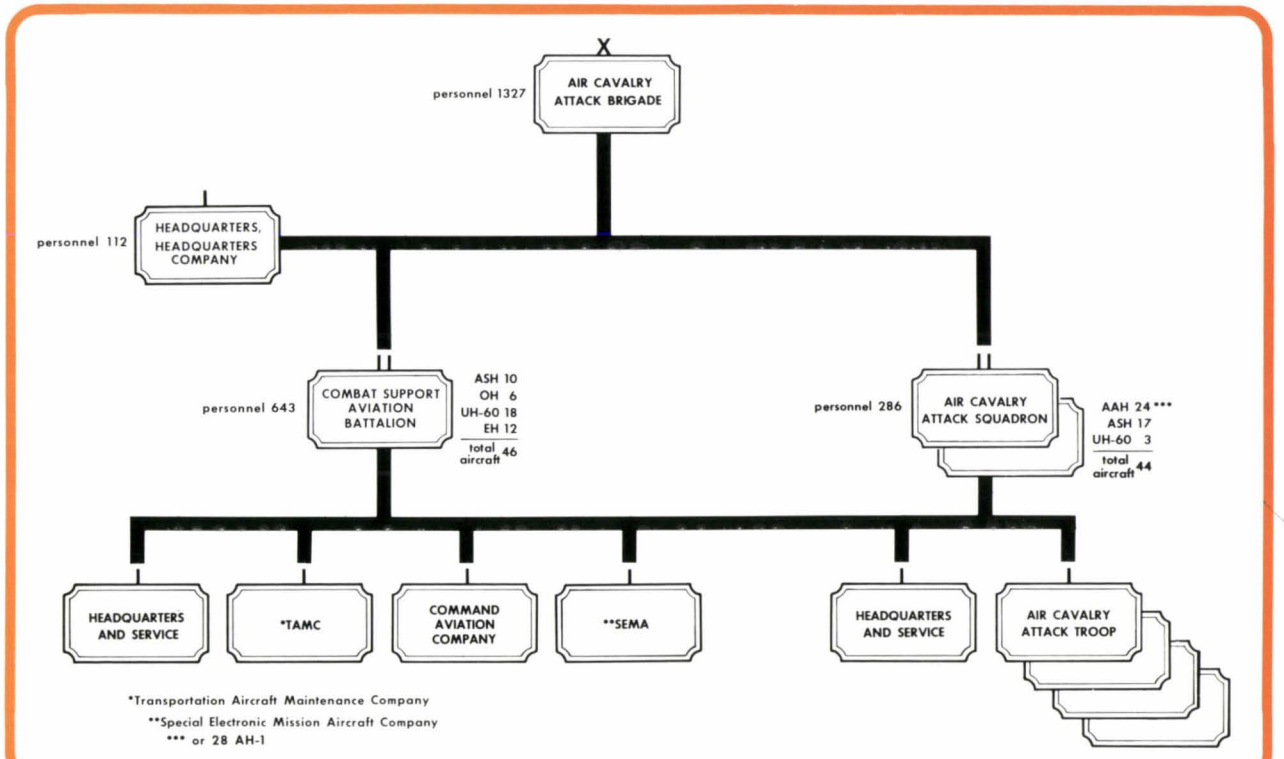


Figure 1

"I find it completely reasonable that an attack helicopter squadron could be employed on a flank security mission this afternoon, with lots of scouts and not very many attack birds, and tomorrow morning go out in massed attack with a few scouts and lots of attack birds. So it may be that what we need to do is change our doctrinal approach to the way we employ our aviation units, the way we organize for combat, and the operational concept that we use in the employment of our aviation units."

The air cavalry attack troop described by Major (then Captain) Gordon E. Sayre in articles appearing in the same issue of the ***Aviation Digest*** and in that month's ***Armor*** magazine was designed specifically for the dual mission mentioned by General Starry.

The idea of the dual mission, along with a recognition of such advantages as increased extended range attack helicopter firepower and more efficient tactical employment and maintenance guided our thinking towards a Division 86 organization that consolidates all division aviation into a brigade-size force. This exciting organization is called, not surprisingly, the Air Cavalry Attack Brigade, or ACAB (figure 1). Its mission is to:

- Find, fix and destroy enemy armor and mechanized forces.
- Provide command control and liaison.
- Provide aerial assets to the divarty and the other maneuver brigades.

To perform its mission, several variations of the ACAB are being considered with differing numbers and types of aircraft. Common to each variation, however, is a brigade headquarters, two air cavalry attack squadrons and a combat support aviation battalion.

The air cavalry attack squadrons (ACAS) are the combat elements of the brigade. The two ACASs perform the dual mission of both air cavalry and attack helicopter organizations. The ACAS provides highly responsive antitank firepower for both the heavy and light division. Consisting of a headquarters and service troop and four air cavalry attack troops (ACAT), the ACAS fights using nap-of-the-earth flight techniques, stealth, and fire and maneuver in concert with other members of the combined arms

team. The squadrons have their own limited combat support and combat service support capability.

The combat support aviation battalion (CSAB) provides:

- command, control liaison aircraft in general support of the division,
- field artillery aerial observer aircraft for the divarty,
- special mission electronic aircraft (electromagnetic and imagery intelligence) in support of division intelligence/target acquisition units,
- both ground and aerial logistic support to all ACAB organizations, and
- aviation intermediate maintenance to all ACAB organizations.

The CSAB consists of a headquarters and headquarters company, command aviation company (CAC), special electronic mission aircraft (SEMA) company, and a transportation aircraft maintenance company (TAMC). The CAC provides the general support (C^3) aircraft for the division and aerial logistical support to the ACAS until the ACAS ground support system becomes operational. The SEMA company provides a significant improvement in both target acquisition and information gathering capability for the division. The "beefed up" TAMC provides the intermediate-level aviation maintenance for all ACAB organizations.

Not only does the ACAB maximize the combat effectiveness of the combined arms team but it also provides us an extremely important additional bonus—a career progression for aviation officers similar to that now followed by other combat arms (Armor, both Artilleries and Infantry) officers. The comparison in figure 2 of command levels and commonly associated rank illustrates one facet of the aviator's command problem of previous years.

With majors commanding aviation companies, aviation captains either competed for command of other combat arms organizations or fell behind their contemporaries. This inequity may well be reflected in the results of recent promotion selection boards. Further, *now that aviation is an entry specialty and a fullfledged combat arm the commissioned aviator will not have an opportunity to command an organization of a different combat arm.*

When the typical Army aviation company is compared with Air Force and Marine similar organizations, it becomes apparent that we have expected more from our Army majors than our other military services ask of their lieutenant colonels (figure 3).

Back in the fifties we organized our first divisional aviation company with *22* aircraft. It was about the size of an Air Force squadron, but we called it a company and put a major in command. In 1962 we created an air cavalry troop with *27* aircraft with a major in command. We fought the Vietnam War with assault companies of *31* aircraft commanded by majors and most recently have created attack companies of *36* aircraft still commanded by majors. Said another way, in the past 25 years, *we have nearly doubled the number of aircraft that we expect an Army major to command—this during a period of ever-increasing sophistication and complexity of aircraft and missions.*

The proposed ACAB corrects many inequities. It modifies the size of Army aviation organizations so that they are more comparable to aviation organi-

Figure 2

INFANTRY / ARTILLERY / ARMOR (command level - rank)	AVIATION (command level - rank)
Platoon - Lieutenant	Platoon - Captain
Company/Battery/Troop - Captain	Company/ Troop - Major
Battalion/Squadron - Lieutenant Colonel	Battalion /Squadron - Lieutenant Colonel

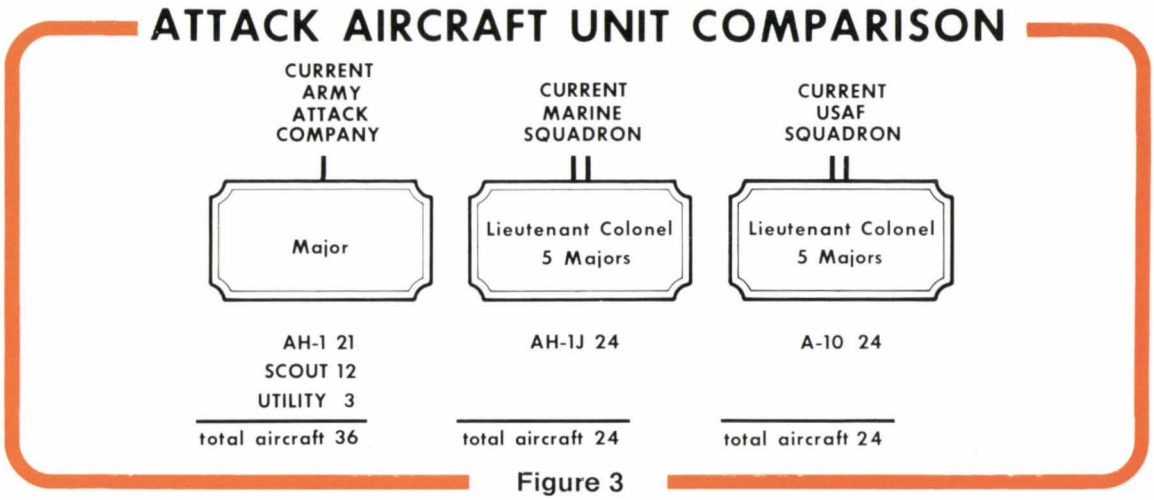


Figure 3

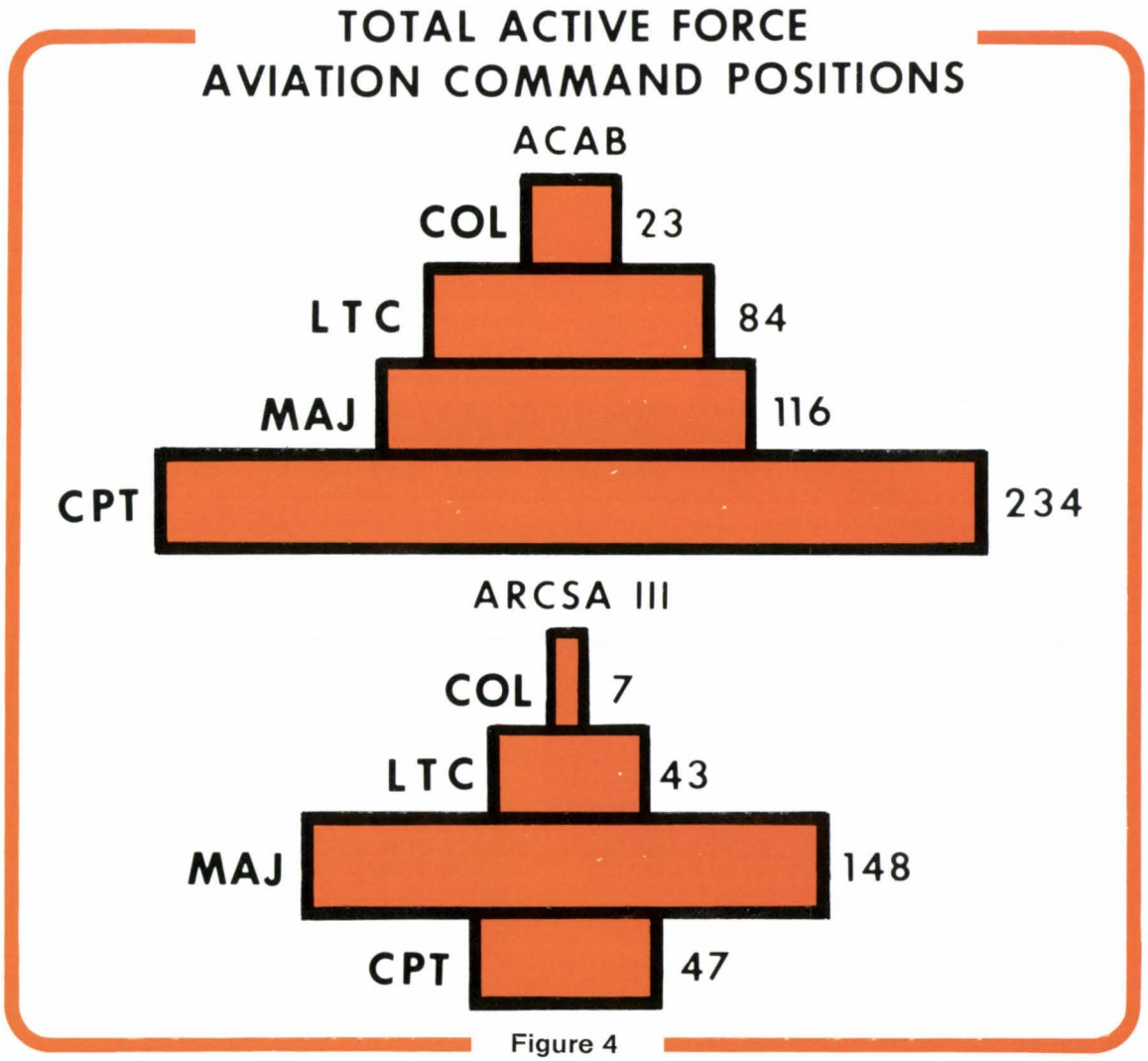
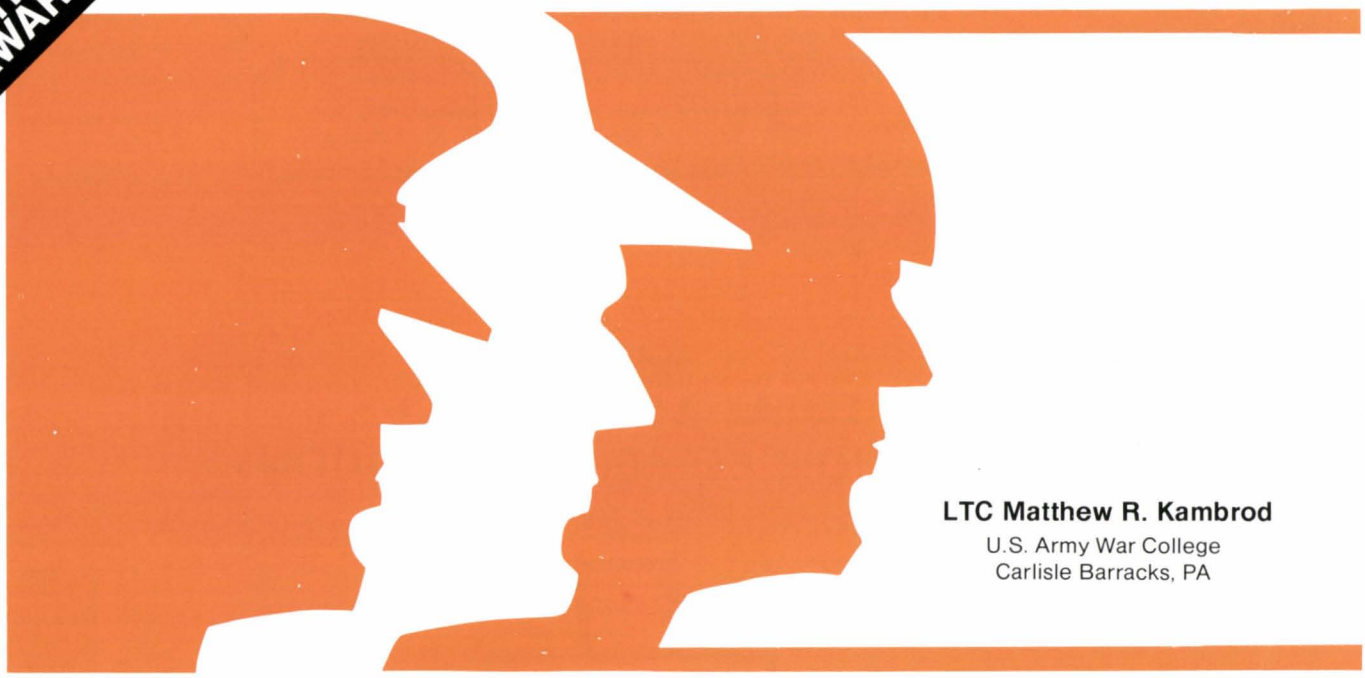


Figure 4

zations in the other military services and provides career progression opportunities for the Army aviator similar to those of other combat arms. A comparison of current opportunities for aviation command with those provided by the ACAB is shown in figure 4.

In summary, the ACAB will make better use of limited resources and will provide a unique opportunity to enhance the combat effectiveness of our divisions. Simultaneously, it will establish a much needed viable career pattern for commissioned aviators.

MONTHLY WRITING AWARD



LTC Matthew R. Kambrod
U.S. Army War College
Carlisle Barracks, PA

ONE OF MY favorite Robert Kennedy quotations addresses the realms of possibility when it suggests that:

"Some men see things as they are and say, 'why'? I see things as they never were and say, 'why not'?"

Results of the recent selection board choosing eligible captains for promotion to major were particularly disconcerting to me as they applied to aviators. For 21 months as a battalion commander I preached the merits of the aviation program to my junior officers, including as an argument for retention, the growing need for specialists in the Army, and the growing dependence on specialists (Officer Personnel Management System) to assure our ability, particularly in the aviation field, to assist the commander in the conduct of sustained ground operations. The selection of a relatively small group or percentage of eligible aviators, in view of my held position espousing the existence of a sound professional future for junior aviation officers, truthfully set me aback. In a deep personal sense I felt the system had to some degree failed us.

Further introspection into what I see as a major personnel promotion problem now and in the future, i.e., the promotion potential of aviation officers, made me question the rationale for the low selection rate. With virtually no contact with promotion boards, but with some understanding of which positions are essential to career progression, I tied the key reason for nonselection of aviators to be lack of command experience in the company grades. In view of strong, competitive, nonaviator candidates having had command of perhaps Infantry companies, Armor troops or Field Artillery batteries, rationale for nonselection becomes quite obvious. Should we accept that as a given, the question then becomes not one of whether the system let us down, but rather what can be done to improve the probability for selection in subsequent iterations of promotion board meetings.

There are at least two viable options with which to address this problem.

The first, one with which I continually grapple in amazement, is what I view as being tied to the necessity for full recognition by senior ground commanders at the highest levels that Army aviation, not air cavalry in itself, not OV-1 Mohawk recon outfits on their own, not combat service support aviation units of themselves, and not the individual slicks which daily shuttle people and supplies to field locations, but rather the composite aviation force structure is an integral part of the combined armed team. Its officer force structure is clearly no better and no worse in quality or expertise than any other specialty field in our Army and, clearly, just as deserving of promotion. Once this is accepted as imposed (if need be) philosophy, I can begin to see a flicker of light at the end of the tunnel.

What will such recognition do for us? Again, at the highest levels, it can be the basis for special guidance to promotion boards. Such guidance probably will ease some pain. Properly couched it might force recognition that company command should not be used as a discriminator when a significant percentage of contenders for promotion have not even had the opportunity to command in their respective specialty—aviation—because of existing table of organization and equipment (TOE) requirements for a major. Consideration to this extent would have to be given in the

"Why Not"

The opinions expressed in this article are those of the author and are not necessarily the views of the Department of the Army nor the U. S. Army Aviation Center

same context as if one were considering a minority group of one type or another. I feel Department of the Army has an obligation to ensure equity lest we find ourselves being intellectually dishonest.

Frankly speaking, however, special guidance to a promotion board remains a temporary fix and does not appear to be a strong solution to the officer aviator promotion problem.

I submit a second option, that of bringing the aviation force structure's TOEs in line with the rest of the Army. I'm suggesting reducing the grade requirement for command of aviation companies from major to captain. Perhaps my strongest argument favoring this change rests in the fact that in many units, assault companies and air cavalry squadrons, captains have and are, commanding companies and doing it quite effectively. Recalling even the war years would result in one's remembering companies in daily contact with the enemy and commanded by senior captains. If we did it then, in war—are doing it now, in peace—why not put a seal of approval on the program and get on with the business of the day? The proposal is simple, but there are too many sacred cows we've lived with for years guarding the gatepost to change. Let's look at some of these.

"The aviation business is complex. Our aircraft are highly sophisticated. It takes enormous maturity and experience to command the full spectrum of resources associated with management of aviation assets. Clearly, it demands a major." I could drop back and say that captains have done it well. I'd rather point to the fact that even majors commanding companies in Vietnam were, because of rapid promotions associated with the war effort, many times younger than today's senior captains.

"But yesterday's majors were seasoned in combat," you'd say. True, in some cases. In many cases, however, many of Vietnam's O4 aviation company commanders were newly arrived in country, on their second tour, the first which saw them serving in ground assignments. Preparation for command was too often a function of merely completing flight school. In my view, the senior captains on their second flying tours were far better and safer bets. Today, we watch our officer aviators enter the program as lieutenants and gain early crucial experience on the hangar floor or in a landing zone rather than by an artillery tube. By the time that young lieutenant is a senior captain, we'll find a seasoned, mature officer aviator, fully cognizant of the capabilities of both those who fly and those who maintain the machines. This obviously will not be the case with every captain in the program, but clearly with some. This leads to my next point.

The assignment of captains to command aviation companies necessarily must be controlled to the extent one would control any assignment to key positions. Company command need not be controlled by Department of the Army, but certainly by the battalion commanders in the field, perhaps the ones most able to make such adjudications. They should select one of their senior, most experienced, and most talented captains for command of their companies, perhaps in concert with United States Army Military Personnel Center when appropriate. In a sense this is not a problem, since battalion commanders, command selected by HQDA, have already proven their relative

abilities to manage personnel and would seldom be prone to do otherwise than select the best.

What of complexity and sophistication of equipment? I sometimes wonder if we don't like to beat our chests to a fault on this one. If we were to look into the Armor specialty and assess the complications of leading and managing Armor units, particularly with new tank systems, we might find the demands on the aviation company commander equivalent to the troop commander in difficulty and responsibility. I'm also reminded at this time of the many first lieutenants now serving as field artillery battery commanders who are responsible for extremely complex equipment and highly skilled technicians associated with nuclear weapons. Challenging? Taxing? *Clearly so, and done today by lieutenants.*

Perhaps the complexity and sophistication issue is yet tied to our perceptions of aircraft operations by our Air Force counterparts. Perhaps the F-4 or F-15 will equate to the advanced attack helicopter in advanced systems and complexity. Perhaps our contention or belief in sophistication of systems is tied to years of awareness and semimystique associated with operating complex Air Force weapons platforms. Perhaps also, we should remind ourselves that daily flights of five Air Force F-4s will depart under the command of a first lieutenant with virtually no trepidation by a squadron commander. Five UH-1s normally are what an assault platoon will employ on lift operations today. If an Air Force lieutenant can handle five F-4s, can we not expect similar results from our Army aviator lieutenants? A case can be made herein for the standard reduction in grade in a company commensurate with diminishing command responsibility.

Another argument frequently presented favoring major commanders lies in the belief that operating 20 or more aircraft under one's command on a numerous variety of missions—to include operations on the federal airways—demands possession of a broad spectrum of technical expertise. This may be true. It's my contention, however, that the mechanics of operating aircraft in any environment is fundamentally a function of training received at the training base. We must accept as a given that officers and warrant officers have learned to operate aircraft. Guidance and parameters within which we can operate those aircraft are plentiful. Continual study of Federal Aviation Administration regulations, Army regulations and associated material increase the professional knowledge of the aviator in the same context as flying itself. My point is that once a reasonably broad scope of knowledge is gained by officer aviators, be they majors or captains, it then becomes leadership and common sense that guides their units, not an interminable amount of expertise in the FARs. Little difference exists herein between senior captains and junior majors. One serves as well as the other.

Company commanders have a great deal of assistance in the execution of their duties. Their officers are an invaluable asset and the professional corps of aviation warrant officers of today are better than ever in their field. Their standardization officers, their safety officers, their senior warrant officers are always there to advise and assist, and at this they have proven extremely beneficial. With all this, captain company commanders have an armada of technical assistance, their own staffs, to advise them when the need exists.

We need to carry the discussion one step further in this area. The battalions are commanded by lieutenant colonels and other field grade staff officers comprising the battalion staffs. These officers administer to the companies. The true functions of the battalion commanders are not only to lead, but also to train the battalions, in large part through teaching. If battalion commanders are involved in the tutorial aspects of commanding their battalions, they clearly can guide the direction of their senior captain commanders of one of their companies. Again, the proof of success exists in the system today; it is not an unknown with which we are dealing.

Mechanically and unfortunately, such a change would take time. "Should it be done?" is a question others will assess. From my standpoint, I have tremendous confidence in our senior captain population. I also have infinite confidence in the professionalism of our warrant officers in our tactical aviation units. Together, with proper battalion command supervision, we do have the potential to revise the structure as discussed.

Quite candidly, I'm not satisfied with developing or retaining an aviation grade structure dissimilar from the rest of the Army. Today, with our lieutenant pilots coming on board without 2 years of ground duty we have the capability for the early acquisition of essential expertise at company level. This assures that at the point in time when a company is available, that senior captain, well trained by that time in aviation resource management, can fill the TOE position and command effectively. Likewise, and of comparable significance, our captains will be competitive for promotion with the rest of the Army.

There's an interesting aspect of human nature with which we're all familiar. It deals with the basic reluctance of people to change situations with which they are completely comfortable. The question which needs to be asked is, can a change improve our posture without adverse impact to the aviation program? To the extent that we can answer yes, then the next logical question is Robert Kennedy's ". . . why not?"

Directorate of Evaluation/Standardization

REPORT TO THE FIELD

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call AUTOVON 558-6487 or commercial 205-255-6487 and leave a message

The Warrant Officer . . . The Who?

IDENTITY CRISIS! Remember that one? People were quitting their jobs, "dropping out," retreating to the wilderness, seeking those solitary havens where they could meditate by the proverbial babbling brook—all searching for the mystical, illusive "self."

They could, however, claim no monopoly, nor originality, on the problem of understanding oneself or their station in life. Take warrant officers, for instance. When was the last time you tried to explain their job to someone outside (or inside, for that matter) the Armed Forces community; or read a book about them; or saw a war movie actor portray a warrant officer character (OK! OK! So Brian Keith played "Mister Warrant Officer Senior Grade Nace" in "Suppose They Gave a War and Nobody Came?")

Yes, warrant officers, their reasons for existing and the roles they play have long been the subject of debate and indecision. No one understands exactly who, or what, they are—or do they?

The rank of warrant officer has been around much longer than most of us realize. It was an established and honored position in the navies of many seafaring nations predating the existence of the United States. Reportedly, Napoleon's armies used warrant officers as intermediaries between the commissioned officers and the "men in the ranks." In our revolutionary Navy, on 23 December 1775, John Berriman was appointed warrant officer on the ship *Andrea Doria.* The United States Coast Guard has used warrant officers continuously since 1790, the United States Army since 1918.

An argument may be supported that given an entity that has endured over several centuries and has played an important role in those organizations of which it was a part, its functions and the need for its existence would be solidified and well established. Surprisingly, until the very recent past, warrant officers have been excluded from this assurance of status quo—even though they most assuredly had met the criteria.

While the United States Navy and Coast Guard seem to have escaped some of the more proliferated instability, due perhaps to experience gained from other navies before them, the history of the warrant officer in the United States Army has been one of considerable turbulence and uncertainty. It has been shaken by periodic upheavals of controversy over the *need* for the Warrant Officer Corps, fueled by certain elements that advocated the elimination of the grade

structure altogether. It has been subjected to masses of sometimes conflicting legislation attempting to concrete its intent and purpose. It has even witnessed periods of neglect; left to stagnate in doubt and dormancy for years on end.

The functions of Army warrant officers have run the gauntlet of extremes, as well. Their jobs have ranged from field clerks to junior commissioned officer duties, to mine planters to nuclear missile technicians.

The warrant officer ranks have been used as incentive and reward for the senior noncommissioned officer that had served long and faithfully; as a preretirement pasture for the commissioned officer that was no longer qualified to continue in commissioned status and as a safety net for selected commissioned officers during a reduction in force.

Even the warrant officers pay grades could not evade such up-the-down-stairs confusion as this; to wit: three grades were initially established in 1918, brought down to one in 1920, raised up to two in 1941, then to four in 1949, and a proposed six in 1967.

Not only were the warrant officers wrestling with an identity problem, but they also were prime candidates for the endangered species list. As late as 1951 a Defense Department committee recommended elimination of the warrant rank from all the branches of the Armed Forces and to replace it with a "limited duty officer program." The Army refused. Instead, it elected to conduct an in-depth study on the subject to determine for itself whether or not the warrants had a valid place in the Army. This decision actually resulted in two studies being accomplished, the second of which was completed in 1954.

After an additional 2-plus years of pondering and modifying the completed studies, the Army published its decision. Finally, in January 1957, 39 years after becoming part of the United States Army, the warrant officers were defined, their roles established and the present and future needs for their services confirmed by official written Army doctrine. The new concept stipulated that "the warrant officer is a highly skilled technician who is provided to fill those positions above the enlisted level which are too specialized in scope to permit the effective development and continued utilization of broadly trained, branch-qualified commissioned officers."

Fortified by the growing complexity of Army machinery and equipment, the need for highly specialized technicians had put the warrant officers' footing on solid ground. It had now become virtually impossible to absorb personnel from the commissioned or enlisted ranks into the warrant structure unless they were properly trained and qualified. Thus, the old philosophy of using the warrant corps as incentive, reward or catch-all had been abandoned, hopefully for all time.

The years following the landmark decision of 1957 have been dynamic for Army warrant officers. Although some change continued to take place, this time the change was meaningful, well directed and resulted in clearing the issues, instead of clouding them. In 1960, DA Circular 611-7 was published outlining the Warrant Officer Program, further clarifying warrant officer policies. DA level studies were commenced in 1966 to develop a formal Warrant Officer Career Program. This resulted in the birth of the Aviation Warrant Officer Intermediate Course (AWOIC) and Aviation Warrant Officer Advanced Course (AWOAC). The first classes began at the U.S. Army Aviation Center, Ft. Rucker, AL in 1969. In 1973, these two courses were redesignated the Aviation Warrant Officer Advanced Course (AWOAC) and the Warrant Officer Senior Course (WOSC), respectfully. All aviation related materials were deleted from the senior course and, in effect, it became branch immaterial, designed to accommodate *all* senior warrant officers, regardless of specialty or military occupational specialty.

Nor was the early or basic stage of warrant officer development ignored. All warrant officer producing schools have concentrated on improving their military development curriculums over the past several years. The United States Army Aviation Training Study, concluded in July 1976, recommended a Warrant officer Candidate Military Development Course (WOCMDC) be developed for the Aviation Warrant Officer Candidate School at Ft. Rucker. The course was implemented in November 1976. DA has approved and directed the development of a Warrant Officer Orientation Course (WOOC), scheduled to begin in fiscal year 1980. This course is to be designed for newly appointed warrant officers, to educate them on their responsibilities and conduct as officers, and to help them make a smooth transition into the officer ranks.

Also, in recent years, increased civil education opportunities have been opened to warrant officers. The Bootstrap Program, formerly reserved almost exclusively for the commissioned types, is now available to the warrant. Fully funded degree completion programs can be had. Even postgraduate courses and advanced degrees are within reach for those willing to work for them and share part of the expense. Indeed, warrant officers today are highly encouraged to pursue their educational endeavors and a minimum education level of 2 years of college (associate degree) has been established as the goal for their grade structure.

However, writing doctrine, educating warrant officers and upgrading warrant officer career schools does not totally solve the identity problem. The commissioned officers and enlisted personnel also

NEED FOR SERVICES CONFIRMED

must be considered. In years past, very little, if any, was taught these individuals about the warrant officers' purpose, function or capabilities. Today, most of the formal commissioned/enlisted career schools have either included instructions to that effect in their academic syllabus, or are in the planning stage to do so.

This article has not attempted to cover all the events that have moved and shaped the Army Warrant Officer Corps over the past two decades. Instead it has tried to point out that there has been and continues to be a great deal of emphasis placed on rectifying many of the ills that plagued the corps during those heaving, pang-filled years of its prolonged birth. The effort persists in the form of high level studies of the corps, analyses of the career program and evaluations of the schools.

At Ft. Rucker specifically, the Evaluation Division of Directorate of Evaluation/Standardization is conducting a total evaluation of the Aviation Warrant Officer career development spectrum; from WOC school to the Senior Course. If you have always wanted to get your two cents worth in, here's your chance! Write your ideas, comments or suggestions down and mail them to:

Commander, USAAVNC
Directorate of Evaluation and Standardization
ATTN: ATZQ-ES-E
Ft. Rucker, AL 36362

If you don't like to write and you feel you have something worthwhile to offer, hop on the AUTOVON and call 558-4691. We welcome your input and would appreciate hearing from you.

There is no doubt that the corps has come a long way. Warrant officers have taken their rightful place alongside the other grade structures and are marching in step. Granted, there are still problems to be solved and people to be made aware—but finally "we are beginning to see the light at the end of the tunnel." Now where have I read that one before? Let's see . . . .

The authors provide their concept for command and control of the combat aviation battalion attack helicopters during defensive operations in the European environment

Attack Helicopters For A Successful Defense

LTC Eugene H. Grayson Jr. and LTC Glenn R. Allen

DURING THE CRITICAL battle of Blenheim in May 1704, the commander of the most professional Army in modern history, Marshall Tallard, committed an unpardonable tactical error at a critical point during the battle. Rather than concentrating his artillery where it could be massed against attacking British Redcoats and Allied infantry and cavalry, he piecemealed the French artillery up and down the line.

Following a successful infantry assault with the cavalry passing through the penetration and raising havoc in the French rear, Marlborough and Prince Eugene won the first decisive victory in many years against a French Army and ended France's domination in southern Germany. In Eugene's *Memoir's*, one of the questions he posed when analyzing the great allied victory was, "Why was the French artillery not concentrated?"

In jumping ahead to 1979, massing or concentrating available assets at the critical point during the battle is as significant today as it was in 1704 and throughout recorded warfare. Yet even today, when forums and committees meet to discuss how to effectively control employment of attack helicopters, ghosts of the past too often "rise up" and before we realize it, piecemeal commitment of the most responsive, flexible and potentially the greatest antiarmor weapon on the modern battlefield has become doctrine.

Employment concepts in this article are directed toward a real enemy threat and the European environment. The ARCSA III divisional combat aviation battalion which currently is composed of two attack helicopter companies, a combat support company, an HHC and an AVIM company, will be addressed and will emphasize that attack helicopters in support of defensive operations should be employed direct support (DS) to the brigade level—and no lower!

It is essential to understand fully that this concept is in support of defensive operations. Once offensive operations are initiated by Allied and U.S. Forces, task organizing of attack helicopter companies—even platoons—may be appropriate to allow detailed planning, rehearsals and to conduct certain offensive operations. But the current situation dictates that if a European conflict were to occur. Allied Forces must first conduct a *successful defense.*

Any reader familiar with the European environment certainly will agree that when the war begins, an absence of targets will pose no problem for the Allies, and that in all likelihood, each committed maneuver task force commander across the line of defense could very well be convinced that the entire Warsaw Pact main attack is heading straight for his command post.

The March 1978 *Commander's Digest* provided a

Glossary

ARCSA	Aviation Requirements for the Combat Structure of the Army
AVIM	aviation intermediate maintenance
DISCOM	division support command
DS	direct support
FARRP	forward area refueling and rearming point
GS	general support
HHC	headquarters and headquarters company
MBA	main battle area
OPCON	operational control
TOW	tube-launched, optically-tracked, wire-guided

major weapons and equipment comparison which listed the Soviet Union tank forces at 45 to 50,000 and personnel carriers at 45 to 55,000. It is then apparent that on a European battlefield. Allied Forces will be vastly outnumbered—thus careful planning and a detailed analysis of tactical employment of all weapons systems is essential—to include the AH-1 Cobra TOW.

Recent articles and discussions dissecting attack helicopter units into committing platoons to this battalion—and to that battalion—and even OPCON to maneuver company teams during the defense, should be viewed with caution. Articles which discuss how the maneuver company (team) commander will employ *his* OPCON attack helicopter platoon in a defensive battle in the European environment demonstrate a complete disregard and knowledge of the real threat facing the Allied Forces.

Threat doctrine portrays an attacking division covering a 20 plus kilometer front, however the bulk of their forces will normally be employed on a front of 10 kilometers (or less), with a depth of 30 kilometers from the line of contact to the division rear (figure 1). Assuming a large force concentration could be managed in such an area, it is likely some initial success will be achieved.

As this thrust develops, commitment of attack helicopters would be seriously considered. What must not be overlooked is that the division commander will be employing all the firepower available from the beginning: artillery, tactical air, ground TOWs, DRAGONs, organic tanks, etc.; and may have slowed or even halted the attack. If not, however, and if the enemy pushes second echelon forces into the battle, a penetration may develop. The key points are that more than one battalion task force is fighting the battle, and this situation is occurring in more than one sector along the friendly division's front.

To develop a scenario and depict a likely situation for employing attack helicopters, two assumptions are required. First, we must assume the covering force has withdrawn and the division is occupying defensive positions in the main battle area. The combat aviation battalion is now in general support (GS) of the division with the combat support company's aeroscout platoon screening a designated division flank, maintaining visual contact, etc., or employed by the G-2 in a reconnaissance or intelligence gathering role in the MBA.

Simultaneously, OH-58 Kiowa's from the command and control platoon, which have been committed to the brigades, may be augmenting this mission with brigade S-2's, forward observers, forward air controllers and commanders at various levels on board in a multitude of roles. In all probability, the two attack helicopter companies already have established an effective liaison with the two most vulnerable brigades.

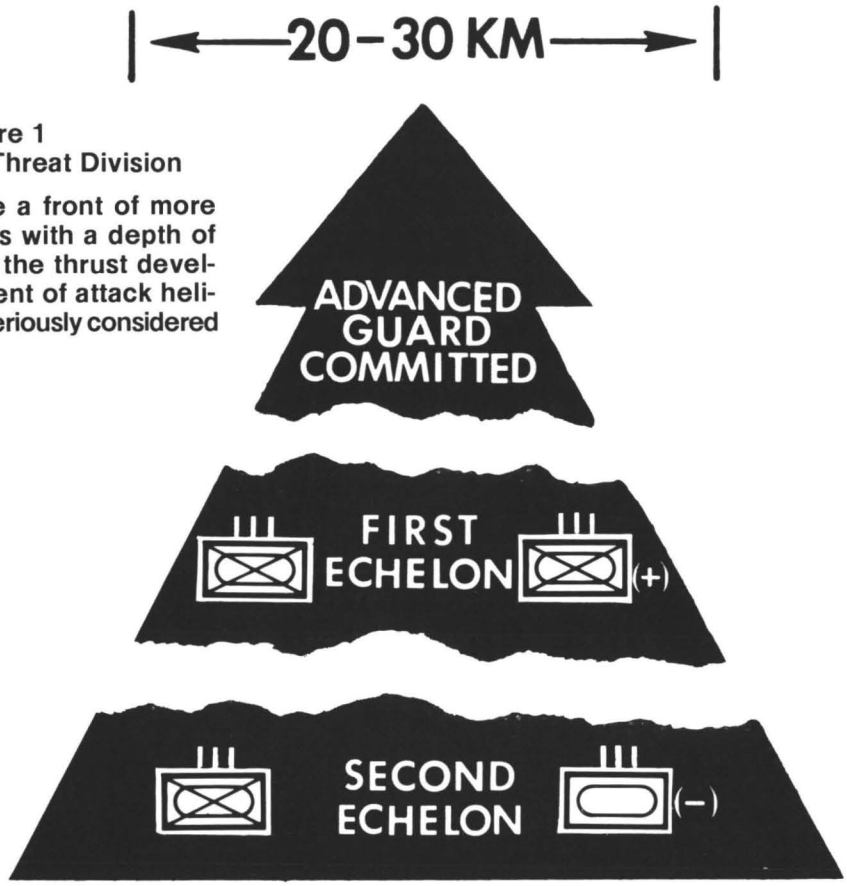


Figure 1
The Attacking Threat Division

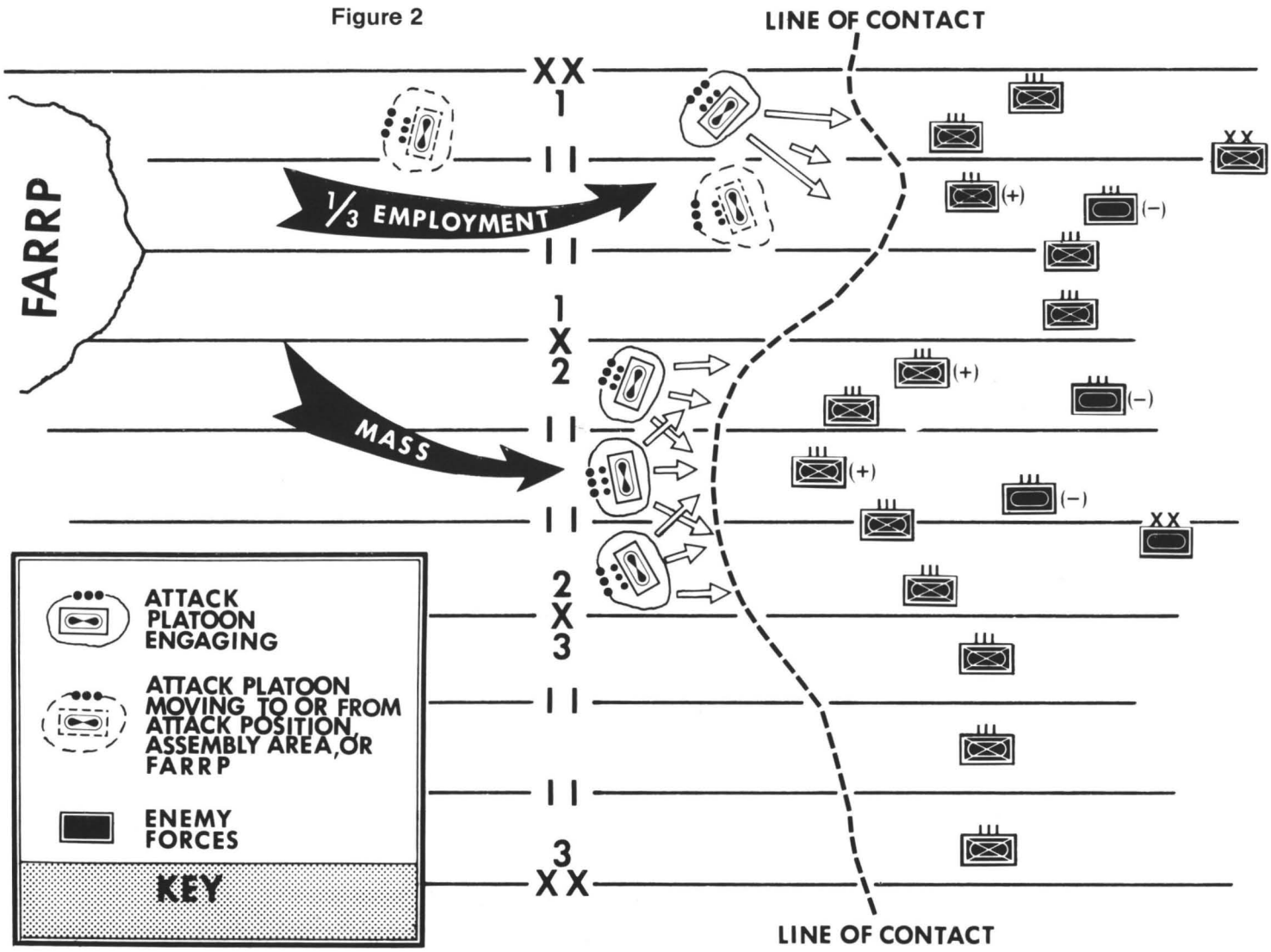
We can anticipate a front of more than 20 kilometers with a depth of 30 kilometers. As the thrust develops the commitment of attack helicopters would be seriously considered

Let's return now to the threat. We know the enemy forces will conduct hasty attacks in several sectors of the division's MBA. We know that ground forces, properly organized, will be able to stop, or at least slow, these hasty attacks. We also know that threat doctrine states that any success will be reinforced, and that the enemy will attempt to mass a 6:1 advantage at one or more points within the MBA, to penetrate with armor/mechanized forces, and seize a deep objective. Keeping this in mind, and assuming the G-2 has carefully analyzed the avenues of approach into the division area, liaison officers from the two attack helicopter companies at the two most vulnerable brigades are coordinating with the commander and S-3, the optimum means of coordinating attack helicopter support as an integral part of the brigade combined arms team.

In examining this potential attack into the division area, it becomes apparent that each maneuver task force (battalion) probably is, or will be, heavily engaged. It also is likely that each of the maneuver task force commanders, convinced the main attack is directed against *his* position, will request all available attack helicopter assets be committed to support *his* situation.

If this analysis of the enemy doctrine is correct, then the attack helicopter company should not be committed until the deliberate attack of at least the first echelon of the threat division is identified. With the firepower to destroy most of the combat vehicles of a reinforced regiment (or the combat effectiveness of two or more regiments), it is contended that the attack helicopter company should not be employed until this thrust is developed and it is obvious that

Figure 2



ground forces cannot contain it. Certainly no one is in a better position to determine this than the *brigade* commander.

Upon commitment to a brigade, the attack helicopter company commander can quickly be updated on the tactical situation from the liaison officer or from the aeroscouts, command and control aircraft, or face to face coordination with the brigade commander or S-3. Obviously each maneuver task force commander (battalion) will be contacted by the attack helicopter platoon battle captain when entering the battalion's area, and the latest intelligence/tactical information can be exchanged. However, the task force commander must realize that the attack platoon or company cannot be diverted from its mission of destroying armor vehicles in the brigades' areas of concern.

This will not be a problem when part of the thrust (or bulge) is in the task force commander's area. The commander already will have all available firepower directed at the enemy forces. A conflict of interest might develop, however, when the attack platoon is using one task force area to place flanking fire against the thrust in an adjacent area (figure 2).

If the question arises, "might this same situation not occur across brigade boundaries?" the answer must be "yes." But brigade boundaries normally are established so as not to divide regimental avenues of approach, and usually are wide enough to allow attack helicopter platoons to engage a threat division's deliberate attack from the flanks without crossing the brigade boundary. If the brigade boundary is crossed, however, the same rule applies; the attack helicopter platoon must not be diverted from striking at the main thrust and must work primarily for the *brigade!*

If then, the attack helicopter company is employed by the brigade commander after the threat division's deliberate attack by second echelon forces has been identified, the next question should be, "what command relationship should be used from division to brigade?"

The attack helicopter company should not be attached, because the brigade does not have the capability to provide logistical support. This support must come from the combat aviation battalion and DISCOM. OPCON is satisfactory, but DS is preferred. OPCON denotes that the brigade commander may direct the positioning of the attack helicopter company's ground, and even air elements—such as assembly areas, attack positions and FARRPs. DS implies that the brigade commander receives the firepower of the attack helicopters, at a target of his choosing. But the attack helicopter commander deploys his unit.

Why DS?

- Because this situation will repeat itself many times in each division sector before the defense is secure.
- DS affords the division commander the best method to quickly commit attack helicopters from one threatened sector to another.
- There is no chance that a brigade commander may unintentionally affect other operations by repositioning elements of the attack helicopter company.
- Even the corps commander may keep a string on the attack helicopter companies, and the DS commitment again allows a rapid reaction to a change in mission.

In summary, it is proposed that in support of defensive operations, the attack helicopter companies of the division combat aviation battalion be employed as a company, DS to a brigade, when the deliberate attack of a threat division has been identified. Nowhere in this scenario has the attack helicopter company been *piecemealed* or committed below *brigade* level.

In the European environment during the main defensive battle, such commitment is not feasible. We must ensure that these assets do not become so whittled away that when the division commander requires an immediate response to one, or several threatened areas, valuable time is not lost while rounding up the attack platoons which may have been piecemealed throughout the main battle area.

About The Authors

LTC Eugene H. Grayson Jr. is a 1959 graduate from VMI and has been an Army aviator since 1961. His aviation assignments have included the 82d Aviation Battalion during the Tactical Mobility Requirements (Howze) Board tests, the 11th Air Assault Division (T) and the 101st Airborne Division. LTC Grayson commanded the 11th Aviation Battalion and then the 503d Aviation Battalion (Combat) prior to his assignment at the ODCSOPS, Headquarters, Department of the Army.

LTC Glenn R. Allen is a 1963 graduate of the Citadel and an Army aviator since 1965. His aviation assignments include serving in the 219th Aviation Company in the Republic of Vietnam and commanding the 334th Attack Helicopter Company and C Company, 503d Aviation Battalion (Combat). LTC Allen served as Assistant Division Aviation Officer, 3d Armored Division and is now assigned as Operations Staff Officer, U.S. Army Concepts Analysis Agency, Bethesda, MD.

THE
THREAT

The Artillery Threat

Captain Carl E. Daschke

Threat Branch
Directorate of Combat Developments
Fort Rucker, AL

CW2 RALPH ROBBINS shifted his weight in the seat, acutely aware that his lanky, 6-foot frame had been strapped into the front seat of the AH-1 Cobra for the past 3 hours. He still couldn't believe that it had really happened; there had been almost no warning. He had only 6 months remaining on his "all others" tour. Why couldn't they have waited a few more months? Sure, tensions had increased and there had been rumors that armed conflict appeared certain. But who would have thought it would lead to open confrontation this soon?

"Aw well, enough politics," thought CW2 Robbins. "It happened and we've got work to do." He scanned the open terrain of the valley with his telescopic sight unit (TSU).

"Hey Ralph, see anything yet?" inquired Lieutenant John Growser, the aircraft commander. They were already 60 minutes into their second fuel load and had yet to fire a missile in anger.

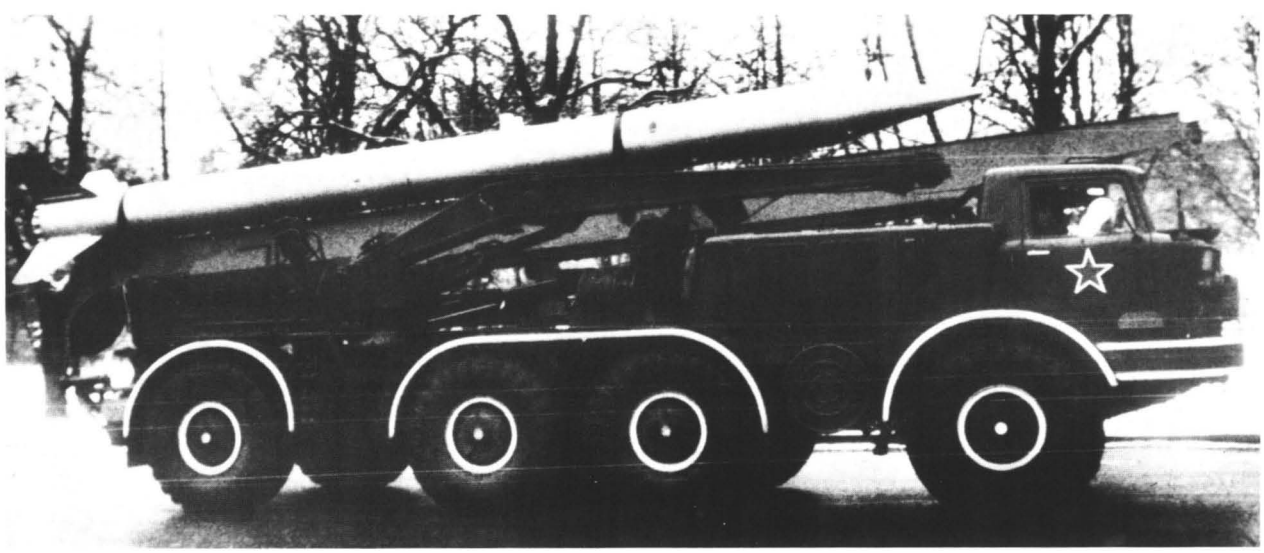
"No sir, not a blessed thing; let's reposition to that high ground and see what's in the next valley."

Lieutenant Growser pushed the transmit button on his cyclic to tell their sister ship, 15615, to cover his movement across the open valley. "Can't be too careful," Lieutenant Growser thought to himself. Like most aviators, he was confident in their ability to survive in a high threat environment providing they used sound terrain flight techniques.

The aircrew moved across the open area without a hitch, their radar warning device indicating no acquisition by radar. "So far so good," thought Lieutenant Groswer.

Once on the ridgeline, they were able to locate a small, open area which offered excellent observation and fields of fire onto the valley floor. Lieutenant Growser hovered to the sparse tree line, which partially obscured their vision into the valley, and slowly increased collec-

Soviet Frog—7



tive to unmask the aircraft just enough for CW2 Robbins' TSU to clear the trees. "OK Ralph, it's all yours; find us something to shoot."

"Right," mumbled CW2 Robbins, who was intently peering through the sighting mechanism.

The scene which he viewed through the sight caused him to gasp for breath. In the distance, some 5 or 6 kilometers up the valley, appeared to be all of the tanks and armored personnel carriers in the world moving in their direction. The formation of T-62s, with their telltale rooster-tails of dust, were moving unobstructed across the political border. "What a sight! I can't believe what I'm seeing," CW2 Robbins thought. "John, it's going to be like shooting fish in a barrel; get on the radio and send for the rest of the platoon."

The first round of the 240-round, 122 millimeter (mm) multiple rocket salvo impacted within 4 feet of the Cobra's cockpit. The concussion of the detonation caused the aircraft to yaw and pitch violently to the right, shrapnel shattering the canopy. Almost instantaneously, eight more rockets impacted within a 30-foot radius of the aircraft. The exploding munitions severed flight controls and hydraulic and fuel lines, before ripping off the aft section of the tailboom. The aircraft, now completely out of control, pitched forward and rolled onto its side. A final rocket, in *coup-de-grace* fashion, struck the aircraft's fuselage between the left weapons pylon and the engine deck. The aircraft and its crew were destroyed within seconds.

What happened? Was the aircraft acquired by radar? Was the aircraft's repositioning observed by the attackers' reconnaissance units? The answer is no. The aircrew had taken care to maneuver the aircraft in such a manner as to preclude reasonable acquisition by optical or electronic systems. Actually, the attackers never saw the aircraft; its presence on the ridgeline was not known but had, in fact, been anticipated by the attacking commander. The aircraft had fallen victim to a threat which is seldom considered—Soviet artillery.

Soviet 122 mm Self-propelled Gun M1974

Few weapon systems available to the Soviet commander match the artillery in inherent destructiveness. And few weapon systems match artillery in its intrinsic threat to Army helicopters.

Artillery, in its normal employment mode of supporting offensive operations, has the potential of stripping away our tactical aviation assets unless we completely understand its full potential and employment.

Historically, Soviet artillery has been the keystone of offensive actions by providing massive firepower to neutralize the enemy's ability to mount a successful defense. Over the past 5 years, the reliance which the Soviets place on their artillery has been evidenced by their efforts to increase both quantitively and qualitively the fire support available to the maneuver commander. The most notable improvements to artillery systems organic to the maneuver division include increasing the number of tubes available and upgrading the older towed pieces to new, more mobile self-propelled models.

Artillery and related indirect systems now available to the maneuver commander include 122 mm and 152 mm howitzers, 122 mm multiple rocket launchers (MRL) and tactical missiles or rockets.

The vast array of indirect weapons represents an omnious threat to aviation, and a thorough understanding of their capabilities and methods of employment will assist the tactical Army aviator in avoiding, or at least minimizing, their threat to the accomplishment of our mission.

Soviet Artillery Organizations. Artillery is organized for combat in two types of flexible divisional groupings: the Division Artillery Group (DAG), and the Regimental Artillery Group (RAG). Both are designed to provide continuous fire support to the maneuver elements. RAGs and DAGs, being flexible organizations, can be task-organized to meet the changing needs of each major offensive/defensive action.

The DAG, varying in size from two to four or more battalions, is employed in general support of the division. Additional firing battalions from Army level assets normally are attached to the DAG.

RAGs are formed by the division from organic and attached artillery battalions, and are assigned the mission of providing direct support to the maneuver regiments.

In addition to the fire support available from the DAG and RAG, maneuver battalions of the first echelon may be allocated up to a battal-

Soviet 122 mm Multiple Rocket Launcher

ion of artillery in an attached or support status for use in both direct and indirect fire roles. It also must be recognized that the motorized rifle battalion has an organic battery of heavy mortars which can augment the fires of the tube artillery.

Methods of Fire. The Manual of Soviet Military Operations, April 1978, describes 10 methods of fire employed by the Soviets. This article covers those methods of fire which present the greatest threat to Army aviation.

One must recognize that Soviet fires are extensively preplanned and integrated into the command's main battle plan. The Soviets rely more on preplanned fires in support of their operations versus on-call fires on targets of opportunity. However, it should not be inferred that they will not engage targets of opportunity. Soviet commanders will preplan the use of their artillery based upon their estimate of the enemy's defenses, known enemy weapons employment, and reconnaissance of the area through which the attack will be conducted.

Fires will be preplanned to provide continuous support during the attack phase. Continuous support will be achieved by conducting fires in these general phases: preparatory fires, fires in support of the attack and fires in the depth of enemy defenses.

Preparatory fires are commonly a combination of the fire assault and overlapping fires, employed against the entire depth of the enemy's first defensive zone. The fire assault is a method of employing artillery for the purpose of neutralizing personnel, weapons (especially antitank systems) and combat materiel. The assault provides for an extremely high density of fire to be allocated over a relatively small area during a short period of time. Towards the completion of the preparatory phase, the commander will employ overlapping fires, which is a high density of fire directed at known or suspected artillery positions, in an effort to transition from the preparatory phase to the supporting fire phase of the artillery fire support plan. Unlike the other fires, the overlapping fire usually is conducted by a smaller number of artillery units.

Fires in support of the attack consist of preplanned successive fire concentrations and fire concentrations. Successive fire concentrations are those fires employed in succession to destroy enemy forces along the front and flanks of the attacking unit. The fires are highly controlled and employed in a phase line effect. Additional support may be provided to the advancing forces by the use of fire concentrations. The fire concentration is a method of conducting fires against a single target, or a group of targets in a single area. Further, it is employed against targets of opportunity (on-call fires) and may be fired by several batteries or battalions depending on the size and nature of the target.

Barrage fires are planned on lines where it is anticipated that enemy counterattacks may be launched. Barrage fires are characterized by an extremely high volume of fire coinciding with the lines of successive fire concentrations. As could be expected, barrage fires require an enormous amount of ammunition to be expended, thus requiring meticulous preplanning in coincidence with the established ammunition supply rate of the unit.

Fires in the depth of the enemy's defense are provided by surface-to-surface missiles, air strikes and long range artillery accompanying the attacking troops. The primary purposes of the fires are to maintain the attack momentum, prevent counterattacks and to destroy enemy forces attempting to withdraw.

Fire plans, for example of a battalion, in support of a deliberate attack readily illustrates the employment and amount of ammunition which is preplanned to be expended in support of the unit's offensive maneuvers. Remember, this is only *one* battalion's fire plan. In support of an attack, the division is capable of fielding a minimum of 14 organic battalions of tube, MRL and rocket

artillery. The number could be significantly increased by the attachment of additional battalions from higher echelons.

The coverage of artillery employment (see accompanying chart) in support of an attack clearly illustrates the rigid, preplanned use of artillery based upon doctrine, reconnaissance and the commander's perception of the enemy's defenses.

Attacking commanders can be expected to plan their fires so that continuous successive support is provided to their forces. It is the successive support (fires planned on terrain where they expect the defender to be located), coupled with their desire to control key terrain by fire which has the potential to systematically strip away our tactical aviation assets. We can reasonably expect our Cobras and scout aircraft, while occupying holding or firing positions, to be vulnerable to the initial artillery fires.

An examination of the area coverage expected from the normal employment of artillery best illustrates the awesome threat presented by indirect fires. For example, by employing successive concentrations of fire, each 122 mm howitzer battalion, firing 3 rounds per tube per minute, is expected to cover a square area with 200 meters

Illustrative Fire Plan, 122 mm Howitzer Battalion

	TIME	METHOD OF FIRE & TARGETS	SIGNALS	1st BATTERY	2nd BATTERY	3rd BATTERY
PREPARATORY FIRES	H-40 to H-27 (13 Min)	FIRE ASSAULT: Artillery and mortar batteries, CPs, radar, platoon strong point of companies in first echelon of defense	• Green flares • SNOWSTORM 2121 (Radio/tel.)	TGT 60 90 rds Sector 11 120 rds	TGT 18 140 rds Sector 11 90 rds	TGT 40 80 rds Sector 11 120 rds
PREPARATORY FIRES	H-27 to H-17 (10 Min)	FIRE ASSAULT: Platoon strong points within deeper defensive positions; destruction of targets by direct fire; controlling fires against artillery and mortar batteries	• Star flares • HAIL 3131 (Radio/tel.)	Sector 16 120 rds TGT 69 14 rds	Sector 16 165 rds	Sector 16 165 rds
PREPARATORY FIRES	H-17 to H-5 (12 Min)	FIRE ASSAULT: Platoon strong points within companies of first echelon of defense	• Yellow flares • RAIN 4141 (Radio/tel.)	Sector 11 120 rds	Sector 11 150 rds	Sector 11 150 rds
PREPARATORY FIRES	H-7 to H+1	OVERLAPPING FIRE: 1st Battery fires at artillery and mortar batteries. (Overlaps H-Hour transition from preparatory to supporting fires)	• Yellow flares • RAIN 4141 (Radio/tel.)	Target 60 60 rds	TOTAL ROUNDS PREPARATORY 1584	
SUPPORTING FIRES	H-Hr to H+5	SUCCESSIVE FIRE CONCENTRATIONS (PSO): On Line 1 WOLF (Sector 11)	• Line 1 WOLF • Green flares • HURRICANE 5555 (Radio/tel.)	Overlapping Fires, as above	45 rds	45 rds
SUPPORTING FIRES	ON CALL	5 minute fires on Line 2 RAT (Sector 21)	• Line 2 RAT • Star flares • THUNDER 6666 (Radio/tel.)	50 rds	50 rds	50 rds
SUPPORTING FIRES	ON CALL	5 minute fires on Line 3 TIGER (Sector 16)	• Line 3 TIGER • Yellow flares • TYPHOON 7777 (Radio/tel.)	32 rds	32 rds	32 rds
SUPPORTING FIRES	ON CALL	FIRE CONCENTRATIONS (SO): Individual targets BARRAGE FIRES (ZO)	Readiness to open Fire on Targets 20, 25, 32, 33, 69, 71 Targets A and B			
		NOTE: These SO and ZO fires are contingency plans, and will be used depending on the progress of the attack		TOTAL ROUNDS, PLANNED SUPPORTING 1152		

to a side (40,000 square meters) during 5-minute engagement periods. Using the area coverage of the battalion firing successive fire concentrations (targets grouped in lines, each line being located deeper in the enemy's defensive sector) multiplied by the five battalions of 122 mm organic to the motorized rifle division, the area coverage increases to 200,000 square meters. The devastation of this type of fire, which is doctrinally employed on Army aviation, becomes apparent.

To imply that the artillery is an indiscriminate threat to aviation is at best an understatement. Unlike threat such as air defense systems, air-to-air interdiction and others, artillery is a threat by virtue of its normal employment. It is the rigid employment which appears to be artillery's "Achilles' heel," and is a key factor in avoiding the devastation of artillery. By gaining a workable understanding of the capabilities and tactics of artillery, we can reasonably predict, with relative accuracy, the most likely areas of employment. For example, as we have discussed, artillery can and will be used to control key terrain. Therefore, careful selection of firing positions and routes of flight will tend to minimize the aircrews' exposure. If a ridgeline offers excellent fields of fire and observation into an area through which the attacker plans to maneuver, you can bet that the attacker will plan some type of indirect fires to be fired on the ridge. Selection of a less direct route or desirable firing position which will accomplish the mission should be identified and used.

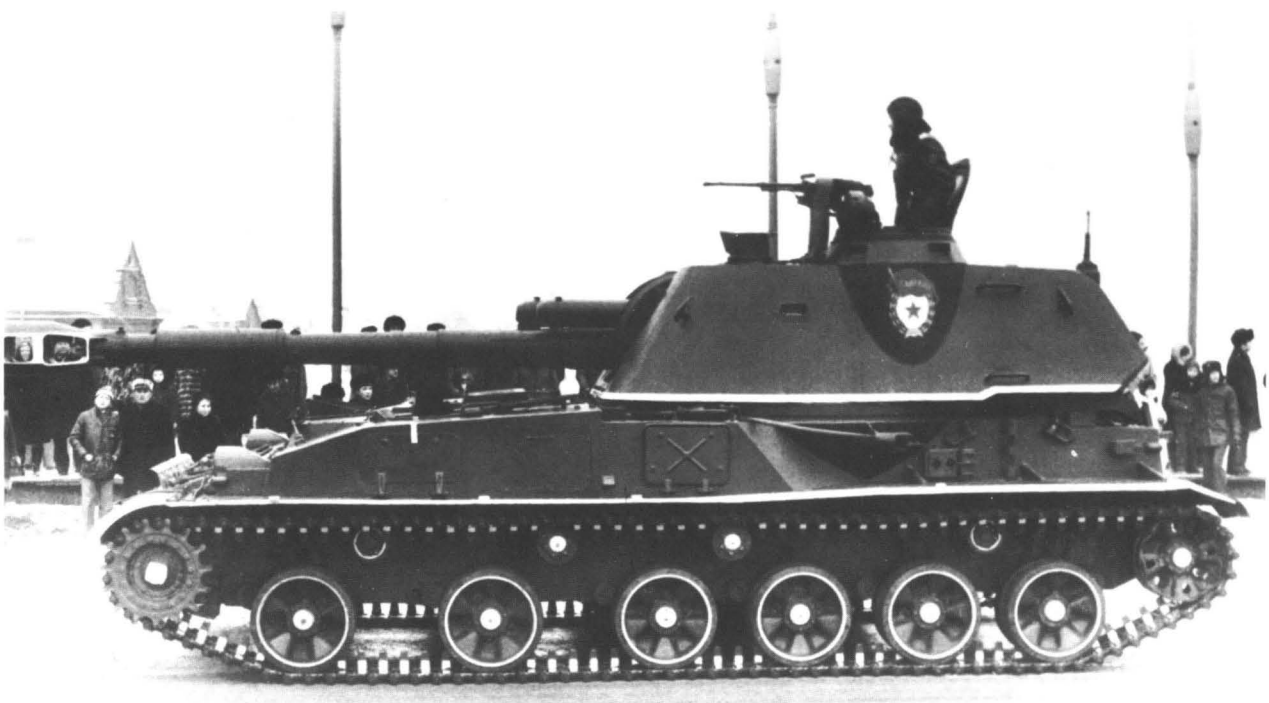
It also would appear reasonable to avoid the premature commitment of antitank aircraft until after the initial preparation fires are completed. This is not to suggest that antitank aviation be held in reserve, but rather not committed until the major thrust or penetration has been identified.

Flight conducted in the vicinity of the forward edge of the battle area (FEBA) must be confined to nap-of-the-earth flight modes. This will preclude aircraft from being detected electronically by the attacker's artillery or air defense acquisition systems. Because of the natural tendency to increase flight altitude behind the FEBA, it is possible to be acquired or "painted" by the longer range acquisition systems. The acquisition of aircraft behind the FEBA allows the attacker to determine possible forward area arming and refueling points, holding positions, and laager or staging areas, thus marking them as likely candidates for artillery interdiction.

As we have discussed, artillery is a keystone of Soviet tactical operations and will present a deadly threat to Army tactical aviation. This threat, however, can be minimized by a basic understanding of its inherent capability, employment, premission planning and adherence to sound terrain flight techniques.

Questions or comments concerning this article are welcome and should be directed to CPT Carl E. Daschke, Threat Branch, Directorate of Combat Developments, ATTN: ATZQ-D-CT, Ft. Rucker, AL 36362 or AUTOVON 558-5671/4709.

Soviet 152 mm Self-propelled Gun M1973



The Aviation Career Incentive Act— An Update

Captain (P) James H. Baker
Aviation Plans/Programs Branch
Officer Personnel Management Directorate
U.S. Army Military Personnel Center

"WHAT'S MY GATE status?" "I made my gate; why does my LES say my flight pay will stop next month?"

"Why did my flight pay rate reduce when I reached 18 years of officer service?"

Since enactment by Congress of Public Law 93-294, better known as the Aviation Career Incentive Act (ACIA) of 1974, these and similar questions reach Military Personnel Center (MILPERCEN) daily. The answers are important, as they impact directly on Army compliance with the mandate of Congress, aviator utilization Armywide, and individual entitlement to Aviation Career Incentive Pay (ACIP). This article reviews the purpose of the Act and the definitions of terms spawned by its implementation; addresses the "fine tuning" of the "gate" tracking system; and attempts to clarify some of those fuzzy, seemingly vauge policies employed by the Army to ensure compliance with the Act.

The Act was to provide the entire Department of Defense with cost effective incentives for military aviators, trained at great expense, to remain on active duty and pursue an aviation career. "Flight pay," generally considered hazardous duty pay prior to the Act, was clearly defined as aviation career incentive pay. Entitlement to ACIP would no longer be based solely on "boring holes through the sky" 4 hours a month, but would be earned on a continuous or monthly basis contingent upon assignment to operational flying duty positions and successful "gate" passage throughout an aviation career.

During 1974 and 1975 a Department of the Army Aviator Review Board convened at MILPERCEN and researched the Official Military Personnel File (OMPF) for each active duty aviator. The board computed and updated on the Officer Master File (OMF) the following data elements: Aviation Service Entry Date (ASED), Total Federal Officer Service (TFOS) date and Total Operational Flying Duty Credit (TOFDC) through 30 June 1974. Worksheets containing Board findings were sent to each aviator for concurrence or nonconcurrence. All members of the Board reviewed nonconcurrences submitted, considered documentary evidence and made a final determination by consensus ruling. Board results were published in DA Circular 600-6, "Results of Aviator Review Board For Army Aviators," dated 19 January 1976.

Following are facts concerning the DA Board:

- Results of this Board are final.
- Board results, with all worksheets and associated documents, are on file at MILPERCEN.
- Aviators who arrived at 12 years' aviation service, on or before 31 May 1974, were considered to have passed the 12-year "gate."
- Aviators who arrived at 18 years' aviation service, on or before 31 May 1974, were considered to

have passed the 18-year "gate" and entitled to continuous flight pay to 25 years' officer service.

Also, during 1974 and 1975 finance and personnel offices Armywide determined ASED and TFOS for each aviator assigned using local personnel files and then updated the JUMPS pay file. This action was independent of the DA Aviator Review Board and resulted in many conflicting data entries between the OMF and the JUMPS pay file. JUMPS pay file ASED and TFOS data are used to make pay rate determinations and are recorded in blocks 45 and 46 of aviator leave and earning statements. MILPERCEN routinely compares ASED and TFOS entries on the JUMPS pay file and personnel file (OMF). Differences are resolved and the appropriate file is corrected. In instances where the JUMPS pay file is in error a check is made for possible overpayment of flight pay. If an overpayment exists, finance offices are advised to take collection action.

Following are facts concerning flight pay rate:

- There are two rate phases for commissioned aviators:
  - ✓ Phase I—monthly rate is based on years of *aviation* service. The pay file ASED entry is used for this purpose.
  - ✓ Phase II—monthly rate is based on years of *officer* service. The pay file TFOS entry is used for this purpose. This phase is entered when an aviator begins the 18th year of officer service.
- There is one rate phase for warrant aviators. Warrant flight pay reaches a maximum at the beginning of the sixth year of aviation service and remains at this level throughout the aviation career. Pay rate is not affected by years of officer service.
- Commissioned aviators do not receive flight pay beyond the beginning of their 25th year of officer service *even if flight is performed.* This means that general officer and colonel aviators may draw flight pay to 25 years officer service, if otherwise qualified.

The ACIA contained a "save pay" period which ran from 31 May 1974 through 31 May 1977. During this period no flight pay was terminated due to "gate" failure. The computation of operational flying duty credit Armywide was accomplished for fiscal years 75, 76, 7T and 77 via MILPERCEN letters. The results of each fiscal year update were published in DA Circulars 600-10, 11 and 13. Circulars were distributed to personnel and finance offices and selected units maintained on a special MILPERCEN aviation mailing list. Effective with the mailing of DA Circular 600-16 during September 1979, the special aviator mailing list was replaced with the address list used to distribute the MILPERCEN's publication, Focus.

On 1 June 1977 the "save pay" period of the ACIA terminated. All aviators who failed one of the "gates" during this period were no longer entitled to continuous flight pay and payments were stopped.

The attempt to manually update operational flying duty credit by MILPERCEN letters proved unsuccessful. This was due to poor return rates, inconsistencies in credit computation and excessive manhours needed at MILPERCEN to validate data and update each year's input to the officer master file. The manual procedure was replaced by an automated system effective 1 October 1977. On this date operational flying duty credit was given automatically whenever an aviator was reported to MILPERCEN via the SIDPERS personnel reporting system as occupying an operational flying duty position. These positions are those where the special skill identifier (SSI) equals 15A, 15B, 15C, 15D, 71A, 67J or 51C. The position additional skill identifier (ASI) can be blank, but cannot equal 1X. Aviators may check their recorded duty position code by reviewing block 20 of their DA Form 2 and current duty position entry on the officer record brief (ORB). It should be noted that "duty MOS," not "authorized MOS," is contained in block 20 of DA Form 2 and is used to determine entitlement to operational flying duty credit. Questionable duty position entries should be brought to the attention of local military personnel officers.

Following are facts concerning the automated update of operational flying duty credit:

- Credit is not added to the cumulative total until an aviator departs an operational position.
- Credit begins to accumulate upon departing en route to an operational position from nonoperational status.
- Leave, travel time and attendance at aviation schools, when en route to an operational position are creditable.
- Time between operational positions is creditable unless nonaviation schools are attended or nonaviation duty is performed.
- Operational credit stops upon departing en route to a nonoperational duty position.
- Flying must be an integral part of an aviator's duties before operational flying credit can be given.
- Aviators who do not fly on a continuous month to month basis must meet the Aircrew Training Manual (ATM) requirements prescribed by the commander to receive operational credit.
- The 15th day of any month is the cut-off day for crediting or not crediting the month as operational.

For operational credit to be given the following documents, as a minimum, must show operational flying status: DA Forms 2 and 2-1, ORB, OER and DA Form 759.

Actions taken to implement the ACIA have continued to improve since 1974. Eventually, automation and updated publications and circulars will clearly reflect the intent of the Act and will ensure continued compliance by and total support of Army aviators worldwide.

Reporting Final

Late News From Army Aviation Activities

FROM THE PENTAGON

Development Program Status. Major systems under development require review at different levels of the Department of the Army and the Department of Defense. DA level review is accomplished by the Army System Acquisition Review Council (ASARC), while DOD review monitors programs through the Defense System Acquisition Review Council (DSARC).

Advanced Scout Helicopter (ASH). The Cost and Operational Effectiveness Analysis (COEA) was forwarded by Special Advisory Group (SAG) IV to TRADOC for approval on 27 September. Both Armed Services Committees of Congress have supported research, development, test and evaluation funds in the amount of $7.5 million for FY 1980. The ASH pre-ASARC was scheduled for 26 October and the ASARC for the 15th of this month. The OSD Program Review is set for the 4th of next month.

CH-47D Modernization Program. COEA update for the CH-47D Modernization Program is being conducted by TRADOC/Transportation School. The program authorized acquisition objective is 482 aircraft; the mod program as structured will provide 361 CH-47Ds. The ongoing COEA will address alternatives to filling the gap between these two figures. The CH-47D Modernization Program is reported to be meeting cost objectives and is on schedule (see September 1979 *Aviation Digest*).

C-12 Aircraft. An additional buy of 10 C-12D airplanes appears possible as a result of congressional support of the Army's requirements in Joint Conference. Distribution of these airplanes will be addressed following procurement approval. Additional C-12 procurements to fill both the utility and GUARDRAIL fixed wing requirements will be addressed in POM 82-86. Procurement of C-12s is difficult to justify in both the budget and POM in light of many high priority, but unfunded programs; the C-12, like all aircraft, must compete against all other Army systems for funding. **(ODCSOPS)**

AR 95-33. Effective the 16th of next month a new AR 95-33, "Army Aircraft Inventory, Status, and Flying Time Reporting (RCS: CSGLD-1837 (R1))" procedure will be instituted. The revised procedures will result in the following changes:

- Aircraft mission capability reporting will be based on a combination of factors that evaluate mission, operational equipment and subsystem availability.
- Correct inadequacies in reporting actual status of weapons systems, i.e., when subsystem status precludes an aircraft from achieving materiel condition standards, time will be reported through the use of codes. Data to be reported will provide information needed for management analysis to identify where corrective action may be needed.
- Materiel condition standards will be more uniform between major commands and geographical areas than currently stated in the regulation.

The revised procedures represent a significant improvement over the current regulation. Problems being experienced in the field will be corrected if the definitions, policies and procedures in the new regulation are followed. (HQDA, DALO-AV, LTC Duke Vasey, AUTOVON 227-0487) **(ODCSLOG)**

AAH Launch of HELLFIRE Missile. On 18 September 1979 the first guided firing and flight of a HELLFIRE missile from the AAH was successfully completed. The target was designated by the GLLD, and a direct hit scored. This initiates the guided HELLFIRE test phase in the AAH program. In the HELLFIRE test program, 11 complete successes have been achieved in 13 guided flights throughout the operational envelope.

AH-1 Flight Weapons Simulator (FWS). The AH-1 FWS completed operational testing 31 August 1979. Preliminary results indicate the AH-1 FWS is a very effective trainer. The device will be an extremely useful tool in the training base for transitioning new AH-1S Cobra aviators as well as maintaining the readiness of combat aircrews. **(ODSCRDA)**

Reporting Final

Late News From Army Aviation Activities

FROM FORT RUCKER

Aerial Submarine. The U.S. Army is considering the merits of the Hughes 500 MD observation/scout helicopter with a Martin-Marietta mast mounted sight. The sight is a weatherproof video camera mounted atop the main rotor mast. It has four fields

Aerial Submarine

of view—the widest showing 10 degrees—and displays a black and white image on a 9-inch monitor in front of the navigator. It also has a 240-degree turning radius (plus or minus 170 degrees yaw) and 30 degrees vertical adjustment capability (plus or minus 15 degrees pitch).

In the track mode the sight can place a laser designation on a potential target. There is also room inside the sight's housing for an infrared night vision sight adapted for operation after nightfall.

Eight Receive Master Wings. For the first time in aviation history, eight officers of the same Warrant Officer Rotary Wing Aviator Class have received their Master Army Aviator Wings as a group at Ft. Rucker, according to Captain James F. Eversman, Jr. one of the recipients.

The presentation was made by Major General James. H. Merryman, commanding general, during a formal ceremony recently at the Lake Lodge.

Captain Eversman said he believed it was also the first time that so many men from the same class all qualified and received their master wings.

The men started as warrant officer candidates in the December 1963 class. Of the 131 men who started the course, 39 graduated in September 1964. Nine are still on active duty.

To qualify for the Master Army Aviator Badge, a person must have either 8 years as a Senior Army

MASTER ARMY AVIATOR BADGE RECIPIENTS—Eight graduates of the 1964 Warrant Officer Rotary Wing Aviator Class recently received their Master Army Aviator Badges. From left are Captains Harry D. Hall, James F. Eversman, Jr. and Michael K. Norberg; Chief Warrant Officer Charles J. Hollen; Major General James H. Merryman, commanding general who presented the wings; Chief Warrant Officers Jerry W. Rhine and Marion H. Rawls Jr.; Captain James M. Lee; and Major George W. Sweat Jr. (Photo by Denise Starr)

Aviator or have been a military aviator for 15 years, 12 of which must have been as an Army aviator, and have 3,000 flying hours.

Broken Wing Awards. Chief Warrant Officers Gary L. Bivens and Lloyd A. Drennon were presented the Army's Broken Wing award recently for exhibiting exceptional flying skill during inflight emergencies at the Aviation Center. Both are OH-58 Kiowa helicopter instructor pilots in the Department of Flight Training.

Mr. Bivens' OH-58 experienced a complete hydraulic failure due to a ruptured hydraulic line on a flight during which he was teaching low level autorotations (no engine power) to a student. He landed without incurring damage to the aircraft or injuries to themselves. Mr. Drennon was teaching

tactical instrument flight when his aircraft's engine exploded and caught fire. He autorotated to a sloped terraced field without further damage to the aircraft. After seeing that his students were out and away from the OH-58, Mr. Drennon retrieved the fire extinguisher and put out the fire. **(USAAVNC-PAO)**

Aviation Life Support Equipment (ALSE). Aviation life support equipment personnel will be interested in a training circular being developed at the Aviation Center. It is TC 1-62, "Aviation Life Support Equipment," scheduled for final print this quarter of fiscal year 1980 and for distribution to the field during the third quarter. The training circular will provide information on the description, inspection and requisitioning procedures for the following life support areas: Publications, triservice; supply, triservice; survival vest, SRU 21/P; survival kit, individual, hot climate; survival kit, individual, cold climate; survival kit, individual, overwater; first aid kit, general purpose; survival vest, OV-1 Mohawk; and oxygen systems. Worldwide distribution of the training circular will be made through normal supply distribution channels. **(DTD-TL-USAAVNC)**

Proper Seatbelt Installation for the OH-58. During Aviation Flight Standardization Evaluation/Assistance Visits, Directorate of Evaluation/Standardization OH-58 Kiowa standardization instructor pilots (SIPs) have noted widespread discrepancies in the installation of the pilot's and copilot's seatbelts on aircraft with MWO 55-1520-228 30-19 completed. TM 55-1520-228-23, page 2-20A, paragraph 2-93b and figure 2-7a, page 2-20c, outlines the proper installation of the pilot's and copilot's seatbelts. Figure 1 shows the proper and improper

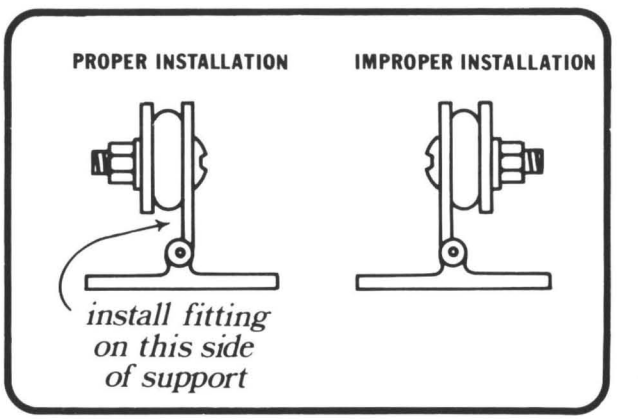


Figure 1

seatbelt installations. The pilot's and copilot's seatbelts are designed to be installed in this manner to ensure crashworthiness. If properly installed, the force exerted by the seatbelt in the crash sequence is directed to the hinge, while, if improperly installed, the force exerted by the seatbelt is across the hinge, which can cause the hinge to be overstressed and subsequently fail (see figure 2). This deficiency can

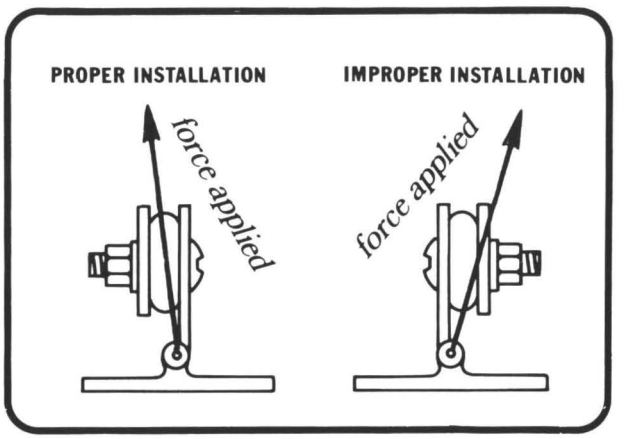


Figure 2

be detected easily during the preflight and corrected on the spot. By correcting improperly installed pilot's and copilot's seatbelts, crash survivability can be greatly enhanced. **(DES)**

Reporting Final

Late News From Army Aviation Activities

FROM ALASKA

120th Aviation Company Rescue. Two Army UH-1H Huey helicopters carrying medical personnel from Ft. Richardson helped save the lives of three passengers and the pilot of a small fixed wing aircraft that recently crashed near Mile 95 of the Glenn Highway. An eyewitness reported the craft bursting in flames seconds before it crashed. Medical staff from the camp transported the victims from the crash site to the airstrip where helicopters from Ft. Richardson's 120th Aviation Company transported them to Elmendorf AFB and Providence hospitals.

The first chopper on the scene was piloted by Chief Warrant Officer Brian Arsenault with copilot Captain Jack Bonniwell and Private First Class Wilbur Moore, crewchief. Medical experts, Specialist 5 William Peeke and Staff Sergeant Jeffrey Mankoff, were aboard the first helicopter and administered intensive medical aid while preparing the casualties for medical evacuation.

A second helicopter piloted by Chief Warrant Officer Carl Gastineau, with Lieutenant Eric Cunningham as copilot and crewchief Sergeant Melvin Kimmons, met with the first Huey and the patients were transported to the hospitals.

New MAST Program. The 283rd Medical Detachment (Helicopter Ambulance) at Ft. Wainwright has been given the okay from the Department of Defense to set up a military assistance to safety and traffic (MAST) program in the interior region of Alaska. It started last month, according to Major Ronald Hembry, commander of the 283rd Medical Detachment and provides emergency medical helicopter evacuation within a 129-nautical mile radius of Ft. Wainwright, north of the Alaskan Mountain Range.

(172D INF BDE PAO)

FROM JAPAN

Highest Aviation Safety Award. The highest of the United States Army's aviation unit safety awards recently was presented to Lieutenant Colonel Lesly F. Ware Jr., Commander, United States Army Aviation Detachment, Japan by Brigadier General Joseph H. Kastner, Chief of Staff, United States Army Japan. The U.S. Army Aviation Safety Award of Excellence represents 6 consecutive years of flying (1 July 1970 to 30 June 1976) without a recordable aircraft accident. The unit's outstanding accident-free performance totals more than 18 years.

(USARJ PAO)

Highest Aviation Safety Award

BG J.H. Kastner (right) makes the presentation to LTC L.F. Ware Jr.

FROM FORT EUSTIS

Transportation School Hotline. Got a question about correspondence courses, SQTs or resident courses of the U.S. Army Transportation School? Something puzzling you about transportation doctrine or literature? Well if you don't know where to turn or what to do, let your fingers find the solution.

The Directorate of Evaluation for the Transportation School has set up a 24-hour hotline to provide Transportation Corps Soldiers a quick response to their needs. The AUTOVON number is 927-3571 or commercial (804) 878-3571. Don't forget that the hotline is a two-way street. The Transportation School is looking for suggestions and recommendations from the field that will improve their service.

(USATC)

FROM ST. LOUIS

SOTAS and the YEH-60B. The second of two multimillion dollar contracts for the aircraft and avionics of the Stand-off Target Acquisition System (SOTAS) was awarded by the U.S. Army Aviation Research and Development Command to the Sikorsky Aircraft Division of the United Technologies Corp. Sikorsky's contract for eight prototypes of the YEH-60B helicopters is for $36.62 million. The avionics contract for the SOTAS of $54.89 million was awarded earlier this year to the Motorola Corp.

Terms of the Sikorsky agreement provide that UH-60A Black Hawk helicopters be converted to the YEH-60B configuration. The contract terms include training, technical data and publications, system test and evaluation, development tests, test and evaluation support and air transportability, component handling adapter and rotor blade deice kits.

First of the eight prototypes of the YEH-60Bs is to be delivered in mid February 1981, two in March and one each in April, May, June, August and September of that year. Each SOTAS helicopter will be equipped with a rotating antenna beneath the aircraft and a data terminal inside the cabin. The primary mission of SOTAS is to detect the movement of enemy forces on the battlefield and relay the information to personnel on the ground. There the information is processed further and displayed on terminals with video screens.

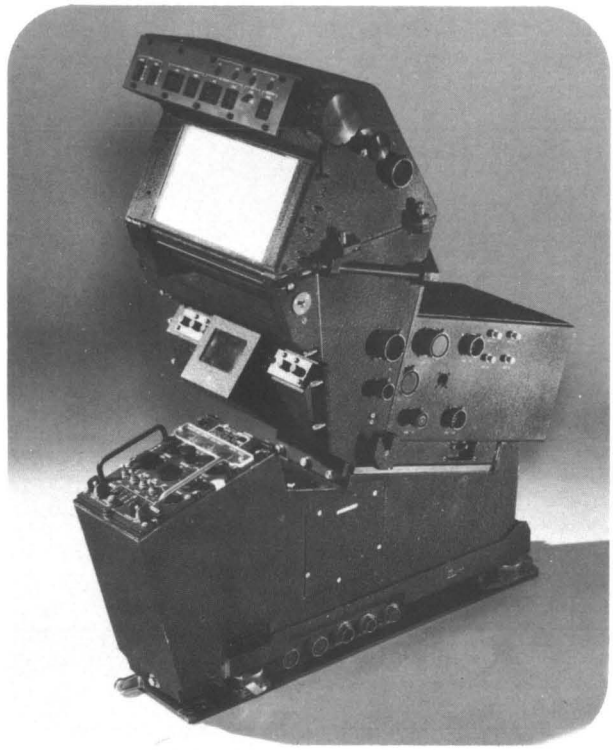
(AVRADCOM PAO)

FROM EUROPE

Broken Wing Award. A 3rd Support Command Soldier received the coveted Broken Wing Aviation Safety Award in ceremonies recently for safely landing an AH-1 Cobra after engine failure. Captain Gene R. Petryk of Headquarters and A Company, 205th Transportation Battalion, was piloting the Cobra, at about 800 feet, over a spotted forest near Hanau when he heard an unusually loud grinding noise coming from the engine transmission area. Although the instrument panel showed no malfunctions, he decided to make an emergency landing.

As he spotted a landing site he saw the engine power gauges quickly dropping to zero. Remembering his lessons, Captain Petryk made a safe emergency autorotative landing. An inspection of the helicopter revealed about 3 pounds of compressor blade material in the tail pipe and engine compartment and minor cracks in the fiberglass fairing around the nose turret.

(3RD SUPPORT CMD PAO)



Mohawk Gets Improved SLAR

FROM MARYLAND

U.S. Naval Test Pilot School (USNTPS) Alumni. An effort is underway to update the USNTPS alumni records. To ensure your receipt of a Reunion/Symposium invitation, please send your current address to: Administrative Officer, U.S. Naval Test Pilot School, Naval Air Test Center, Patuxent River, MD 20670. **(USNTPS)**

Mohawk Gets Improved SLAR. An improved side looking airborne radar (SLAR), the AN/APS-94E, has been delivered to Europe by the U.S. Army Electronics Research and Development Command (ERADCOM) at Adelphi. Installation of the new units on the twin engine OV-1 Mohawk is expected to be completed soon. As the primary surveillance sensors on the Mohawk, the SLAR provides near realtime detection of moving targets at ranges of up to 100 kilometers. Deployed with Mohawk units in Germany and Korea, it is used in border surveillance. The APS-94E uses dry film processing techniques to produce hard copy photographic imagery and replaces the APS-94D which employes wet chemical processing. ERADCOM's Combat Surveillance and Target Acquisition Laboratory (CSTAL) at Ft. Monmouth, NJ provides technical direction for the system's development. Senior CSTAL engineers Jack Harary and Victor Jiranek directed the project.

(ERADCOM PAO)

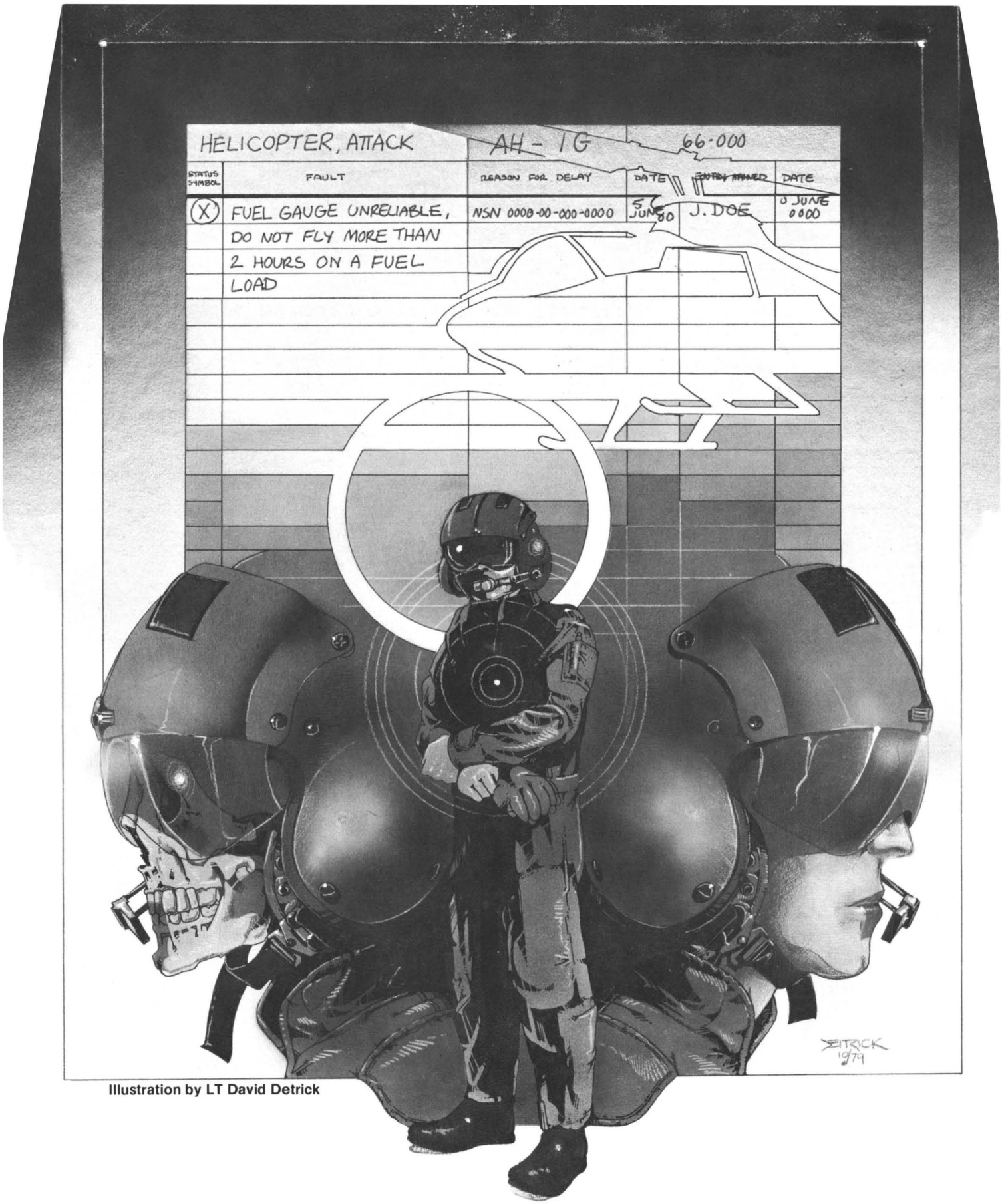


Illustration by LT David Detrick

THAT SENSE OF URGENCY

Risk always has been a significant factor in the aviation profession, yet measures can be taken to minimize the risks in the training environment. "That sense of urgency," desirable as it is, should not override rational reasoning and behavior by aviators and support personnel, and it is the responsibility of commanders to ensure safety and the conservation of resources in the training environment

Prepared and Loyal! Mission Ready! The Buck's Cashed Here! Can Do! Airmobile, Sir!

Are these titles for "gung ho" late night movies? Are they zealous, over-drilled phrases? Hardly! Any military unit worth its salt owns one born of tradition. Such mottoes are exclaimed proudly and held as an ideal.

Each phrase shares common denominators: adrenaline—energy—desire—the will to win; *that sense of urgency* to accomplish the mission.

Military history remembers the commanders who could spring the valve and get the adrenaline flowing—from Missionary Ridge to Iwo Jima to the Parrot's Beak.

Safety and the conservation of resources in the training environment is a formidable responsibility of commanders. They control the flow to ensure that *that sense of urgency*, as desirable as it is, does not override rational reasoning and behavior by aviators, maintenance technicians, petroleum handlers and support personnel. It is a formidable task indeed and aviation commanders who charge their staffs and subordinates to assist them decrease by 90 to 100 percent their chances of having to write to families of deceased crewmembers. Risk is inherent in the aviation profession, yet it can and should be minimized in the training environment.

That sense of urgency that so easily can lead to mission blindness in the "preparing to fight" environment is not a new theme for an aviation safety article. *Aviation Digest* articles allude to it often. FLIGHT-

CW3 Raoul Archambault III

Troop B, 3rd Squadron, 4th Cavalry
Schofield Barracks, HI

FAX recently said, *"The very nature of search and rescue missions produces a strong sense of obligation to carry out these missions. This can easily lead to runaway and illogical reactions where crew and aircraft capabilities are exceeded . . . commanders must ensure that the capabilities of the crews and aircraft are not exceeded and that aviators do not violate flight discipline due to a sense of urgency."* No this is not a new theme, but one well worth repeating.

The nature of any aviation mission produces a strong sense of obligation for accomplishment. Our professional ethics demand we get the job done and the declaration, "Above the Best," was not born of selective noncompliance with mission orders.

I propose to renew the theme by referencing personal experiences and incidents that clearly illustrate an unchecked sense of urgency leading to mission blindness. I am not trying to embarrass anyone or point a finger. Several who may read this article could say, "Hey! That sounds awfully familiar." If anyone is embarrassed then I share your embarrassment. I am one of the principal characters in two of the situations depicted below. It *is* my intent to stimulate thought among all aviation personnel; to encourage reflection, discussion and careful analysis of similar incidents in your units and thereby to promote safety consciousness.

"Ahhh," you say, "another instructor pilot berating us to be safety conscious! I think I'll stop reading this article right now. I'm fed up with this safety business—there are so many regulations and restrictions now I can't keep up with them—Federal Aviation Administration, 95-1, 95-5, United States Army Forces Command, division, brigade; battalion and squadron, company and troop. Everybody has to tack their 2 cents worth on. How can I train my people to survive in the ferociousness of combat, and teach them to give ground commanders the support they expect and deserve when my people are hung-up on being safe?"

How can you? Whether you are a battalion or company commander, platoon or section leader; platoon or section sergeant, maintenance officer; instructor pilot, pilot or safety officer, *you can!* You can by realizing that the intrinsic value of safety consciousness is axiomatic in any successful military operation. *It is tempered discipline.* It is the external rules and regulations that if diligently practiced and adhered to become internalized. Once ingrained they give us the framework within which to develop the ability to think logically with split-second timing; develop the ability to evaluate effectively our capabilities and limitations under the sustained fear and hardship of combat.

Discipline internalized, and thus tempered, provides the framework within which to develop the ability to precisely control *that sense of urgency* to get the job done, because we will know how to evaluate the odds of success versus failure when (and if) we individually choose in combat to break this or that rule, stretch it out or exceed a limitation.

You can, in essence, train your people to get the job done and survive. Your resources are conserved and your losses held to a minimum by inculcating safety consciousness in the training environment. By *demanding disciplined evaluation and analysis* of every situation from daily maintenance to preflight to ordnance delivery, you can ensure ground commanders that they will receive your support—not just in one "hell-bent-for-leather" display of aviation prowess but time and time again by surviving *to return to the battlefield* with a precise, professional sense of urgency.

Consider the following experiences and resurrect your own. Talk about them in your morning operations briefings or your safety meetings: tear them apart and evaluate them.

Incident One

During a unit deployment exercise, a platoon of eight Army helicopters launched VFR (visual flight rules) for a 200-mile journey

to a training site. Competition between unit commanders, individual platoons and maintenance personnel to see who could get all of their aircraft to the destination as a group was keen. Competition is a valuable management tool when properly stimulated and monitored. The adrenaline was flowing and *that sense of urgency was there.*

Because the platoon was short of aviators, nonrated crewchiefs occupied copilot positions. Midway through the flight one of the pilots informed the flight leader that his airspeed indicators were inoperative. The flight leader directed the pilot to divert to a civilian airfield adjacent to the route and to remain there until the problem was corrected. Another aircraft was detailed as an escort. The remainder of the flight continued to the destination.

Once the aircraft was safely on the ground, maintenance personnel, who arrived aboard a chase aircraft, attempted to repair the indicators; however, no required, appropriate entry was made in the aircraft logbook as to the grounding condition. A precautionary landing had been made but went undeclared—unreported—and therefore unknown to the aviation community.

The unit commander arrived and was informed of the problem. He encouraged quick action. This was the only aircraft botching the deployment. When the maintenance officer reported the repairs completed, the pilot was ordered to continue to the destination. The pilot wondered aloud whether or not a test flight should be performed. No sweat—no write-up on DA Form 2408-13—no flight worthiness check required.

An extraordinary conversation took place between the pilot, commander and maintenance officer to the effect that should the indicators be faulty and the pilot should have to ditch the aircraft, no one would ever know the airspeed indicators were inoperative. What did the crewchief have to say about all this? Nothing. What does he know? He is just a nonrated trooper who never needed to read Army Regulation 95-1 concerning required equipment for VFR flight (isn't it just for pilots anyway?). Yes, he knew a little about TM 38-750, but he was just along for the ride in safe, competent, professional hands.

The pilot departed the civilian airfield with the designated escort. Prior to reaching the shoreline he determined the indicators were still inoperative. Instead of returning immediately to the civilian airport he elected to continue the flight, endangering the life of the nonrated crewmember, as well as his own, over a distance of more than 95 nautical miles across open ocean and 10 foot swells.

I say "endangering" because it is questionable whether the pilot concerned (or any pilot for that matter) could successfully accomplish an autorotation to open water or the ground using only an attitude indicator for reference, or the perceived attitude of the aircraft. It is questionable whether or not a successful running landing could have been performed (minimum airspeed during an AH-1 hydraulics failure?); a fixed pedal or a loss of thrust could have been disasterous.

What about inadvertent instrument meteorological conditions? Air-to-air inquiries from the escort helicopter about the airspeed indicators went unanswered. The flight leader, upon seeing the pilot at the destination site, inquired about the status of the aircraft. The pilot told him the indicators had not been properly repaired, that he was not fully cognizant of the danger involved, and that he did not return to the civilian airfield "because of what the commander would have said. He wanted the aircraft here." (Who was the pilot in command?) Perhaps the most unsettling revelation in this conversation was that the pilot first became aware of the malfunction during takeoff *from the home base airfield.* He did not want to be "the one" to leave the flight.

Logbook entries were made at the destination airfield, the aircraft was repaired and flight-checked. The pilot, not thoroughly knowledgeable of his duties, exercised poor judgment and violated published procedures. By regulation, compliance with published procedures is mandatory unless specifically waived. What of the commander's judgment? The maintenance officer's? The crewchief's?

Oh, that sense of urgency leading to runaway and illogical reactions where crew and aircraft capabilities were exceeded.

He made it though! Besides, if he had put down in the ocean no one probably would have known.

Incident Two

Prior to a 2-day aerial gunnery range exercise, a company commander summoned an instructor pilot (AH-1) to discuss a night firing exercise. When asked his opinion of the plan, the instructor recommended strongly against it at that particular time for several reasons:

- **No one in the firing platoon had done any night flying for the past 2 months. (What happened to your night flying when minimums disappeared for awhile during ATM transition?)**
- **The aircraft were not performing well in severe dust and wind conditions at the altitude of 6,000+ feet (range elevation MSL).**
- **The heavily scratched and damaged canopies from operating in a volcanic dust environment.**
- **The total lack of acceptable forced landing areas in the range area.**
- **The unacceptable wind shear conditions (090 degrees at 20 knots/gusts to 33 at the firing line; 270 degrees at 24 knots/gusts to 35 at the cease firing line).**
- **The lack of an acceptable night horizon for training purposes.**
- **The recommended supplemental oxygen requirements for night operations above 4,000 feet.**
- **The fact that the platoon would be conducting a range exercise all day from dawn to dusk.**
- **Air and ground crew fatigue would be critical.**

After listening to the instructor's recommendations and without further discussion the IP was told he would conduct the night firing exercise.

"Yes, sir. Your training objectives, sir?"

"Well, none actually. The battalion commander is coming and I want to show . . . we've really got it together. Take him downrange. Shoot."

"Yes, sir. Can you arrange for illumination?"

"Do you really need it, or can we get by . . . ?"

"We're going to need it."

"Okay."

After 13 continuous hours on the range the platoon fired at night.

The two instructors were physically and mentally exhausted. Let's pick up some of the conversation:

- **The pilots: "My turret won't fire!" (There were no weapons installed)**
- **The armorers: "I thought you knew what you were doing!" (The ammunition was loaded backwards)**
- **The crewchiefs: "Sir! I've been looking for that screw driver." (It was on the engine deck)**

All were exhaused. The instructors advised the platoon leader that fatigue was critical, and triggered the following conversation:

"No sweat . . . look sharp . . . the colonel's inbound."

"But . . ."

"But nothing . . . one of you *will* take the battalion commander downrange. That's an order from the CO. You guys decide who."

The instructors went back to the line. Let's listen in to their conversation:

"Aw, I'll do it."

"How many hours have you flown today?"

"Let me see . . . huh . . . about eight, I guess."

"Well, I've flown about seven, so I'll do it."

"Are you sure? You don't look too good . . ."

"I'm not sure of anything right now . . . I can't think straight . . . but we've got a mission."

"You know, the SIPs (standardization instructor pilots) back at Rucker (Aviation Center) wouldn't believe this."

"This isn't Rucker."

"Yeah, but I wouldn't want to be the one to explain what we're doing."

"Me either. You remember what they told us in the IP course? Demand professionalism . . . set an example . . . it's your duty to promote safety consciousness . . . do not act in any unsafe manner . . . don't allow anyone to pressure you into being unsafe . . . set the example."

"The SIPs don't write my OER."

"Maybe we should just refuse to do it."

"That's insubordination. Besides the ol' man has really been prepping the colonel . . . might make him look silly . . . life could get miserable."

"For some reason, I find that hard to believe right at the moment."

"There are ways, my friend, there are ways."

"Well, I guess you're right. I can handle it. I used to fly 12- to 14-hour days in 'Nam. I'll dazzle them with my footwork. What pad did I leave that aircraft on?"

The mission was flown. The battalion commander was qualified but not current in the aircraft, or familiar with the operation of the weapon systems. In his preoccupation with the commander in the cockpit the instructor nearly collided with a flare projectile. The flare extinguished.

"Boy, it is black up here!"

"Yes, sir. (I really love that lady . . . those kids . . .)"

WHAM!

"What was that?"

"Wind shear, sir. The tailrotor—we're going to get smacked crosswind and base. (Don't fail me now, sweetheart, just a couple more passes.)

After expending all ordnance the instructor began the pattern back to the rearm pad. From downwind to base he lost complete visual acquisition with the lighted landing pad. The battalion commander "controller guided" the pilot in for landing.

"Well, thanks for the ride."

"Yes, sir. (Rage . . . thanks aircraft . . . thanks God. Relax . . . release the death grip on the cyclic . . . lady luck . . . I feel high . . . who's next? . . . dull headache feeling . . . flight time . . . 30 minutes . . . 30 minutes? That's all?"

Oh, that sense of urgency leading to runaway and illogical reactions where crew and aircraft capabilities are exceeded.

Read through the incident again, if you will, and identify as many errors in judgment and execution of responsibilities as you can. How does this incident stack up against the principles of night flying outlined in TC 1-28? How about the aeromedical factors?

Army Regulation 95-5, one of those external rules we are dealing with, does not leave any room for misinterpretation or misunderstanding: *"Commanders will ensure that sound flight principles and safe practices are followed in all flight operations regardless of mission urgency."* (*Chapter 3, paragraph 3-1*). *The Army aviator will: ". . . maintain strict air discipline with respect to regulations, rules and ethics."* (*Chapter 4, paragraph 4-4*).

These rules are well known and so obvious to many of you that I may be charged with belaboring the point. But, it deserves belaboring. Consider the following statement of our neighbors to the north: "If you think that mission accomplishment and a safe operation are conflicting requirements, you and your unit are living with problems that should be corrected. Perhaps your accident record shows that; if not, you've been lucky." (Colonel J. R. Chisholm, Director of Flight Safety, Canadian Armed Forces—DIGEST, July 1978.)

Without strict adherence to the external rules and regulations the framework within which rational decisions can be made is never established. The philosopher William James observed that "reason is but a speck on a sea of emotion."

We cannot ignore the necessity for reasoned decisionmaking in this profession and, therefore, cannot risk operating without establishing the framework. We simply cannot afford it. We are outnumbered and outgunned by staggering proportions on the battlefield of the future. If we consider the full impact of this reality it becomes strikingly clear that the conservation and effective use of resources in the preparatory stages is imperative.

Army Regulation 95-5, Chapter 11, paragraph 11-3, is worth careful consideration as you evaluate this thesis and provides a vehicle of thought leading to a truly dangerous subaspect of a training environment void of safety consciousness. The paragraph reflects behavioral science research and states, "people who work intimately with a system [in our case "man-machine-environment"] may become thoroughly familiar with its deficiencies to the point of failing to

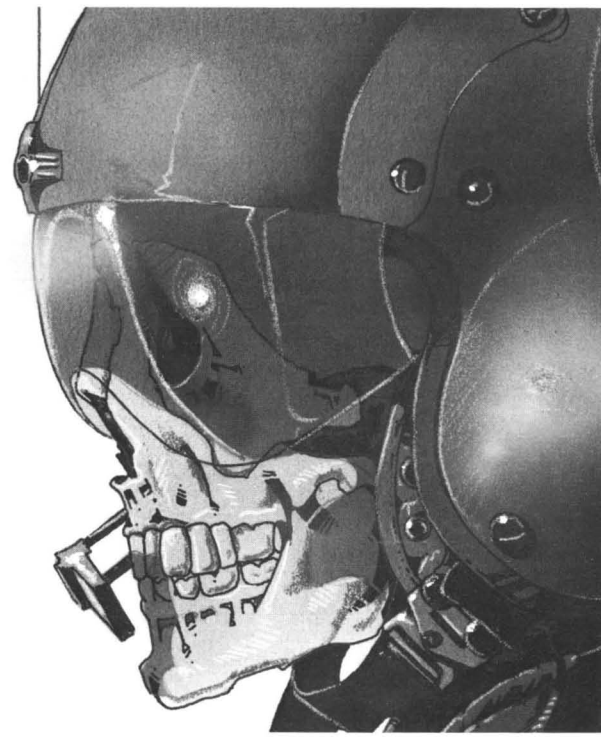
consider improved ways of accomplishing the same result."

In other words, the expedient though unsafe practices and procedures exercised in direct violation of regulations and researched data soon become, in the daily activities of the practitioners (the commanders, the maintenance technicians, the pilots) the standard operating procedures. Bad habits become acceptable habits.

"Hey, no sweat, we've always done it that way."

By any measure of aviation professionalism this attitude illustrates maladaptive behavior. The change or removal of environmental conditions that may be serving to reinforce and maintain this attitude is absolutely necessary to conserve and develop resources.

Let's consider what can happen in such an environment. The following incident, in statement form from an instructor pilot, clearly illustrates runaway and illogical reactions where crew and aircraft capabilities are exceeded. It involves perhaps the most inexcusable of errors in the aviation profession—fuel exhaustion. Consider how that sense of urgency—unchecked and uncontrolled—incapacitates people in terms of disciplined decisionmaking ability. They are unable to foresee the consequence of irrational actions until the results approach catastrophic proportions.



Incident Three

During the week of 5 June 1978 through 9 June 1978, I was the designated pilot in command of Army aircraft 66-Blank. My mission during the week was to fly the aircraft to the aerial gunnery range, remain onstation with other platoon elements, and to conduct gunnery training in my capacity as an AH-1G instructor pilot. My secondary mission was to provide full cooperation and courtesy to a civilian newsteam in a public relations effort requested by the team and approved by the division information officer. I was to provide the newsteam with film and facts regarding the training being conducted and the unit's role in support of the division.

When not working directly with the newsteam, training was being conducted in accordance with FM 17-40, Exercise 1A, 3A and 5A (Individual and Crew Qualification). The officer in charge of the range was my platoon leader. The range safety officer was the unit's aviation safety officer.

I preflighted aircraft 66-Blank on Monday, 5 June 1978, at about 1230 hours. The aircraft logbook reflected an entry that the fuel quantity gauge was unreliable. The aircraft status was a circled red "X" with the restriction that it was not to be flown more than 2 hours on a fuel load. The aircraft was not originally scheduled to be taken to the range because in order for the 2-hour flight restriction to be valid, the aircraft would have to be topped-off with fuel before each flight. The originally scheduled aircraft list was reshuffled twice on 1 June 1978 because of maintenance and armament problems. An unscheduled unit training holiday on Friday, 2 June 1978, depleted maintenance personnel support and the platoon pilots continued the shuffle on Friday and Saturday to provide an adequate complement of mission ready aircraft for the following week. The aircraft I was originally scheduled to use was not ready due to starting malfunctions. The maintenance officer was ordered to work Friday by the platoon leader and attempted to fix the aircraft.

During my preflight of 66-Blank I checked the operation of the fuel quantity indicator and determined that the gauge was operational to the extent that it would "bracket" the amount of fuel aboard. The gauge needle would fluctuate between 1,500 and 1,700 lbs. I made this check in conjunction with a visual inspection of the fuel level. If I had determined the gauge was totally unreliable I would not have accepted the aircraft for the intended mission; however, I was approaching the takeoff time and running out of choices. It is impossible to fully fuel and adequately arm the AH-1G for training at the range. One provision has to be traded for another to accomplish the mission due to gross weight, density altitude, temperature and power requirements establishing go/no-go limitations.

I filed a tactical flight plan at base operations for 84 hours of training. I was the pilot in command and the approving authority. The platoon leader was my copilot.

We did not fire any exercises on Monday, 5 June 1978, due to the late arrival of ammunition. We commenced firing on Tuesday beginning with weapon harmonization and Exercise 1A. I maintained a fuel quantity of 900 to 1,000 pounds during these and subsequent firings. As an added safety precaution, I verbally restricted the aircraft to 30 to 45 minute firing runs and required refueling after every flight. I had fuel added to the aircraft based on time calculations and the bracket quantity indications in the cockpit. I considered average cruise consumption rate ineffective due to the mode of flight being employed. Nap-of-the-earth flight and aerial gunnery require continuous power changes (in masking and unmasking maneuvers, e.g.) and the weight of the aircraft constantly changes as fuel and ammunition are expended. By using a hand-held computer, the clock, the −10 and the bracket indications I determined I could successfully accomplish the mission; however,

because the flight time and fuel load computations required close monitoring, I verbally restricted the aircraft to operation with an instructor pilot aboard, preferably myself inasmuch as I was doing the monitoring.

On Tuesday, 6 June 1978, I ordered the platoon maintenance sergeant to call the maintenance officer by landline for a new fuel quantity indicator. On the same day two AH-1 Cobras from a sister unit arrived to await weather improvement at home base. Aboard one was a maintenance officer. I asked him if one of my crewchiefs could swap fuel indicators between our respective aircraft. He cooperated and by installing a good indicator in my aircraft I was able to determine that the problem was not entirely with the faulty gauge. The newly installed gauge still gave bracket indications but the bracket was 50 percent smaller. The indications only fluctuated plus or minus 100 pounds instead of plus or minus 200 pounds. After this test was performed the original indicator was reinstalled and I entered in the aircraft logbook that either the forward or aft fuel cell quantity probes were not working properly. A faulty circuit from one of the probes could be causing the needle to fluctuate by virtue of a short circuit. The logbook entry was given a red diagonal status by the maintenance sergeant who was also a technical inspector.

On Wednesday the newsteam arrived accompanied by division public information personnel. The unit commander, who had recently assumed command, arrived on the range. The maintenance officer arrived with a replacement aircraft for one of our Cobras that was experiencing armament problems. My aircraft was on rearm pad #5 and was loaded with ammunition. The maintenance officer went to the aircraft and began troubleshooting the quantity probes. While he was working the media personnel were receiving a formal briefing from my platoon leader. When I was introduced to the newsteam on the rearm line, the maintenance officer was still working and had the aft probe wiring completely disconnected. He was being assisted by the technical inspector. While they continued to work I briefed the newsteam on the aircraft systems and conducted a cockpit and passenger briefing in accordance with the dash 10.

The flight downrange was delayed while we waited for the maintenance personnel to finish. When he finished, the maintenance officer told me that the indicator was now completely inoperative. I asked him how I was to determine my fuel quantity now. He replied that he had determined that I had 980 pounds of fuel aboard by adjusting or crossing the wires. I used this figure as a base figure for my time and load calculations. I continued the mission using half-hour increments for flight and adding fuel after each run. Entering into my decision to continue was that as an added safety backup to my calculations was the master caution and segment warning light for 10 percent fuel. It is important to note that there is a difference between the 20-minute fuel light employed in the UH-1 and the AH-1 10 percent light. The 20-minute light is predicated off the average mean rate of fuel consumption in the UH-1. The 10 percent light in the Cobra is predicated on 10 percent usable fuel in the tanks. If you have no other caution lights on, the 10 percent light will come on at 160 pounds. You have then anywhere from 15 to 18 minutes left of usable fuel.

The fuel cells are connected by a crossover line and in the bottom of each cell is a float switch. If you have no other caution lights on, the fuel level has to fall below both of the float switches before the light will activate representing 160 pounds. If you had a fuel boost pump failure and the light came on it would still be valid. When the fuel boost fails it simultaneously changes the circuitry through the float switches. Instead of these switches being wired in series where both of them have to make contact, the first one to have fuel fall below it will make contact. It may not happen at 160 pounds, but could happen as high as 320 pounds. The point is it is normally a reliable system and the light should "flicker" before it activates solidly. In combat, when assisting the ground commander in contact, the flicker was the signal to break off and head for home for turnaround. Within the confines of the range the flickering light would have given me more than sufficient notice to land. After each half-hour of operation I added 65 gallons of fuel (423 pounds).

The aircraft status remained red diagonal and I continued my mission on my evaluation of the safety considerations balanced against the importance of accomplishing the mission. I was flying on a calculated risk basis attempting to accomplish an important mission for my battalion and division under circumstances that I was not appreciative of in the first place. In the final analysis, I was relying on the 10 percent fuel segment warning light to buttress my own calculations which I should not have been making in the first place. I should have never accepted the aircraft at home base and, at the very least, I should have grounded it when the indicator went completely inoperative. FM 44-41, paragraph 3-16d, page 3-11, states that any fault that could become dangerous by continued use will be considered a red "X" condition.

Because rain and wind interfered with the newsteam's activities it did not finish its work as scheduled on 7 June. The newspeople returned on 8 June, and I continued to fly the same aircraft. In terms of functioning armament systems and the show, we were doing the best we ever had. The filming was to take 20 minutes to complete; however, due to weapon systems which they particularly wanted to film not working, I extended the period to accommodate the media. On a calculated risk basis, I abandoned the first safety restriction I had self-imposed to limit flight to only one-half hour.

My computations prior to the flight indicated I had at least 900 pounds of fuel. I extended the period to 1 hour relying on the 10 percent fuel warning to provide backup. The 10 percent fuel light never flickered or activated. While in left hand traffic returning to the rearm pads and while downwind over the ocean, my fuel pressure began to fluctuate. I called the range tower and requested immediate clearance for landing. I made an emergency final approach at 100 knots prepared to perform a flat glide autorotation to a grassy area forward of the rearm pads. I extended this approach in order to ensure clearance of the wires at the approach end of the range. I did not declare an emergency as such because I did not want to cause any unnecessary panic in the cockpit with my civilian passenger.

Prior to selecting the grassy area I ruled out the beach because children and dogs were playing there. The fuel pressure continued to fluctuate and decrease as I terminated my approach. My 10 percent light did not activate, I still had my engine at termination so I came to a hover because the selected landing area, although flat, was covered with 4 feet of grass and I could not determine the nature of the terrain. My forward and aft fuel boost lights came on just prior to termination. When this happened my fuel pressure went to zero.

I hovered in a left circle away from the tall grass to return to pad #5. As I was approaching the pad, my N1 began to fluctuate and I elected left and short of the pad to execute a hovering autorotation. I landed the aircraft smoothly and the engine continued to run for 2 minutes at engine idle. I accomplished a normal shutdown and had ground personnel assist my passenger out after the weapon systems were safe and clear. I made appropriate logbook entries and dis-

mounted to inspect for damage. There was none. I then reported to the platoon leader and safety officer what had taken place.

Later in the day I was informed by the maintenance officer that I could have known exactly how much fuel was aboard by connecting a probe wire he had disconnected. When I inquired as to why he did not tell me that the day prior he remarked that he forgot about it, thinking only about it on his way out to recover the aircraft after the incident.

That sense of urgency—unchecked, uncontrolled—primarily by four key individuals—the instructor pilot, the platoon leader, the maintenance officer and the safety officer. All were operating in an environment particularly susceptible to mission blindness. Accomplishment of the mission was the primary concern. The public relations effort *had* to be successful. The new unit commander *had* to be impressed with the "can-do-it-no-matter-what" platoon. In this regard, maladaptive behavior was viewed as correct and adaptive. The civilian passenger involved almost became a statistic for his own newsprogram.

A careful analysis of this last incident reveals numerous "cues" available throughout as warning signals in an environment void of safety consciousness. Each cue, in turn, was ignored.

The new unit commander inherited quite a mess in terms of a rational, safe operations environment. His coincidental entry on the scene serves to illustrate a second dangerous subaspect of this kind of environment. The same desire that motivates subordinates' behavior toward their superiors in industry and business is prevalent in the military—the desire to please the boss. It is even more acute in the military because of the unreasonable weight placed on efficiency reports for career progress. Naturally, subordinates have a keen interest in knowing what is required to please the boss.

If the same standards are acceptable one day and unacceptable the next, people get confused and resort to whatever action seems most appropriate. It is a human relations game of Russian roulette and in aviation units it is an invitation to disaster. Commanders above all must therefore be consistent in their philosophies and actions. Double standards, lip service to regulations and researched data are absolutely out of the question. They should not tolerate it in the training environment.

By demanding disciplined evaluation and analysis of every situation from daily maintenance to preflight to ordnance delivery, commanders can accomplish their missions and conserve their resources. They cannot do it alone. They must charge their staffs and subordinates to assist them; impress upon them that it is their duty to help weave a system of safety conscious checks and balances.

Check and balance daily—Soldier to Soldier—Soldier to machine—Soldier to environment.

Has *that sense of urgency* run amok in your individual and unit operations? Does your accident record show it, or have you been lucky?

Maintenance-error mishaps increasing

IN RECENT years, maintenance-related cause factors have been cropping up in more and more mishaps. A study of maintenance-error mishaps covering the period 1 January 1974 through 31 March 1979 revealed that maintenance errors appeared in 9.8 percent of all precautionary landings, 14.5 percent of all forced landings, 16.7 percent of all incidents, and *21.6 percent of all accidents.*

During the slightly more than 5-year period studied, inadequate or improper maintenance was responsible for 34.5 percent of all mishap damage costs. This means that out of a total of nearly $87 million in damages, $30 million resulted from maintenance errors. And the costs don't end there. Maintenance deficiencies resulted in 39 (22.7%) of the 172 fatalities that occurred during this time frame. In addition, these inadequacies accounted for 130 (27.5%) of the 472 total injuries.

In 1974, the maintenance-error mishap rate for rotary wing aircraft was about one-half that for fixed wing. Today, it has caught up with the fixed wing rate, and, in fact, appears on the verge of exceeding it. Maintenance-error mishaps have increased for all types of rotary wing aircraft. Statistics show that the overall maintenance-error mishap rate for AH-1/TH-1 aircraft has increased by almost

one-third over the 1974 figure; for UH-1 aircraft, it has almost doubled; for CH-47/CH-54 aircraft, it has more than doubled; and for OH-58 aircraft, it has nearly quadrupled.

A case-by-case analysis was made of 1,663 maintenance-error mishaps to identify the maintenance errors that caused or contributed to the mishap.

Rotary wing aircraft

Rotary wing aircraft logged 6.2 million hours of flight or 86 percent of the total number of hours flown by both rotary wing and fixed wing aircraft. Excluding OH-6 and TH-55 helicopters, a total of 2,076 maintenance-related errors were instrumental in producing 1,391 rotary wing mishaps.

Following are the maintenance errors most often committed:

UH-1

A total of 1,008 maintenance-related errors were present in 687 mishaps.

- Improper installation and routing of fluid and pneumatic lines, including O-rings and seals, accounted for 139 errors.
- Errors involving improper voltage regulator adjustments and battery servicing appeared 77 times.
- Improper torquing occurred 92 times.
- Improper wiring procedures resulting in frayed, broken wires, shorts and loose cannon plugs accounted for 61 errors.
- Maintenance-induced FOD to engines and components appeared 85 times.
- Improper inspection procedures accounted for 224 errors.
- Errors involving improper adjustment of fuel controls, overspeed governors, VIGV actuators, and bleed bands appeared 79 times.
- Improper assembly of tail rotor control systems and tail rotor assemblies accounted for 43 errors.

OH-58

A total of 493 maintenance-related errors were involved in 262 mishaps.

- Improper torque appeared as a cause factor 84 times.
- Maintenance-induced FOD to engines and components appeared 92 times.
- Improper inspection procedures appeared as a cause factor 84 times.
- Improper wiring procedures resulting in frayed, broken wires, shorts and loose cannon plugs accounted for 50 errors.

AH-1/TH-1

A total of 287 maintenance-related errors were present in 242 mishaps.

- Improper installation and routing of fluid and pneumatic lines, including O-rings and seals, accounted for 56 errors.
- Forty-nine errors involved improper torque.
- Errors involving improper inspection procedures appeared 70 times.
- Improper wiring procedures resulting in frayed, broken wires, shorts and loose cannon plugs appeared 14 times.

CH-47/CH-54

A total of 288 maintenance-related errors were present in 200 mishaps.

- Improper installation and routing of fluid and pneumatic lines, including O-rings and seals, accounted for 64 errors.
- Errors involving improper torque appeared 35 times.
- Improper hatch, door, and window maintenance and adjustment occurred 29 times.
- Thirty errors involved improper inspection procedures.

Fixed wing aircraft

Fixed wing aircraft logged 1.0 million hours of flight or 14 percent of the total hours flown by both fixed wing and rotary wing aircraft. A total of 382 maintenance-related errors were instrumental in producing 272 fixed wing mishaps.

- These errors were associated most often with the landing gear system. In fact, 110 of them related to this system. In 52 errors, switches were either improperly installed or adjusted. In 58, malfunctions of actuators occurred because of inadequate or improper maintenance.
- Improperly installed fluid and pneumatic lines, including O-rings and seals, accounted for 60 errors.

Maintenance-error mishaps increasing

- Errors involving improper installation, adjustment or lubrication of throttle, mixture and propeller controls appeared 29 times.
- Improper wiring procedures that resulted in frayed and broken wires, loose cannon plugs, and electrical short circuits occurred 27 times.
- Twenty errors involved improper torque.
- Improper maintenance on engines, propellers, and propeller governors accounted for 19 errors.
- Another 19 errors were associated with improperly secured cowling and inspection panels.
- Errors involving loose or improperly sealed fuel and oil caps appeared 18 times.
- Improper installation and adjustment of fuel controls, injector pumps, and carburetors accounted for 16 errors.

Other maintenance faults were associated with the following, in descending order of incidence:

- Improper ground handling of aircraft.
- Leaving tools in aircraft.
- Improper inspection procedures, adjustment of voltage regulators and cleaning of engines and airframes.
- Maintenance-induced FOD to engines and aircraft components.
- Improper installation and securing of doors and windows.
- Inadequate servicing of aircraft with fuel and oil.
- Improper maintenance, adjustment, and inspection of flight controls.

How many of the maintenance errors listed can honestly be justified? The answer is probably none. Why should UH-1 maintenance personnel have committed 92 errors involving torquing procedures? Or 139 errors involving the installation and routing of pneumatic and fluid lines? Why should OH-58 maintenance personnel have performed 92 improper acts that produced FOD to engines and other components? Similar questions can be posed concerning the actions of maintenance personnel associated with all other rotary wing and fixed wing Army aircraft. With possibly few exception, these errors were preventable.

No attempt was made to determine specifically what caused or allowed the error. However, the information does provide some insight as to the types of errors associated with maintenance-caused mishaps. Managers and supervisors of maintenance personnel should consider the errors cited here in light of their maintenance operations. A review of the causes of mishaps and aborted flights in a unit might show that the unit's contribution to the Army-wide maintenance mishap experience is far greater than originally believed, or maybe ever far less. Whichever the case, corrective actions are needed.

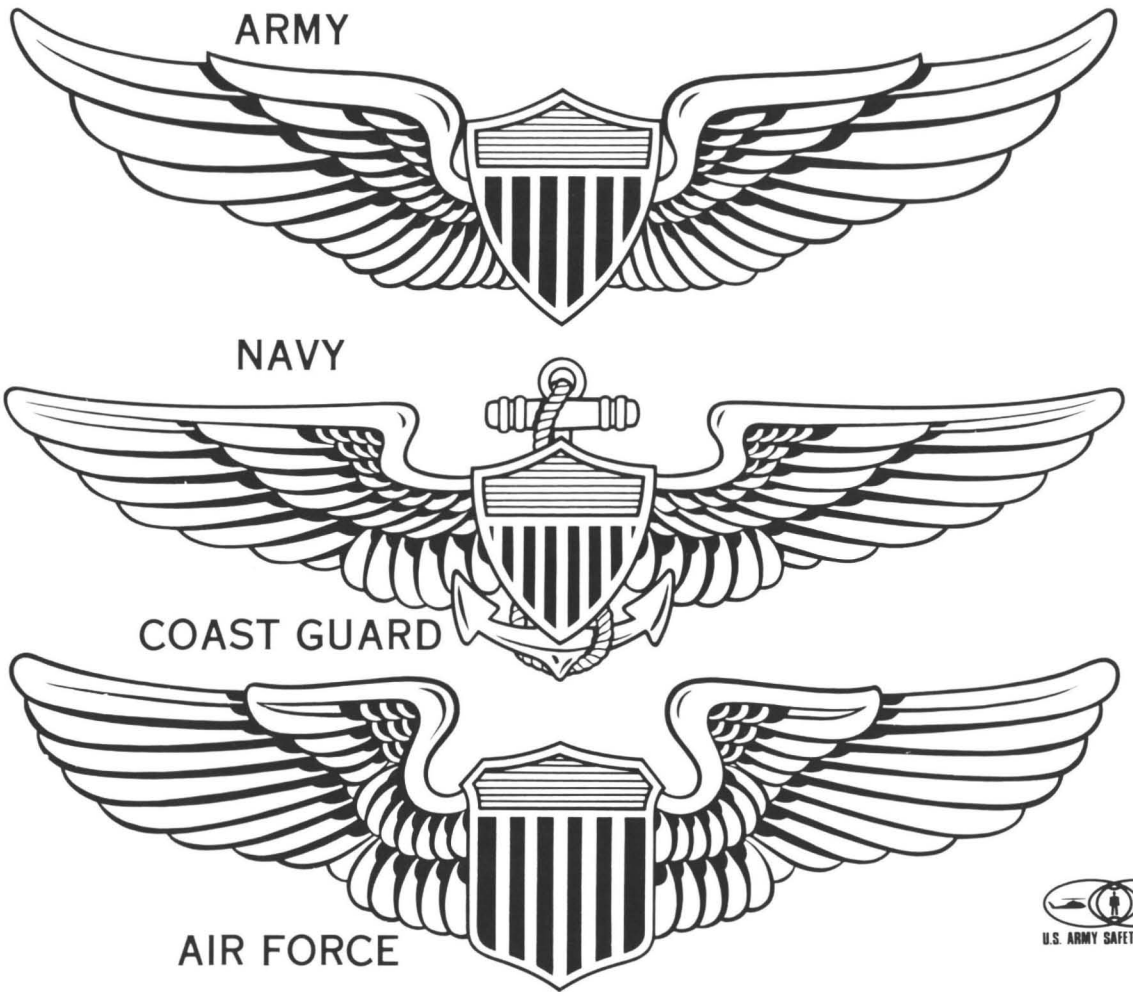
Recently, the cause of a UH-1 engine failure was traced to improper washing procedures. In this instance, personnel were hosing down the engine while it was in operation. Yet, the TM procedures for cleaning this engine specifically states that the engine will be shut down a minimum of 45 minutes before being washed, and that washing will be done by means of spray equipment (not hose) while the engine is motored with the starter. Why wasn't this procedure followed?

During the course of another accident investigation, it was revealed that, while maintenance cause factors may not have been responsible for the accident, mechanics at the installation were not following correct procedures nor heeding the cautions stipulated in TM 55-1520-210-20 when replacing UH-1 trunnion assemblies. Common discrepancies noted were the use of screwdrivers or other unauthorized tools to spread trunnion housing ears during removal and installation of trunnions; failure to properly align trunnion slots with bolt holes; and forcing retaining bolts in place by pounding them with a hammer or twisting them with a wrench when bolt holes and trunnion slots were improperly aligned. After these facts were publicized, one unit inspected their aircraft and found 29 trunnion mount discrepancies. Again, why weren't correct procedures being followed?

Actually, there is no reason why maintenance errors cannot be virtually eliminated. In its simplest form, good maintenance is trained personnel following correct procedures. Review the findings of practically any maintenance-error mishap, and then ask yourself if that mishap could have been prevented. In almost every instance, the answer will be yes.

While failure to follow by-the-book procedures was by far the most frequent maintenance error, the study also revealed other major areas affecting the quality of maintenance, such as training, technical manuals, and personnel, particularly the shortage of qualified first-line NCO maintenance supervisors. The conclusions of this study were forwarded to DA where a special task group is now working to determine ways and means for improvement.

Army Safety Center hosts 18th JSASC



U.S. ARMY SAFETY CENTER

THE ARMY SAFETY CENTER hosted the 18th Joint Services Aviation Safety Conference (JSASC) in August at Fort Rucker, Alabama. This conference is held annually and the host function is rotated among the Army, Air Force, and Navy. The Coast Guard is also an active participant. The objective of the conference, initiated by the Navy 18 years ago, is to enhance aviation safety by discussing areas of mutual interest and seeking solutions to common problems.

Representatives from the Canadian Forces, the Federal Aviation Administration, the National Transportation Safety Board, and the National Aeronautics and Space Administration were also on hand to help strengthen aviation safety among our allied neighbors and other government services and civilian agencies.

Major General James H. Merryman, commander of the Army Aviation Center, kicked off the conference by welcoming approximately 75 military and civilian safety representatives to Fort Rucker.

The conference was officially opened by Brigadier General Joseph C. Lutz, Assistant Director, Human Resources

"Safety is a very important business for all of us because its ultimate goal is to preserve our resources so that we are ready to go to war if called upon."

Army Safety Center hosts 18th JSASC

Development, Deputy Chief of Staff for Personnel, Department of the Army, whose office is responsible for the Army Safety Program. In his keynote address, General Lutz pointed out that the equivalent of an entire battalion of people was killed last year in Army accidents and that more than half of these fatalities occurred in privately owned vehicles. For this reason, he asked all the safety center commanders to take a hard look at this situation and consider incorporating general safety into future Joint Services conferences.

Rear Admiral Stuart Nelson (Ret), Office of the Deputy Assistant Secretary of Defense for Environment and Safety, echoed General Lutz' concern for the loss of service members in POV accidents. He also spoke of the high-level interest in safety within the Department of Defense, particularly in the area of occupational safety and health.

Major General James F. Hamlet, Deputy The Inspector General (Investigation and Assistance), told the audience that the JSASC has "priority and visibility at the highest levels of the Army" and that "good ideas should be shared."

Also addressing the conferees were Brigadier General Garry A. Willard, Jr., Director of Aerospace Safety, Air Force Inspection and Safety Center, Norton Air Force Base, CA; Captain C. L. McGathy, representing the Commander, Naval Safety Center, and Director, Aviation Safety Program, Norfolk, VA; Colonel Edward E. Waldron II, Commander, Army Safety Center, Fort Rucker, AL; and Mr. William K. Lowry, Chief, Safety Programs Division, U.S. Coast Guard, Washington, DC. They discussed their problems and accomplishments in aviation safety.

The major portion of the conference was spent in five separate discussion seminars. Chaired by Army Safety Center personnel, these seminars addressed 54 agenda items dealing with life sciences, analysis, system safety, education and training, and aircraft mishap prevention and investigation. The seminars resolved most of the agenda items.

As a result of the conference, in the near future we can expect to see:

- A revised Joint Services Safety Training Film Catalog which lists safety films, audio-visuals, and commercial products along with complete ordering information.
- A Joint Services listing of all Safety Education Courses.
- A Joint Services Supervisor's Safety Correspondence Course.
- Slide tape programs on helicopter aerodynamics, dynamic rollover, and ground resonance.
- A revised Joint Services booklet for civilian authorities on what to do and how to report military aircraft accidents.
- A seven-point wire strike prevention program.

Items which require further evaluation and discussion will be acted upon during FY 80 by separate panels or at the 19th annual JSASC next year.

Brigadier General Lutz closed the conference with these words: "Our business is to restore and sustain the fighting force in all our armed services. We must continue to march in the areas of accident prevention and safety awareness."

MG James H. Merryman, Commander, Army Aviation Center, welcomes JSASC conferees to Fort Rucker.

COL Edward E. Waldron II (right), commander, Army Safety Center, discusses some safety aspects with BG Garry A. Willard Jr. (left), Director of Aerospace Safety at the Air Force Inspection and Safety Center, Norton Air Force Base, CA, and COL J. Robert Chisholm, Director of Flight Safety for the Canadian Forces.

The author describes ongoing and conceptual improvements which will allow the OH-58 Kiowa, an observation helicopter, to be used as an alternative aircraft to perform the scout role until the fielding of the advanced scout helicopter (ASH), the ultimate scout, in the mid-1980s.

the Improved OH-58

Major (P) Vincent P. Mancuso
Office of TSM, Advanced Scout Helicopter
Fort Rucker, AL

THE U.S. ARMY's OH-58A Kiowa observation helicopter initially was purchased and fielded in 1969 during the Vietnam War. It was obtained as a replacement for the OH-6 Cayuse to perform the varied missions of administrative coordination, liaison, light logistical resupply, artillery spotting and general observation.

The end of the Vietnam War and the ensuing shift of national defense priorities brought into focus the need for an aerial scout aircraft for artillery, air cavalry and attack helicopter units which could perform and survive in the European high threat environment.

Figure 1

	OH-58A	OH-58C
Maximum Allowable Gross Weight	3,000	3,200
Maximum Airspeed (knots)	120	120
	HOGE/VROC @ 3,000 lbs	HOGE/VROC @ 3,200 lbs
Sea Level/59 degrees Fahrenheit	900 ft/Min	630 ft/Min*
2,000 ft/70 degrees Fahrenheit	90 ft/Min	500 ft/Min
2,000 ft/95 degrees Fahrenheit	Cannot Hover	440 ft/Min
4,000 ft/95 degrees Fahrenheit	Cannot Hover	110 ft/Min

***This reduction in vertical rate of climb when compared with the OH-58A is caused by the additional 200 pounds max gross weight of the OH-58C. Steps are being considered which may further increase the OH-58C transmission rating. If this occurs the sea level VROC of the OH-58C will increase from 630 ft/min to 1,117 ft/min.**

OH-58C: The OH-58A Product Improvement Program (PIP) leading to the OH-58C, began in 1974 as a result of the ASH Special Task Force (STF) conclusion that a near term interim solution to the aerial scout deficiency was needed. To fill the void the STF prepared an interim scout helicopter (ISH) ROC that would improve the OH-58A flight performance and improve its target acquisition capability using hand-held optics.

The ISH ROC was approved by Headquarters Department of the Army on 12 November 1975. The first of these modified aircraft came off the Bell Helicopter modification line and were accepted by the Army in August 1979.

The OH-58C incorporates the design improvements discussed below.

T63-A-720 Engine. The T63-A-720 engine replaces the T63-A-700 engine and increases the shaft horsepower (shp) from 317 to 420; thereby providing capability of better performance on hot days and at high altitudes (see figure 1).

Main Transmission Vulnerability Reduction. A new four pinion planetary transmission replaces the present three pinion transmission on the OH-58A. The new four pinion planetary system's advantages are increased maintainability and reliability, plus a 30-minute dry run capability. The four pinion planetary system features four pinion gears supported by cylindrical roller bearings in a silver-plated steel cage.

Improved Mast Bearing. A new improved mast bearing will be installed.

Low Glare Canopy. A four panel, flat acrylic windshield is provided to replace the two panel fully contoured acrylic windshield. This reduces the high degree of solar signature produced by contoured windshield panels, thereby minimizing the vulnerability of the aircraft and its crews. Also, susceptibility to reflective glint and possible distortion from within the aircraft will be eliminated.

Instruments and Controls. Incorporation of a new instrument panel by retrofit provides the following improvements:

- The attitude and turn/slip indicators are replaced with a self-contained 4 inch attitude director indicator incorporating a turn rate needle, an inclinometer and navigation pointers.
- A course direction indicator is added.
- A transmission oil pressure gauge is added.
- The 2-inch torque indicator and instantaneous vertical speed indicator are replaced with 3-inch instruments.
- Space provisions are added for additional warning system and navigation system indicators.
- The master caution panel is relocated from the lower console to the instrument panel.

In developing the OH-58C instrument panel, consideration was given to improving the instrument lighting for compatibility with night vision goggles, reducing glare in the cockpit, consolidating the navigation displays, reducing the pilot scanning requirements and allowing space for additional systems. All instruments are front panel mounted for ease of maintainability.

Transmission Low Oil Pressure Warning System. An improved transmission oil pressure warning system is provided by retrofit. This gives the pilot the capability of determining transmission oil pressure via an instrument panel mounted gauge. The system uses a pressure transducer and a pressure gauge. Incorporation of the system provides a safety feature whereby the pilot can determine if sufficient oil pressure exists to continue flight at a reduced power setting.

Controllable Landing Light. The two fixed-position landing lights on the OH-58A have been replaced by one variable direction 450-watt light that is controlled from the cockpit by two switches: an ON-OFF-STOW function switch on the collective stick and an EXTEND-RETRACT, RIGHT-LEFT rotation switch on the pilot's cyclic stick grip. This installation allows the pilot to direct the landing light beam as desired without changing the helicopter attitude. It also can be used as a search light, thus contributing to overall system effectiveness. Incorporation of the light makes the performance of tactical training and administrative night flying more satisfactory.

Environmental Control:

• *Cabin Air.* New ducts have been added to the distribution system which routes air from the rear cabin overhead ducts, down the bulkhead center post, and under the crew seats to new bulkhead outlets near the cabin floor. This new system avoids door post routing, thus reducing the pressure drop and temperature losses currently encountered in the OH-58A system. The new system also provides adjustable foot warmer outlets for rear cabin passengers.

• *Windshield Defogging System.* The windshield defogging system modification connecting the hot air and/or outside vent air flow through the defogging blower and nozzle requires two duct tees with flapper valves (one for each nozzle) and ducts to connect to the inlet side of the blowers. In this configuration, the defogging blowers, which circulated only cabin air through the defogging nozzles in the OH-58A configuration, now have the capability of boosting air directly from the heater or outside vent air (or a mixture of the two) through the defogging nozzle. This configuration also results in better cabin circulation for hot air or outside ventilation air.

• *New or Improved Components.* Several hardware modifications to the heating and ventilation system have been incorporated—improved blowers, an improved jet pump heater and a new air temperature sensor. The improved vent/defogging blowers provide longer life by using an improved sealed bearing design. Also, accessibility for blower removal is provided. The improved jet pump heater incorporates internal modifications to improve the efficiency of the mixing valve which allows performance limited only by bleed air flow available from the engine. The new temperature sensing unit increases the maximum heater outlet temperature from 200 degrees Fahrenheit to 235 degrees Fahrenheit.

• *Cabin Insulation.* Improved cabin insulation is achieved by modifying the insulation blanket which snaps to the passenger seat back bulkhead. The addition of Velcro fasteners to the blanket edges between the snap fasteners helps to seal the rear cabin from air leaks to the rear fuselage area, thereby reducing heat loss from the cabin.

Reduced Vulnerability Flight Control System. A reduced vulnerability flight control system is incorporated in the directional systems of the aircraft. This will prevent the disabling of the control system by enemy fire which exists in hostile areas of operation and endangers the aircraft without causing total failure to that system. The reduced vulnerability of directional control system is achieved by installing a backup system separate from the primary one. The backup directional controls are actuated via a push-pull cable assembly. To reduce vulnerability, the cyclic control system was redesigned using aluminum alloy castings with the cross section of the arms changed from an angle to an "H" section.

Detecting Set, Radar Signal. As with Radio Receiving Set, AN/ARN-123, CPO for Detecting Set, Radar Signal AN/APR-39(V)1 will be available within the OH-58C. AN/APR-39(V)1 provides the pilot with

Glossary

ASH	**advanced scout helicopter**
CPO	**complete provisions only**
FM	**frequency modulated**
HOGE	**hovering out of ground effect**
IR	**infrared**
ISH	**interim scout helicopter**
NOE	**nap-of-the-earth**
PIP	**Product Improvement Program**
RF	**radio frequency**
ROC	**required operational capability**
shp	**shaft horsepower**
STF	**special task force**
VHF	**very high frequency**
VROC	**vertical rate of climb**

ABOVE: OH-58C instrument panel improvements

Night vision goggle compatible
Radar warning
Improved attitude indicator

RIGHT: Front view of OH-58C The OH-58C at home in the NOE environment OH-58C improvements

Variable direction 450-watt controllable landing light
AN/APR-39 radar signal detecting set antennas

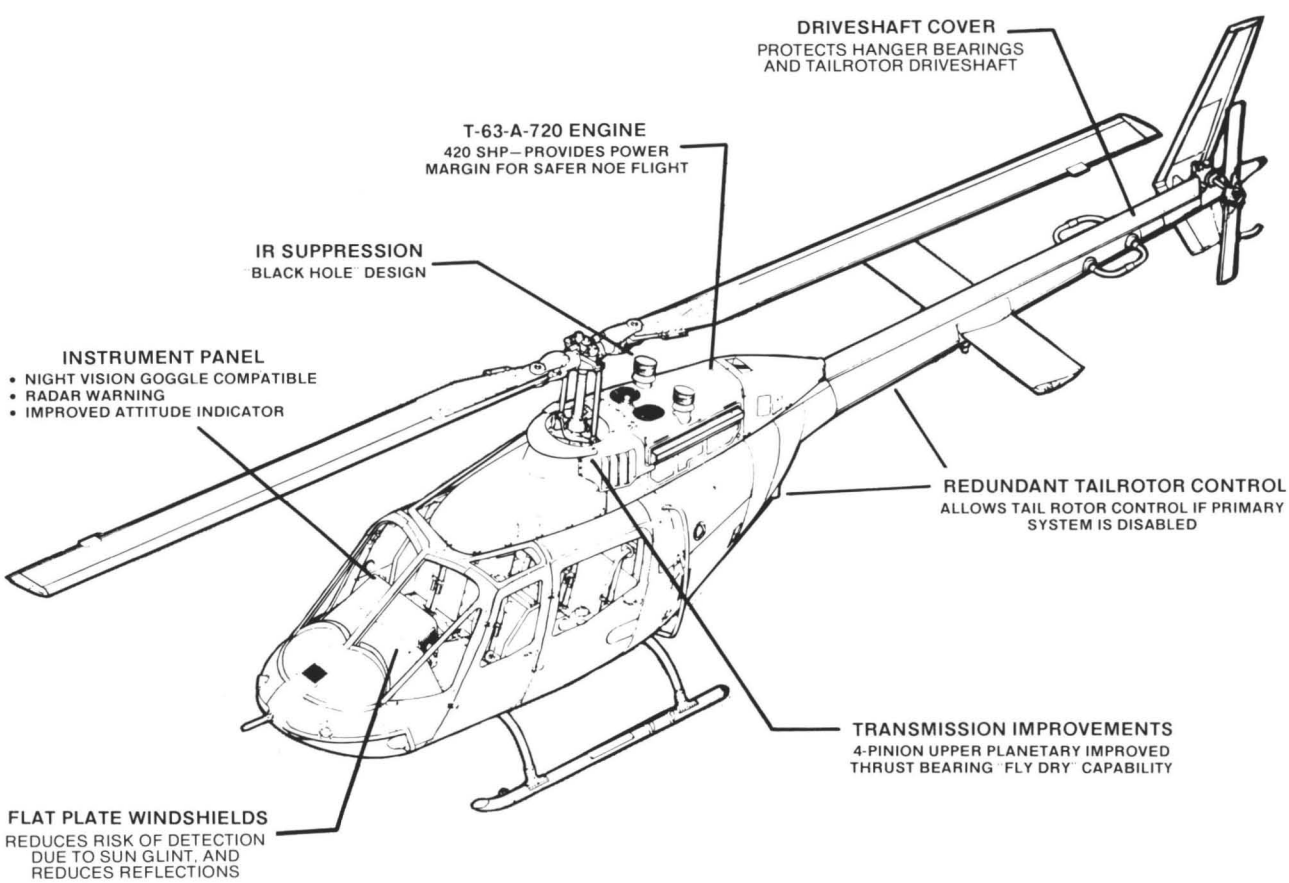
an accurate warning that the aircraft is being illuminated by threat type tracking and guidance radars.

IFF Diversity Transponder AN/APX-100(V)1. This is a lightweight space diversity transponder, functioning to receive the RF interrogations from two antennas and to transmit the reply to the antenna from which the stronger interrogation signal was received. It operates in Modes 1, 2, 3/A, C, 4 and Test and has a built-in test capability in all modes. Special reply features available to the operator include Emergency, I/P and X Pulse. Major component of the AN/APX-100(V)1 is RT-1156/APX which is panel mounted and includes all indicators and controls necessary to operate the system.

IR Suppression. IR signature suppression cowl shields and stacks have been added.

NOE Communications. The OH-58A has a limited means to transmit and receive radio communications during NOE missions which deny line-of-sight transmissions. Since the preponderance of OH-58C scout missions will be flown at NOE, the aircraft will be provided an NOE communications system using either modified VHF/FM radio equipment, modified high frequency equipment, or a combination of these. This will provide non-line-of-sight communications which minimize aircraft exposure to line-of-sight threat weapons while allowing for effective communications with other battlefield elements.

These and other possible improvements to the OH-58 which are being investigated such as Doppler navigation and an improved target acquisition/designation system are recognized to be an interim solution only designed to give the Army an aircraft that will serve its *near* term battlefield aerial scout requirements. It is not the ultimate solution as the OH-58C cannot adequately perform the scout mission. Investigation of new development, and/or major modifications of existing inventory helicopters as future alternatives to meet the Army's scout helicopter needs in the 1980s and beyond is continuing.



PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, DARCOM, ATTN: DRCPO-ALSE, POB 209, St. Louis, MO 63166

Retirement Age Extended

I know I can get your attention when I mention extending the retirement age, but don't take the remark personal. The retirement age of the foliage penetrating flare (NSN 1370-00-490-7362) which is a component of your SRU-21/P survival vest, has been extended to 6 years service life. The new 6 years service life is now compatible with the Air Force and Navy who also use this same item.

Lost PEARL?

No red-blooded Army aircrewmember would ever want to be caught without PEARL! We always recommend that you read PEARL and keep it readily available. But we realize that some of you have lost or misplaced your PEARL file. So, the personnel at Headquarters, 5th U. S. Army (Mr. Al Cargen or MSG Al Freeman, AUTOVON 471-3964 or 4063) have put together a pamphlet of PEARL articles (January 1978 through July 1979). Some of these pamphlets are available by calling the above numbers or writing to:

Commander
Headquarters, 5th U. S. Army
Aviation Division
ATTN: AFKB-TR-A
Ft. Sam Houston, TX 78234

Helpful Advice

The Federal Aviation Administration issued a safety suggestion recently, which we thought was worth passing on. "Carbon Monoxide—This is the time of year to winterize your aircraft. An important item in the winterizing program should be a thorough inspection of the exhaust cabin heater components for possible leaks. Carbon monoxide gas from such leaks could enter the cabin and result in crew incapacitation. Remember—when carbon monoxide gas enters the cabin, there is *no* warning; it is colorless, odorless and tasteless."

Inspect Your ALSE

A question asked recently concerned requisitioning a survival kit directly from the supply depot. The question was, is it acceptable to use without inspecting the kit first since it is a new item?

We recommend that all survival kits requisitioned directy from depot be inspected to ensure that they contain all the items, that the items bear current dates and that they will perform as advertised prior to their use. The following list is what one aircrewmember found wrong with his new overwater survival kit:

- CO2 bottle on raft was empty.
- Lanyards not attached from kit to CO2 bottle.
- CO2 bottle valve assemblies were obsolete.
- Rations were beyond expiration date.
- No inspection dates were on rafts.
- Signal flares were beyond expiration date.
- CO2 bottles were not inspected for proper CO2 charge.
- No spring in inflator assembly for raft.
- Zippers on cases were broken.
- No matches in match case.
- First aid kits had expired medical items.

Some aviation units have personnel trained by the Air Force and Navy who are available to assist you in inspecting survival kits. If you cannot locate one of these school-trained individuals, we recommend that you contact your nearest Air Force or Navy life support equipment shop for assistance. These people have the required test equipment necessary to give your survival kits their stamp of approval.

Requisitioning ALSE

Some DA Form 2765 requisitions have been returned marked cancelled because the ALSE items are not listed in the Army Master Data File (AMDF). The items not listed in the AMDF are:

NSN	Item	RIC	Cost
6230-00-267-7132	Boot, Dust & Moisture (SDU-5/E)	S9G	$ 1.23
5820-00-371-6806 (LS)	Antenna	FPZ	21.66
5340-00-827-0802	Protective Cap (SDU-5/E)	S9I	.02
4220-00-868-9259 (LS)	Cell, Floatation (LPU/10) L Hand	FPZ	15.10
4220-00-868-9260 (LS)	Cell, Floatation (LPU/10) R Hand	FPZ	15.97
5330-00-928-7029	Washer, Sealing (PRC-90)	S9I	.41

Hand processed "off-line" requisitions must be sub-

mitted by your supply section to obtain the above items. Note that some of the NSNs have (LS) on the end of the number. These are items stocked by the Air Force (FPZ) and the (LS) must follow the NSN for the Air Force to recognize it.

Materiel Readiness Bulletin

The Materiel Readiness Bulletin, published by TSARCOM, has much useful information for the troops, including aircrewmembers. The bulletin is distributed worldwide and it is intended that everyone in the Army see it. If you are not getting your copy, you may write to Commander, TSARCOM, ATTN: DRSTS-SPSA (1), 4300 Goodfellow Boulevard, St. Louis, MO 63120.

Judith Moulton
Photo by Dieter Baur

ATC ACTION LINE
UNITED STATES ARMY COMMUNICATIONS COMMAND

SID Radar Vector Departure Procedure

BASIC EN ROUTE IFR flight plan filing seems to cause most pilots little trouble. Some have questions about the departure and arrival phase, especially when there is SID, radar vectoring or departure procedure involvement.

A SID is a prescribed departure route charted to reflect the route to fly. It contains navigational information, altitude restrictions, if any, and other aspects of the departure routing from takeoff to the en route phase of flight. A flight plan filed should specify the SID you want by computer code, if one is assigned. Acceptance of an ATC clearance with SID involvement constitutes a contract with ATC that you will comply with all ingredients of the SID as published. If the departure controller finds it necessary or convenient to provide a radar vector during the SID phase, the radar instruction constitutes an amended clearance. The vector is usually to your advantage to avoid traffic conflict or to expedite or shorten the departure route distances. The controller should advise you the reason for the vector and the point at which you should rejoin the SID or en route structure. If this doesn't happen, make it happen by asking. You both must be in harmony.

If there is no SID, you should file direct to a point or fix within the en route structure. A clearance provides assurance there is no known IFR traffic conflict. It does not assure obstruction protection until you join a published route.

If a departure (route) procedure is published, you should file as above. You should then fly that procedure and when completed proceed direct to the filed point or fix within the en route structure. This type departure procedure constitutes a restriction as regards to free navigation in the departure phase. Some also may include a minimum climb requirement so as to safely overfly an obstacle that exists under the route. Some also may include a ceiling/visibility restriction which helps assure you can see and avoid a close in obstacle and then not be further restricted by the minimum climb factor provided. These are expressed: "300-1" or "minimum climb of 280 feet NM to 1800 feet." You also fly this route to the specified altitude and then direct to the field en route structure point or fix. Always expect radar service in areas where radar exists. It is not necessary to request radar vectors. Understand the rules so you can correctly follow the procedures and your safe arrival at destination is more reasonably assured. More on that issue in a future issue.

Readers are encouraged to send questions to:
Director
USAATCA Aeronautical Services Office
Cameron Station
Alexandria, VA 22314

the Improved OH-58

A new OH-58C Kiowa in flight after an acceptance ceremony at the Amarillo, TX Bell Helicopter Textron facility. The Kiowa was the first of 275 OH-58C observation helicopters the Army recently has ordered. (For more about the OH-58C see page 42.)