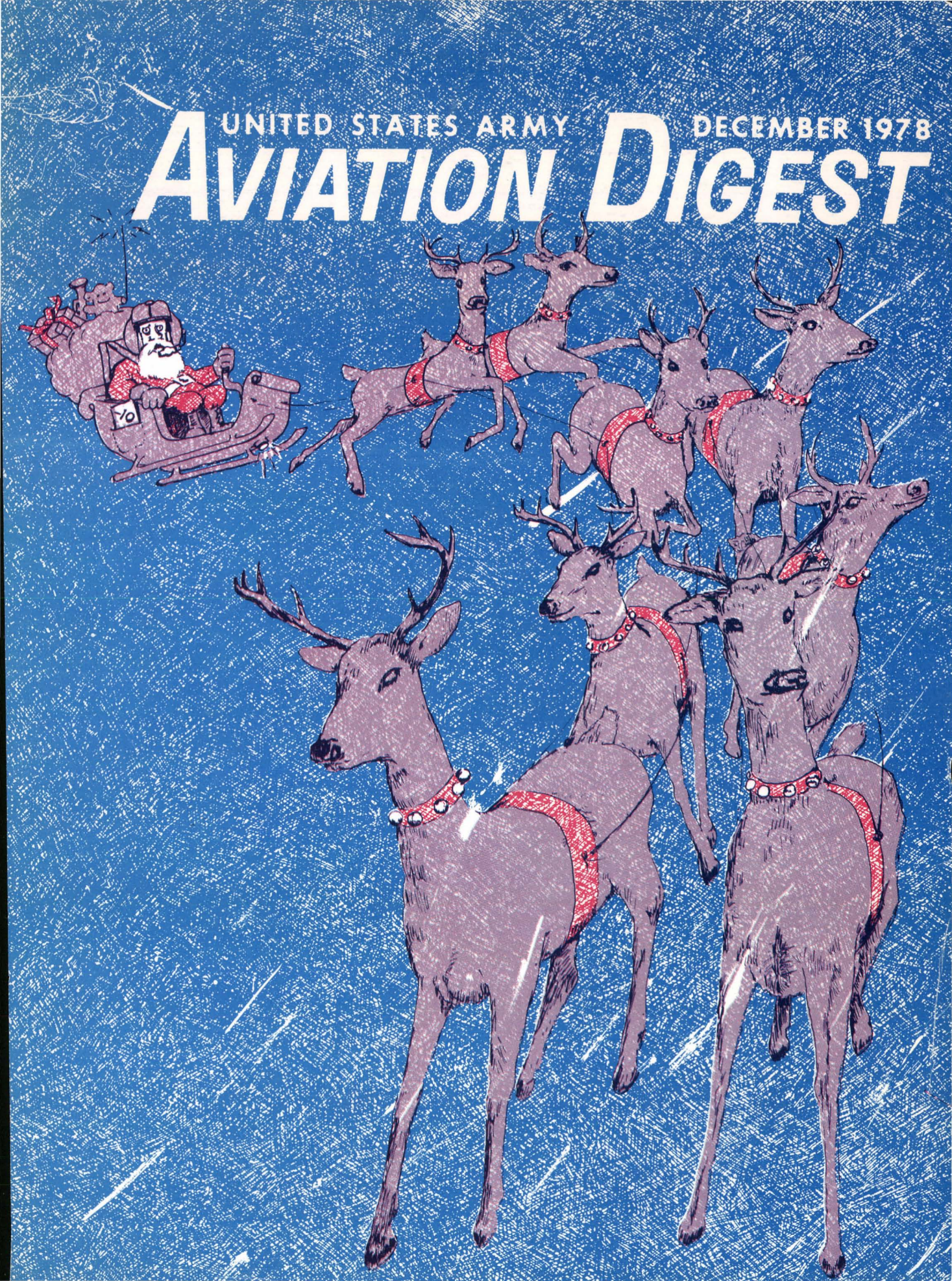
UNITED STATES ARMY DECEMBER 1978

AVIATION DIGEST



UNITED STATES ARMY
AVIATION DIGEST
DECEMBER 1978
VOLUME 24 NUMBER 12

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Richard K. Tierney
Editor

Cover by Fred Martin

The mission of the *U.S. Army Aviation Digest* 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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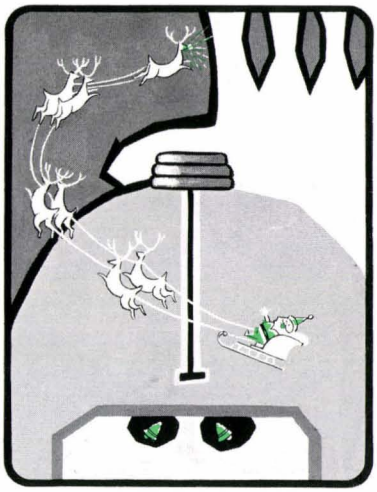
VIEWS FROM READERS



Editor:

Just received the August issue in my unit . . . so thought I had better write my letter before the rest of the world forgets what was in the August issue.

I was the action officer for that ODCSPER request for justification of aviator positions here in Eighth Army (August *Aviation Digest,* page 17).

Sometime after submitting our input we received a copy of the Aviation Specialty 15 Management Study telling how company grade aviators are in such critical supply while there are excess field grade aviators.

Last week we received a letter from ODCSOPS requesting us to examine our TOE/TDA and various TADS documents to locate slots that might be identified as field grade aviators, expertise — required positions. I've got that action too.

Some of the examples of positions that might be identified stretches the imagination somewhat. What this letter is getting to is this: Are you guys at ODCSPER and ODCSOPS talking to each other or are you going your separate uncoordinated ways?

Please sign me: *Confused!*

CPT Michael Stratton
HHC, 17th Avn GP
APO SF 96301

Editor:

The role of the attack helicopter has shifted drastically from the Vietnam era when it was used primarily as an antipersonnel weapon to the present primary mission of destroying enemy armor. Coupled with this shift of mission are the radical changes of doctrine and tactics which have evolved since the end of the Vietnam war. We now rely heavily on the use of terrain flight, minimum exposure, maximum standoff range and integration into the combined arms team.

We have equipped our active Army units with the AH-1S Cobra which is well suited for the antiarmor mission using current tactics. However, our Reserve components are still equipped with "substitute assets." These substitute assets consist of B, C and M model UH-1 Hueys armed with M-21, M-5 and a limited number of M-22 weapons systems. No matter how well trained and motivated our Reserve component aviators are, they are not properly equipped to fight on the modern battlefield. As currently planned, the Reserve components will begin receiving the AH-1S in the mid-1980s. Can we afford to wait 7 years to upgrade our Reserve component attack helicopter units to a viable fighting force? The obvious answer is NO!

What are our alternatives?

One possible solution is to accelerate deployment of the AH-1S to the Reserve components. However, because of the low number of AH-1Ss in the inventory this would leave a critical shortfall of AH-1Ss in the active Army.

A better solution is to procure a number of light attack helicopters for the Reserve and National Guard. We have a built in, ready to go solution as the Israeli and South Korean Armies are buying these type aircraft today.

The tube-launched, optically-tracked, wire-guided (TOW) equipped Hughes 500 M-D would provide the Reserve components with a light attack helicopter which is capable of fighting and surviving on the modern battlefield. The 500 M-D is a growth version of the OH-6A Cayuse which flew more than 2 million hours in combat for the Army in Vietnam. The 500 M-D retains the agility and simplicity of the OH-6A but provides 50 percent more payload and 25 percent more speed. A five-bladed main rotor, T-tail and increased engine power provide for greater performance, agility and stability for weapons delivery. Additionally, it is capable of carrying a variety of armament systems such as the TOW Missile System or XM-230 30 millimeter (mm) Chain Gun and 2.75 inch rockets which make it well suited for both the antiarmor and air cavalry missions.

In the TOW configuration, the 500 M-D is capable of hovering out of ground effect at 4,000 feet pressure altitude and 95 degrees Fahrenheit while carrying four TOW missiles with an endurance of 1.9 hours. The AH-1S under the same climatic conditions is capable of carrying eight TOW missiles with an endurance of 2.0 hours. For air cavalry operations the 500 M-D could be equipped with a 30 mm cannon and 2.75 inch rockets.

Given today's air defense threat, low aircraft signatures are essential for survival. Low visual, aural, infrared and

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BRITISH ARMY AVIATION

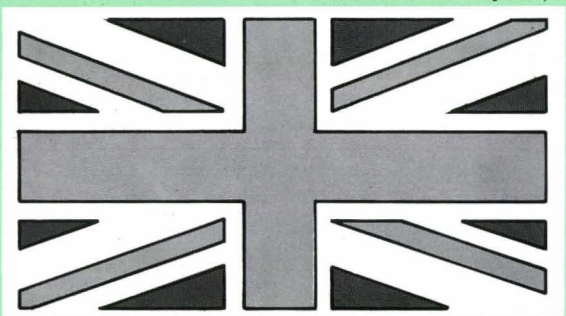
Army Air Corps Helicopter Operations At Night And In Adverse Weather Conditions

An adaptation of a presentation by Colonel A. C. D. Watts to Major General James C. Smith, Commander, U.S. Army Aviation Center

IN COMMON WITH all other arms and services, we in the British Army are trying to extend our capability so that we can operate throughout the 24-hour day, and therefore cope with adverse weather by day or night.

We already have accomplished a number of things:

The crew. Until recently Army air operations have been conducted by a single pilot. Within the last few years, however, the emphasis has changed and now we operate with two crewmembers: a pilot and air observer in reconnaissance helicopters and a pilot and air gunner in antitank guided weapon (ATGW) helicopters. The reasons for this change are:



- It is essential in the armed action role. The armed action role is exclusively the antitank killing role for which our utility helicopters currently are armed. The role is described as "armed action" rather than "antitank" because if we arm our aircraft in the future for purposes other than just antitank, it is a broad enough heading to encompass them all; e.g., arming them possibly for some close air support tasks or for airborne escort tasks during an airmobile operation.
- It increases our reconnaissance ability by having a trained observer equipped with stabilized optical equipment. Currently this is standard aircrew binoculars with the Kenlab stabilizer gyro. The AF 120 stabilized sight on ATGW helicopters is to be replaced by the Hughes tube-launched, optically-tracked, wire-guided (TOW) roof-mounted sight on the Lynx. A stabilized sight is to be fitted to all our reconnaissance helicopters in 1980.
- It relieves the workload on the single pilot-crewed helicopter, a factor particularly relevant to operations at night and in adverse weather.

New helicopters. The Gazelle has been in service for 5 years and the Lynx entered squadron service last summer. Both these helicopters are easier to fly than their predecessors, the Sioux and the Scout. They basically are more stable, allowing more of the crew's time to be devoted to the operational task rather than pure flying.

Night trials. A number of night flying and firing trials have been held, some in a series of trials nicknamed Firefly. These trials have produced much useful information on techniques and equipment, and have confirmed many of our views that until now have been largely theoretical. The aim of these trials was to determine:

- That aircrew could operate low level at night.
- That aircrew could acquire tank targets at night under white light out to ranges of 3,000 to 4,000 meters (m) again flying low level.
- That aircrew could hit tank targets at night using the M-22 missile under the optimum white light means which proved to be the 105 milli-

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FRENCH ARMY AVIATION

ALAT, Like U.S. Army Aviation, Is Emerging As A Key Element On The Modern Battlefield

Colonel Claude F. Regis
French Army Liaison Officer
Fort Rucker, AL

LIKE ITS U.S. Army counterpart, French Army Aviation, or ALAT *(Aviation Légère de l'Armeé de Terre)*, was born during World War II. It began in 1943 during the North African campaign when French Field Artillery units began using American made L-4s (Piper Cubs) as observation aircraft. The observers were Artillery officers but the pilots came from the Air Force.

It wasn't until 1953 that the French Army bought its first helicopters and began training its own aviators, observers and mechanics. In 1956, with a few Sikorsky H-19s and 100 Vertol H-21s, the first airmobile operations took place and aviation units were organized at division level.

In the early 1960s, facing the Soviet threat in Western Europe, aviation battalions were organized in each Army division. By that time, French aerospace industry was able to acquire the capacity to design and produce the aircraft and weapons needed by the Army.

Also like the U.S. Army, French Army Aviation is not a separate branch. Officers must serve at least 2 years in their respective branches before they may apply for aviation training; later in their careers they must return to their branches for additional service.

Personnel wise, there are about 6,700 — 500 officers, 2, 400 non-commissioned officers (NCOs) and 3,800 enlisted soldiers. Unlike the U.S. Army, a large percentage of ALAT pilots are NCOs. A general officer commands Army Aviation and is responsible for personnel management, training, safety and also acts as an advisor to the Army chief of staff for concepts and employment.

There now are 570 helicopters in the ALAT inventory, but the newly approved structure of the Army calls for 680 rotary wing aircraft:

- 360 light observation helicopters (half will be Alouette III, and half Gazelle).
- 180 antitank helicopters (70 Alouette IIIs armed with SS-11s; and 110 Gazelles armed with High subsonic Optically Tracked — or HOT — antitank missiles).
- 140 utility tactical transports (UTTs) (Puma SA 330s).

Aviation Units. Restructuring of the French Army began in 1977 and ultimately will result in a total reorganization of aviation units. Army divisions are being reduced about 60 percent and aviator assets are being transferred to corps level. To improve training and increase the combat effectiveness, combat and general support units now are separated. When the restructuring process is completed each of the three Army corps will have:

- One general support group of 30 LOHs.
- Two aviation combat regiments of 72 aircraft each. In addition, a few small general support aviation units are attached to the "Internal Defense Zones."

The aviation combat regiment has a table of organization and equipment which authorizes 864 personnel: 57 officers, 340 NCOs

RIGHT: Antitank infantry team disembarks with MILAN missile from SA 330 PUMA

BELOW: The utility/tactical transport PUMA with retractable landing gear down

and 467 enlisted soldiers (figure 1). The inventory includes 72 helicopters: 20 LOH/Scouts, 30 antitank helicopters and 22 tactical transport helicopters. Each of these type aircraft has a crew of two pilots.

An Army Aviation Command (COMALCA) exists at corps level and its mission is:

- To *prepare* and *conduct* airmobile operations.
- To dispatch the general support LOHs.

COMALCA has a personnel strength of 9 officers, 12 NCOs and 24 enlisted soldiers.

Operationally, COMALCA divides into three cells:

- With corps forward command post for planning and coordinating operations.
- In the vicinity of the corps forward command post to conduct the airmobile maneuver.
- With corps rear command post for logistics.

Equipment. There are two types of LOH/Scout aircraft, the old and new. The old is the Alouette II, which entered the ALAT inventory in 1956. Alouette II is a turbine powered, fully articulated three blade rotor-type aircraft.

In 1974 delivery began on the

Gazelle SA 341 LOH/Scout. The Gazelle's 600 shaft horsepower engine enables the aircraft to fly at a maximum airspeed of 260 kilometers per hour.

The Alouette III, which entered service in 1963, is the ALAT's older model antitank helicopter and probably will remain in service for many years to come. Basically a utility aircraft which has been converted to an antitank helicopter, the Alouette III is highly reliable and quite adept at performing nap-of-the-earth (NOE) flight. Powered by a 850-shaft horsepower engine, the Alouette III has a maximum gross weight of 4,800 pounds. It carries four SS-11 antitank missiles with a periscopic stabilized sight system.

The newest antitank helicopter is the Gazelle SA 342. Equipped with four HOT antitank missiles, this aircraft has a climb rate of 2,000 feet per minute. Delivery of the Gazelle SA 342 began this year.

The third type helicopter in the French Army Aviation inventory is the UTT (Puma SA 330). This aircraft, which entered service in 1969, carries 12 fully equipped troops plus a crew of three. The UTT is powered by two 1,400 shaft horsepower engines.

Employment. The concepts of employment are influenced by the relatively small aviation resources and by the special situation of the French Army in Europe. These concepts differ from the U.S. Army concepts in the following ways:

- Aviation assets are placed at corps level for optimum tactical efficiency (French Army corps level is smaller than corps level in the U.S. Army.)
- The Combined Arms Team support is no longer emphasized. It is generally accepted that airmobile units and particularly the Scout Attack Helicopter Teams can perform better in front of divisions, on their flanks or between divisional boundaries when the enemy is not yet (or no longer) deployed.
- The airmobile unit is more efficient when it combines the action of antitank helicopters and heliborne antitank guided missile (ATGM) ground teams. For this reason the aviation combat regiment has 20 Pumas and it has been decided that it would be colocated with the corps Infantry regiment and constantly trained with its two ATGM companies.
- The Aviation Combat Regiment has the capability of moving ahead to meet (and reconnoiter) an enemy division. It also can destroy the division's first echelon in a single mission.

Training. ALAT training is conducted at two schools:

- E.S. ALAT, at Dax in southwestern France. Here basic training is conducted, including the observer's course and the mountain flying phase.
- E.A. ALAT, located at LeLuc in the southeastern part of the country, which mainly is used for Puma transition, NOE basic and advanced courses, and instrument courses.

NCOs receive 125 hours of basic aviation training plus 20 hours of Gazelle transition. This is a 29-week course conducted in Dax. Then the aviators receive either an 18-hour, 3-week NOE course in LeLuc or a 36-hour, 7-week Puma transition course.

Basic aviation and Gazelle training for officers is the same as that for NCOs, except that officers receive an additional 45-hour, 9-week observer course. After the initial training which varies from 163 to 245 hours, officers are assigned to their respective units.

Since 1943 French Army Aviation has come a long way. Doctrine and equipment are subject to change but ALAT, like U.S. Army aviation and facing the same threat, is about to become a significant combat element on the modern battlefield.

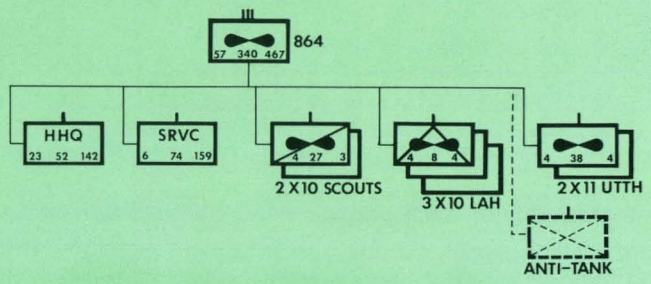

FIGURE 1 ABOVE: The Aviation Combat Regiment

LEFT: SA 342 GAZELLE firing HOT missile

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meter (mm) artillery flare shell.

• That having found that the above was possible, to put together and prove a practical tactical concept.

The views confirmed were that ATGW helicopters in concert with reconnaissance helicopters could conduct a night engagement, albeit very rigid, and by means of complex orchestration between ground troops, artillery, reconnaissance and ATGW helicopters over familiar or pre-recced terrain and routes. It also confirmed that training and aircrew abilities could achieve much, much more in being able to operate their machines in night and adverse weather than we have imagined previously. The need for three additional bits of equipment were identified however; radar altimeter, a navigation system and night vision goggles. The weapons fired were M-22 missiles.

Training. We have recognized the need for increased emphasis on night flying training. The average pilot achieves 20 to 25 hours per year with a marked increase when operating in Northern Ireland. The Northern Ireland figures vary depending upon the time of year but could be as high as 10 to 15 hours per month. The hours are spent in low level navigation exercises, operations into prepared and unprepared landing sites where the transit flights have been at safety altitudes, normal circuit and bumps. In Northern Ireland a variety of operational tasks including troop insertions/extractions, infrared (IR) illumination for infantry operations, etc., is included.

NGAST 6643 (Naval General Air Staff Target; roughly equivalent to a letter of agreement): This has superseded GST 3528 and is pursuing a crew vision aid. Between them these targets have, for about seven years, been the vehicles upon which much of the work at the various research and development (R&D) establishments have been funded. The research includes activities in the image intensification (II), low light television (LLTV), infrared and radar fields. We have trialled a number of equipments for the R&D establishments with varying success. We are therefore in a fairly strong position to know what is feasible in the future and, more important, to recommend a policy that makes sense not only tactically, but also financially.

Problem Areas

Our ability to fly at night is limited to a relatively short time of the year at present and, as will be explained later, it is a major problem. Further, there is the question that even if we could fly in poor weather and on black nights how much could we usefully achieve? We will deal with these two aspects separately — first with flight.

Darkness and Weather. There are four main factors:

- Darkness
- Meteorological visibility
- Cloud base
- Icing

All four affect flight but generally only darkness and meteorological visibility affect the performance of the task. The meteorological statistics that we have used can be disputed, but they are from the best source — the meteorological office at Bracknell, confirmed by meteorological staff in Germany as being representative of our likely operational area. There are two qualifications:

• The details are based on Hanover, Germany, 200 feet above mean sea level (AMSL), being most appropriate for the 1st British Corps area of operations.

• The figures have been reduced to an annual average. They will vary from month to month and even from hour to hour.

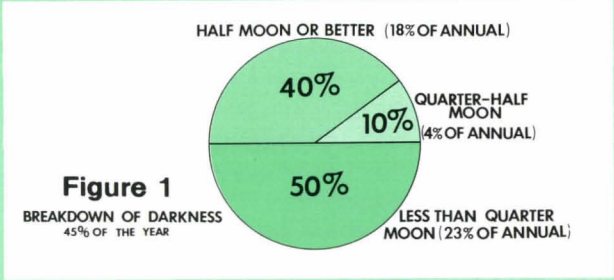


Figure 1
BREAKDOWN OF DARKNESS
45% OF THE YEAR

Darkness. This exists for 45 percent of the year in Northern Germany. Figure 1 splits this darkness into one-half moon or better; one-quarter to one-half moon; and less than one-quarter moon. These figures are respectively 40 percent, 10 percent and 50 percent. As a percentage of the full year they are respectively 18 percent, 4 percent and 23 percent.

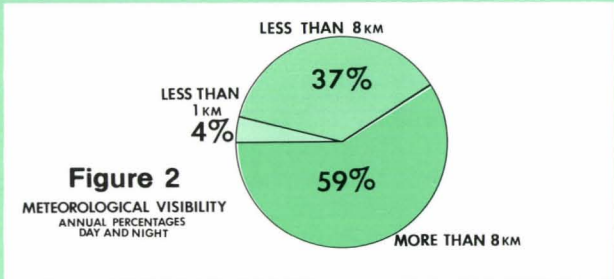
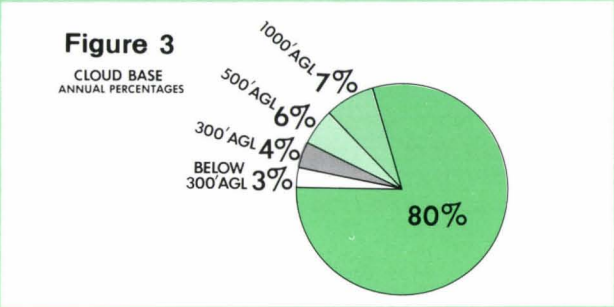


Figure 2
METEOROLOGICAL VISIBILITY
ANNUAL PERCENTAGES
DAY AND NIGHT

Meteorological Visibility. If you wish to detect a tank at 4,000 meters, which is reasonable for an ATGW with a range of 4,000 meters, a meteorological visibility of 8,000 meters or better is required. Figure 2 breaks down the meteorological visibility into percentages of the year,

that is day and night when it is less than 1 kilometer (km); better than 1 km but less than 8 km; and 8 km or better. The figures are respectively 4 percent, 37 percent and 59 percent.

Cloud Base. When discussing whether clouds are significant and whether we should cater for them in our avionics installation, it is worth considering figure 3 which shows that the cloud base is down to 300 feet above ground level (AGL) for only 4 percent of the year. We therefore believe that it is not a major factor.

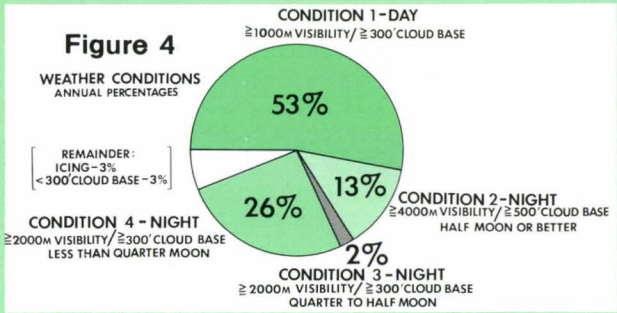


Icing. There is strangely little reliable data on this but we believe that icing conditions exist for a relatively small portion of the year. They will, however, be concentrated in the winter months and therefore hamper operations in that period. But to provide the helicopter with full protection from icing is expensive, heavy and requires a lot of power. In summary, the weather conditions have been categorized (figure 4) thus:

Condition 1

Day light	Cloud base	300 feet AGL or better
	Visibility	1,000 m or better

This condition exists for 53 percent of the year and we believe, from a subjective assessment backed by experience, that it is a condition in which the average Army pilot can cope with no additional aids over and above the standard fit in all our helicopters.



Condition 2

Night	Cloud base	500 feet AGL or better
	Visibility	4,000 m or better
	Darkness	1/2 moon or better

This condition exists for 13 percent of the year. Experienced pilots in a high state of night flying training can operate in a considerable portion of this now over areas they know well, albeit with a high pilot workload. To guarantee operation in this condition over unfamiliar territory and by any pilot we require the following additional aids:

- Radio altimeter to give actual height above the ground directly below the aircraft.
- A lightweight self-contained navigation system. Both the Gazelle and the Lynx will have a doppler-based Decca tactical air navigation system (TANS).
- II goggles to give the pilot and crew vision for obstacle avoidance and to assist in map reading. The navigation system and radar altimeter are in the Lynx now and will be fitted to the Gazelle in 1979.

Condition 3

Night	Cloud base	300 feet AGL or better and less than 4/8 cover
	Visibility	2,000 m or better
	Darkness	1/4 to 1/2

This condition exists for 2 percent of the year. We cannot operate safely in it at present, but would be able to with the aids mentioned for Condition 2. The accuracy of the navigation aid is critical because of the difficulty in the recognition of updating land marks, and the problem of obstacle avoidance at the lower level, the typical accuracy required being an error of at most 1 percent or 2 percent of distance flown since last update. This system also will obviously assist in Condition 1.

Condition 4

Night	Darkness	Less than 1/4 moon with any cloud cover

This condition exists 26 percent of the year and offers the field for most improvement. The navigation system and radio altimeter will be essential, but the special equipment needed to penetrate this degree of darkness, such as thermal imaging and radar are complex, possibly unreliable, bulky, heavy and very expensive.

I have not mentioned flight in clouds, but then the cloud base is down to 300 feet AGL for only 4 percent of the year and below this height for only 3 percent. We therefore consider that it is not cost effective to equip all our helicopters for regular and prolonged flight in clouds. Consequently we do not need a precision, and therefore expensive, let-down aid.

Obviously there will be occasions when it will be necessary to penetrate clouds for short periods

either to climb above them to avoid high ground, or to remain in them while crossing high ground. This need would be at its most acute when recovering aircraft to the rear after an engagement. We could overcome this if we were prepared to accept the policy of having one of two recovery landing sites, carefully selected in open ground, allowing helicopters to home overhead using the very high frequency-frequency modulated (VHF-FM) homer or, within the limits of its accuracy, the navigation system and then to conduct a procedural let down assisted also by the radio altimeter.

Effect On Tasks. Being able to fly in the conditions we have considered only allows us to carry out about 30 percent of our tasks — these largely in the command and control, and movement of troops and materiel roles only. For the remaining 70 percent of our tasks — and these are the priority ones of observation and reconnaissance, armed action and direction of fire — we need to see a reasonable distance. What stops us is darkness and visibility.

Having posed the problems, what are the solutions? As always, it would appear to be money. We have split the solutions into those for the rich and the poor.

Solution for the Poor

Meteorological Visibility. The only way to engage enemy targets successfully is to get closer so that you can actually see them. This imposes the need for a much higher degree of fieldcraft and stealth and the requirement to fly even lower than we do now. Our dictum can be that of Admiral Horatio Nelson's famous signal at the battle of Trafalgar, "Engage the enemy more closely," But we *must* maintain a wary eye for the Warsaw Pact's low level air defense (LLAD) and Mi-24 HIND threat.

Darkness. We must make maximum use of white light in all its forms, artillery flare shells, reconnaissance flares, free flight illuminating rockets and search lights. These last can be used with IR filters and appropriate binoculars. These techniques need developing and should enable us to carry out such tasks as route reconnaissance, post strike evaluation and landing site reconnaissance which at the moment we cannot contemplate at night.

Solution for the Rich

The promise of LLTV, radar and forward looking infrared radar (FLIR) is fascinating but of course only radar will defeat both visibility and darkness. Thermal imagery (TI) depends to some extent on reasonable visibility and LLTV requires one-quarter moon or better. The weights, complexity and costs are all high and there is still a long way to go before they are practical. But is it really a dream for the rich?

Troops deplaning from a British Army Lynx

If we assume an aircraft costs 1 million pounds (about 2 million dollars) and a radar with moving target indicator (MTI) 200,000 pounds (about $400,000), for the price of 2 aircraft — which would represent the loss of 2 percent effectiveness in a fleet of 100 aircraft, we could buy 10 kits to give, say, 2 per regiment in the British Army of the Rhine. We should then be able to guarantee target acquisition and carry out an antitank engagement at night using white light. Such equipment also would improve our reconnaissance capability and increase our total overall effectiveness. It will be interesting therefore to see the outcome of NGAST 6643 which is designed to extend our capabilities at night and in poor weather.

We plan to equip our aircraft so that they can fly by day down to at least 300 feet AGL in visibility of 1,000 m and at night down to at least 300 feet AGL in visibility of 2,000 m and with light conditions of 1/4 moon or better, by equipping them with radio altimeters, self-contained accurate navigation systems, and II goggles. In fact, flight in day and night conditions where the aircrew can maintain visual contact with the ground. They will have a limited cloud flying ability and we will accept the tactical rigidity imposed by carefully selected recovery LS and procedural let downs.

We must improve our night flying training and our fieldcraft so that we can work closer to the enemy to overcome the visibility problem. We must make much more use of white light and pursue as many techniques as possible to make it effective. And, we await with interest the development and possible outcome of NGAST 6643 to improve our capability.

The Antitank Battalion

Major Dennis Carlin
HQ, First U.S. Army
Fort Meade, MD

IT HAS RECENTLY become popular to describe the antitank (AT) helicopter as a maneuver element and full partner in the combined arms team. This represents a significant departure from the current usage and would require changes in the TOE and placement of AT battalions.

In the European environment we are faced with a tank heavy and air defense-rich threat. We are outnumbered five to one in tanks alone. This could equate to very much larger ratios if we consider our requirement to defend a rather large portion of the border. The attacker, on the other hand, will mass forces in the areas of the intended breakthrough.

Through innovative means such as the active defense we have been able to predict an ability to defeat the entire first echelon of the threat force. It is tenuous, however, from that point forward. It seems we have a staying power problem. This problem has been assumed of aviation organizations for some time, but it seems that the problem is more widespread than we admit.

At the risk of being overly confident I would contend that with the full realization of the AT battalion, we could not only eliminate the first echelon, but succeeding echelons as well. We have at our disposal the most effective antitank system ever employed on the battlefield. It is true that even better sytems are on the way but could be years in coming. Our mission is to face the threat of today.

In analyzing the future battle area, we find dangerous avenues of approach of the threat force. We also find possible approaches that are not as dangerous. We are not able to risk all in emplacing our troops only on the most dangerous approaches but must effect economy of force measures on the others. If our homework has been applied correctly we should find the first echelon following the most dangerous approaches and we do, therefore, weight that area with troops and equipment. With present strength levels this will leave sparse defenses in some regions — often no more than a strong pointed screen.

It is possible that the loss of the first echelon will not be sufficient to stop the threat attack. We then must face the possibility of defending in sector against the second echelon by laterally shifting units to block and reinforce. This will be a risky maneuver which could result in units road-marching and countermarching without being employed effectively. How then can we organize with current equipment to face the threat in a continuous battle against the first, second and even third echelon? How do we build in staying power?

It just so happens that our most effective antiarmor system also is our most mobile system. We have, in the AH-1S Cobra, the ability to strip the threat of the enemy's tank and ZSU-23-4 force, which would also strip the attacker's moving smoke screen. The BMP would become extremely vulnerable to our tanks and mechanized infantry.

The threat force employs about 40 tanks in the first wave of the first echelon of the motorized rifle division. These tanks are overwatched by the 40 tanks of the second wave and by four ZSU-23-4s of the regiment. These items of equipment could be eliminated within the first 5 minutes of action with very little loss on our part. This seems a bold statement, but is in fact a very down-to-earth assessment of our own proven capabilities.

See Glossary Next Page

This brings us to the point. We organize into combined arms teams and carry this organization to brigade level in peacetime. We recognize the gain in training realized by this organization.

In Europe today we practice alerts. We recon and prepare elaborate plans for ground defense. As a result of this planning and practice we have measurably upgraded our ability to occupy forward positions in a timely manner. Our troop leaders are knowledgeable of the plan of action and know their respective areas intimately. Can we then say that we have done our best in preparation? No indeed — we have organized only *part* of the combined arms team.

The defense of Europe depends, to a very large degree, on the effectiveness of the antitank battalions we are forming, yet we are forming them at a level that denies them

the quick reaction and thorough preparation that their counterparts enjoy. We find it difficult to coordinate and execute combined arms training with tanks and infantry — and it is nearly nonexistent with attack helicopters! We thoroughly prepare our defense with tanks and infantry yet we have no clear concept on how we will even employ our attack helicopters.

Antitank battalions possess the capability to perform reserve missions down to brigade level where it must be employed. It may turn out to be very expensive indeed if compared to the current organization. In any case, it *will* come to that one day. We did not initially organize our tanks down to brigade level but soon found we had to. That also was very expensive.

We have left our most efficient antiarmor system out of the fight by oversight. This shortcoming will be clearly understood *after* the first battle of the next war.

According to current plans and current organization we intend to defeat the first echelon of the threat force. We then will be at about 50 percent strength and very possibly out of ammunition. We will be poorly disposed to effectively counter the second echelon and will, very likely, meet it with only token resistance. We are not talking about weeks of defense — we are talking about days!

Could it be that we are prepared to fight the first battle but can't even show for the second?

Allow me to present a scenario of the first battle under a reorganized brigade with tanks, mechanized infantry and antitank helicopters.

U.S. forces are organized as per my proposal when put on alert for imminent attack. NATO forces occupy forward defensive positions with major combat power placed in the area of the expected main attack.

We will focus on one mechanized brigade. This brigade has a 40-km front in which two major threat approaches are located. Two task forces are located to block these approaches and the remaining task force is in an economy of force role covering the remainder of the sector. To assist them, the scout pilot of the antiarmor battalion is given the mission to screen in front of them and maintain contact with the covering force. The antitank battalion is positioned to support the efforts of one of the blocking force battalions. They have, however, thoroughly reconnoitored routes to and from firing positions to support the other battalions.

The attack comes in the early hours of day one. The covering force engages and begins the assessment and canalization of the enemy force.

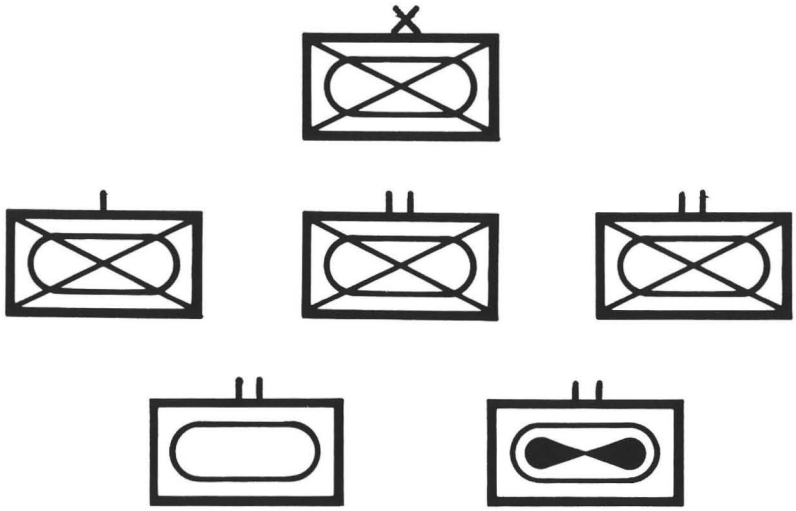
As the attack develops it is believed that a motorized division opposes one of our battalions, as we expected. The other battalions will get spill-over from other attacks, but nothing is developing to make us believe they could not handle their threat.

The covering force passes through after 2 days of battle and the enemy reaches the FEBA early on day three. Initially, the task force on the ground engages at maximum range. As expected, massive artillery support tends to neutralize their fires. At this time, in holding posi-

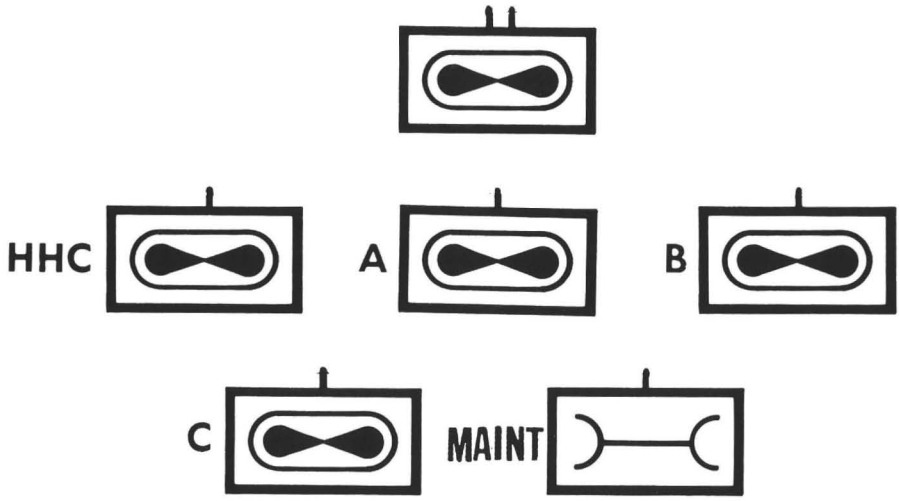
Glossary

AT	antitank
BMP	NATO designation for a Russian personnel carrier infantry fighting vehicle
FEBA	forward edge of the battle area
km	kilometer
MRD	motorized rifle division
NATO	North Atlantic Treaty Organization
TOE	table of organization and equipment

Reorganized Combat Brigade



Antitank Battalion



tions 3,000 meters to the rear, the antiarmor company unmasks and begins the engagement.

With 21 attack helicopters engaging, the entire ZSU-23-4 cover and 10 enemy tanks are destroyed. Subsequent launches eliminate 30 more enemy tanks and the first wave is in disorder. The ground task force is quickly eliminating the BMP force.

The enemy artillery is ranging but has not located the attacking helicopters. The second wave follows the first, due to lack of a full appreciation for the situation now developing. They meet the same fate as their predecessor and are stopped quickly.

By this time the recon companies of the second echelon of the MRD have found the lightly defended area of our economy-of-force task force. The movement laterally of this force was detected and reported by the recon platoon of the antitank battalion. The second company of that battalion is diverted to their alternate firing positions in support of this task force. The ground fields of fire are much reduced in this area, forcing them to begin the engagement at closer range. The attack helicopters, however, were still able to engage at more than 3,000 meters.

The results to the enemy are similar to the first instance, but friendly ground forces received numerous casualties due to the unfavorable range of engagement in their direct fire engagements.

By now the attack of this first echelon division has been defeated. This is a significant contribution because we have been able to retain our combat power while destroying the combat power of our enemy. We have been able to move laterally rapidly enough to support a new threat and we have retained a reserve, not fully committed, at brigade level.

Is this view of the battlefield overly simplistic and optimistic? Would the possibility of adverse weather defeat our use of helicopters? Probably not. We may take more ground casualties due to adverse weather causing reduced firing ranges, but a direct fire engagement between a tank and a helicopter is improbable. Tanks are not designed to acquire aerial targets during battle and the ZSU-23-4s provide such an identifiable target that they could easily be eliminated prior to their being able to engage effectively.

My intent is not to sell a particular TOE. If the need for joining up the combined arms team is acknowledged, the TOE will follow. It is important to keep sight of the number of aircraft we are talking about.

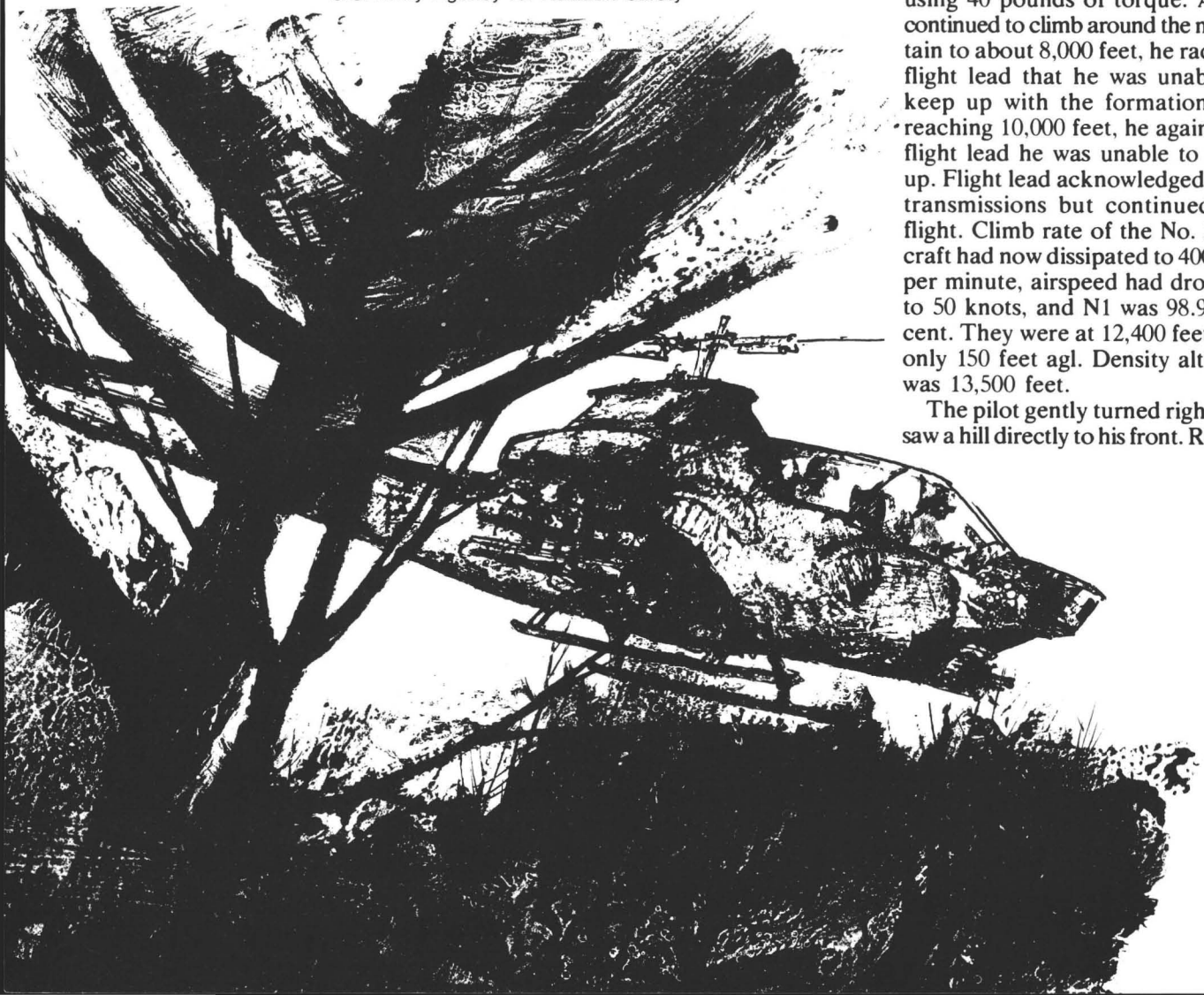
Each antitank battalion will have 65 AH-1 Cobras, 4 UH-1 Hueys and 10 OH-58 Kiowas. Obviously this is at least three times the number currently planned for. It is here that we meet the resistance. It seems unlikely that we will be given that number of helicopters and pilots. If we assign attack companies to combat brigades we will degrade their combat effectiveness through reduced training management and maintenance effectiveness. In other words, we should not assign helicopters to brigade at company level for the same reason we don't assign tanks in that manner.

To be a *full partner* in the combined arms team, you must be a *full-time partner.* You must have a clear concept of how the ground battle is to be fought and how you fit into this battle. You will not be like an artillery unit that is in direct support or general support, but a maneuver element with mission requirements. We have the capability now to sustain combat, it is our responsibility to ensure that our capabilities are realized and exploited.

USAAAVS

POWER AVAILABLE vs. POWER REQUIRED

David T. Forbes
Directorate for Investigation, Research, and Analysis
U.S. Army Agency for Aviation Safety



THREE ARMED Cobras were to fly loose trail formation on a training mission over mountainous terrain. The flight leader briefed the crews on weather, stating there were clouds to the west of their takeoff site, but that they could probably get through some holes and go VFR on top.

Only two miles out after takeoff, the flight encountered clouds and flight lead decided to go around the mountain range to remain VFR. At this time, the pilot of the No. 3 aircraft was climbing at 800 feet per minute at an airspeed of 70 knots using 40 pounds of torque. As he continued to climb around the mountain to about 8,000 feet, he radioed flight lead that he was unable to keep up with the formation. On reaching 10,000 feet, he again told flight lead he was unable to keep up. Flight lead acknowledged both transmissions but continued the flight. Climb rate of the No. 3 aircraft had now dissipated to 400 feet per minute, airspeed had dropped to 50 knots, and N1 was 98.9 percent. They were at 12,400 feet, but only 150 feet agl. Density altitude was 13,500 feet.

The pilot gently turned right and saw a hill directly to his front. Rather

than turn right upslope or downslope, he decided to climb over the hill. At this time, the aircraft leveled, rate of climb stopped, and engine rpm decreased to 6350. The pilot initiated a cyclic climb and gained about 250 feet, but airspeed dropped to 10 knots. Rpm continued to decrease and, as the pilot turned downslope with a quartering tailwind of about 25 knots, he noticed that the controls were sluggish. The aircraft fell to 50 feet agl at a sinking rate of 350 feet per minute with a forward airspeed of 10 knots. The pilot made a Mayday call just before the aircraft crashed.

In another case, the crew of an OH-58A took off to look for a downed helicopter in mountainous terrain without preplanning the mission. During climbout, the crew learned the helicopter had been located and the crew rescued. However, they continued up the mountain so that the operations officer could accurately pinpoint the wreckage. Flying upslope at an airspeed of 20 to 30 knots, the pilot made a shallow right turn and rolled out of the turn to a heading of 240 degrees. As he stopped the turn, the aircraft yawed sharply to the right and shuddered. The pilot ran out of left pedal and lost directional control. He decreased collective to regain directional control and the aircraft continued to settle. The aircraft was now at 10 feet agl with no available landing site. The pilot increased collective and again lost directional control. The aircraft rotated 360 degrees as the rpm warning light came on and the audio sounded. The OH-58 crashed at 12,700 feet msl at a density altitude of 14,800 feet. All three crewmembers escaped injury but the aircraft was a total loss.

Both of these accidents occurred in a similar environment at high altitude and low airspeed. Why do mishaps such as these continue to happen? Simple. Power required to sustain flight exceeds power available from the engine and the aircraft simply falls out of the sky.

To fully understand the power-required curve for helicopters, which differs only slightly from that of a fixed-wing aircraft, the first items to consider are the various components that make up the total power required.

Figure 1 shows the three components to be parasite power, induced power, and profile power and plots these various forms of power requirements and airspeed. Parasite power is the power required to overcome the parasite (frictional) drag of the fuselage, rotor hubs and landing gear. Parasite power is zero while hovering and increases with speed. Induced power is the power required to accelerate the air downward to create the rotor lift and diminishes as forward speed increases. Profile power is the power required to overcome the parasite drag of the rotor blades themselves and increases with airspeed. The resulting curve of these drag forces is considered classic in the sense that it is developed for most tests and evaluations of fixed- and rotary-wing aircraft.

To understand the important relationships of this classic curve as plotted for a typical helicopter, let's look at figure 2. Point A on the curve shows the airspeed for the minimum power required. Using a given set of parameters, flying at an airspeed of N_A will result in minimum power required to sustain flight for maximum endurance, holding, loitering, etc. Point B, established by a tangent from the apex to the curve, shows that this airspeed (N_B) produces the maximum range for a given fuel load. Point C is the maximum airspeed (Vne) as established by the manufacturer. Point D is the stall speed (N_D) or point when the airflow does not produce sufficient lift to sustain *fixed-wing* flight. Point E is the power required for a helicopter to hover.

Using figure 3, let's interject the parameters of weight, altitude, and temperature which control the specific power required. An increase in weight, altitude and/or temperature will cause an increase in the power required and conversely. This figure also shows the shift of the

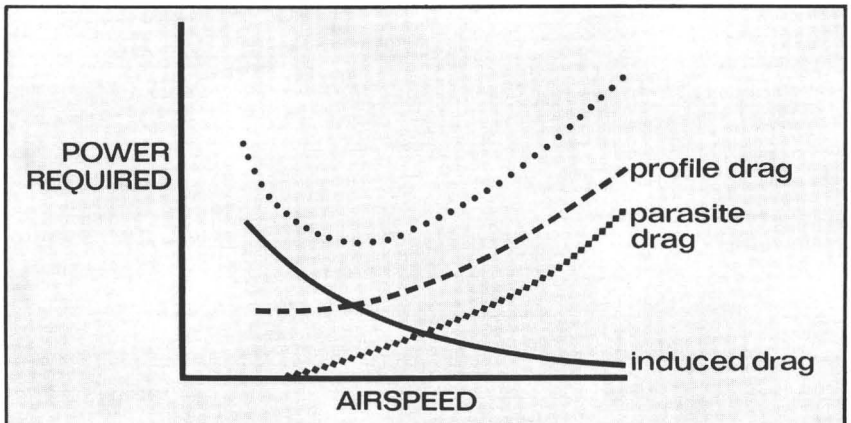
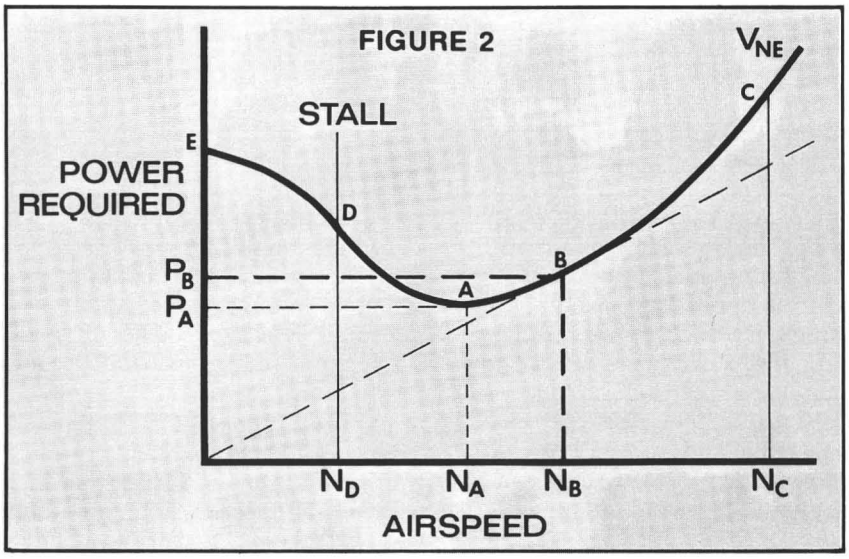
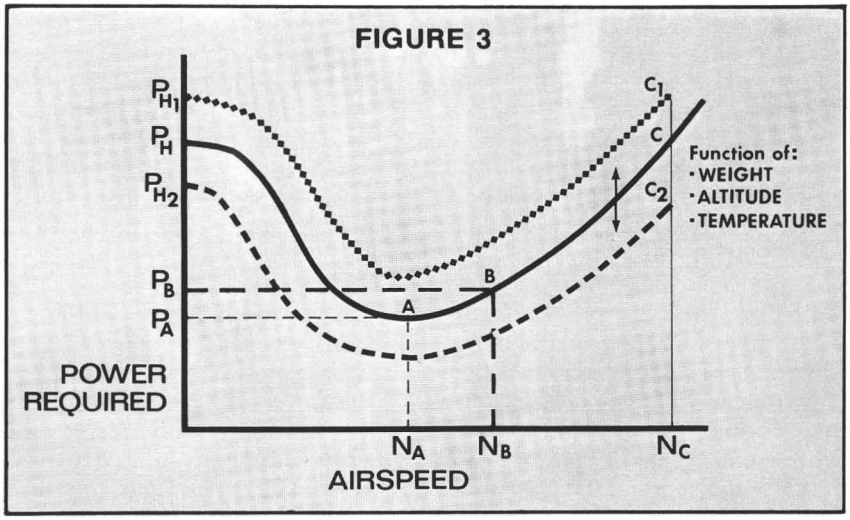
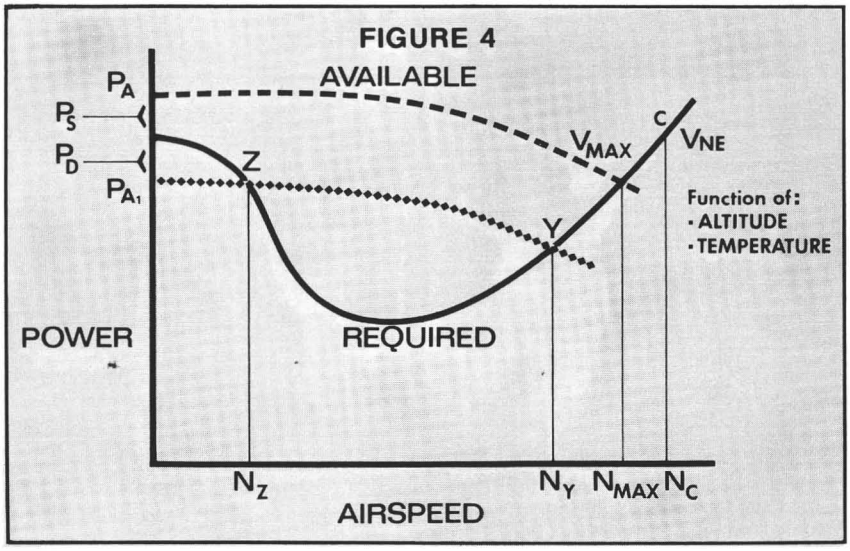


Figure 1

POWER AVAILABLE VS. POWER REQUIRED







curves when the parameters are increased (curve 1) or decreased (curve 2). For all practical purposes, weight is the principal factor which determines *power required.* Although altitude and temperature have a minimal effect, they have more effect on *power available.*

Power available is that power developed from the engine to drive the helicopter rotor system or an airplane propeller. Figure 4 shows the power available curve imposed on the power required plot for turbine engine helicopters. The first thing to realize is that the parameters governing power available are altitude and temperature; thus power available decreases as altitude or temperature increases. Notice that the power available curve is typical of that produced by a turbine engine and is considered as the maximum power available.

The difference between power available (PA) and power required is a power surplus (PS) for a helicopter with a given weight and engine exposed to a certain altitude and ambient temperature. Now, let's increase the altitude and/or temperature to where the curve (power available 1) is relocated to power available 2 and analyze the relationship. (This condition can also be developed by increasing weight.) In this situation, power available exceeds power required only between airspeeds of Nz and Ny. Level flight at an airspeed either above where the curves cross (Point Y) or below where the curves cross (Point Z) is impossible due to insufficient power. Notice that Points Vmax and Y were constructed to show that power available can dictate maximum speed as well as Vne. A helicopter with a power deficiency (PD) can fly at an airspeed beyond Point Y (out to Vne) and below Point Z, but this involves a conversion of altitude to airspeed or dissipation of rotor rpm.

Using a hypothetical situation, let's see what happens when a pilot attempts to operate in a power environment as plotted by PA_1. Pilot takes off at sea level and maximum gross weight (condition at PA) and flys up to a mountain pinnacle (condition at PA_1). He sets up and begins an approach, decreasing airspeed as the approach continues. Below the minimum power rquired airspeed (backside of the power curve), he starts to increase power to compensate for decreasing airspeed. Eventually, Point Z is reached with the engine topped out (maximum power available). Decreasing the airspeed further results in more power required than available and the helicopter begins to lose altitude. The pilot continues to increase collective and rotor rpm starts to bleed off, possibly to the point that directional control also suffers. This decrease in rpm can result in decreasing lift to sustain flight and the aircraft falls faster and, perhaps, in a right turn.

To prevent a situation such as this as well as the two accidents discussed previously, the following three steps are recommended.

- Plan the mission and ascertain the parameters of aircraft weight, altitude, and temperature which govern power required and power available for both the takeoff and landing sites. Next, consult the appropriate dash 10 charts (see table 1) to determine the specific power required and power available for the takeoff and landing sites. Evaluate the power required and power available relationship and, if necessary, adjust the helicopter takeoff weight to accommodate the landing situation.
- Allow some margin for error in both planning and flying the mission by employing a "worst case" planning philosophy. Plan for a power margin by using the power charts for hovering out-of-ground-effect. Also plan for a no-wind condition as wind direction and velocity may differ from that planned.
- Use the Acid Test which is a three-step method to ensure that the power required and power available relationship will permit a safe landing at the destination. First, note and record the torque required to hover when preparing for initial takeoff (reading is power required). This technique assumes that the variance in power required due to a change in temperature or altitude is offset by the change in weight from fuel consumed. Second, upon reaching the landing site, before being committed to the approach, pull in collective until the main rotor rpm starts to droop and note the torque (reading is power available). Third, compare the torque of power required and power available to determine the difference. This power differential and the dictates of the mission should provide sufficient information as to whether the approach should be continued, modified, or aborted.

TABLE 1.—Helicopter Performance Charts (Power Available vs. Power Required)

Helicopter Type, Model and Series	Operator's Manual	Performance Charts	
		Power Available	Power Required
UH-1D/H	TM 55-1520-210-10	Fig 14-21	Fig 14-22
OH-58A	TM 55-1520-228-10	Fig 7-3	Fig 7-5
AH-1G	TM 55-1520-221-10	Fig 14-6,14-7, and 14-8	Fig 14-10, 14-11, 14-12, and 14-13
AH-1S	TM 55-1520-234-10	Fig 7-3	Fig 7-5
OH-6A	TM 55-1520-214-10	Fig 7-3	Fig 7-5
CH-54A	TM 55-1520-217-10	Fig 7-3	Fig 7-9
CH-54B	TM 55-1520-217-10	Fig 7-3	Fig 7-8

Reporting Final

Late News From Army Aviation Activities

FROM THE NATIONAL GUARD, NEBRASKA

Award of Excellence. Soldiers from the 24th Medical Company, U.S. Army Aviation Support Facility, Nebraska Army National Guard, below, prepare to airlift a rancher and his wife from a snowbound ranch. The Aviation Support Facility recently was presented a Department of the Army

Community Relations Award of Excellence for its outstanding community relations efforts. The facility conducts a 24-hour neonatal medical evacuation program for emergency infant patients, assists the community during natural disasters, conducts aviation tours and provides demonstrations for various groups in the state of Nebraska. (For additional information concerning the Nebraska Guard, see the *Digest,* December 1977, page 19.)

☆ ☆ ☆

FROM FORT HUACHUCA, AZ

One ATC Manager. A major reorganization of Army Air Traffic Control (ATC) units places all ATC functions, tactical and monitorial, under one manager, the U.S. Army Air Traffic Control Activity (USAATCA), an element of the U.S. Army Communications Command (ACC). There are five types of ATC operations—management, tower and ground controlled approach which are terminal functions, plus en route and tactical terminal. Before last October, ACC was involved heavily with the first three functions and somewhat involved in en route operations. The reorganization places ACC in the position of operating all five functions for most of the Army.

The single manager concept allows for the transfer and consolidation of equipment and positions and results in a small money savings. A definite gain in equipment development and standardization is anticipated.

The new concept, developed by ACC and the U.S. Army Aviation Center, Ft. Rucker, AL, provides for a modular building block structure of tactical en route, tower and ground controlled approach radar teams. Changes in Europe are typical of the reorganization. The 14th Aviation Unit (ATC) was deactivated and reorganized as the 59th ATC Battalion under the 5th Signal Command, ACC's subelement in Europe. The 59th will be comprised of four companies and an Army flight operations detachment (AFOD). The AFOD is the central point of contact for Army flight plans, search and rescue operations and coordinator with other services and Governmental agencies.

The single manager concept in Europe ensures

NATO interoperability. In Korea, the 284th Aviation Unit (ATC) and the 82d Signal Detachment were deactivated and the 125th ATC Battalion (Corps) was activated with two companies. Further changes will go into effect in the United States next October with the formation of two battalions with four companies. The reorganization continues into the Reserve forces with an ATC group headquarters, a battalion headquarters and two companies to be formed in the National Guard and one company in the Army Reserves. Eventually, ACC will have Army ATC responsibilities in the theater of operations down through division level. **(PAO-ACC)**

☆ ☆ ☆

FROM FORT RUCKER, AL

Perfect Record. Available records and memeories at the Aviation Center reveal that Warrant Officer Rotary Wing Aviator Class 78-19 set a record with its graduation last month. There were no failures due to academic or flight deficiencies for the 20 students who started flight training last February.

BG James H. Patterson, Ft. Rucker's deputy commander, recognized that accomplishment at the graduation ceremony, calling it a "truly outstanding feat on the part of these Army aviators." One of the original 20 was lost because of medical reasons, and 4 students who had been set-back from other classes were added. So at graduation time, 78-19 had 23 members. **(USAAVNC-PAO)**

Aviation Medicine Clinic. The Army Aviation Medicine Clinic and Physical Exam Service at Fort

Assisting MG James C. Smith (L) in cutting the ribbon to open the U.S. Army Aviation Medicine Clinic and Physical Examination Service are (L-R) Marvin Wheeless, Architect; COL Daniel T. Sanders, Commander of the U.S. Army Aeromedical Center and Lyster Army Hospital; and COL Edward F. Cole, Commander, Aeromedical Activity

Rucker officially were opened 13 November with a ribbon cutting ceremony at their new locations at the corner of Andrews Avenue and 28th Street.

Present for the event was Major General James C. Smith, post commander who, before cutting the ribbon, thanked all personnel involved in accomplishing the renovation of the two buildings.

The Aviation Medicine Clinic originally was located in the old hospital area near the Enterprise gate. The physical exam service also was located in the old hospital area. The move came about because the old clinic was in outdated buildings. The new location is more convenient and better care can be administered to patients.

Marvin Wheeless, an architect with the Fort Rucker Facility Engineers, designed the changes for the facilities. The cost of the contract was $327,000.

The buildings, which originally were World War II nurse's billets and more recently troop billets, were completely renovated to conform to the requirements of the hospital. For instance, a connecting wing between the two buildings was built on a concrete slab to reduce vibration so as not to interfere with the audio testing that is done there. **(USAAVNC-PAO)**

EURO/NATO Training Group Meets. Representatives of the United States, West Germany, Denmark, Norway, and the Netherlands met at Ft. Rucker, AL, from 14 to 16 Nov as the EURO/NATO Training Group. Center right is MG James C. Smith, Fort Rucker's commander, who was host for the 3-day session. The conference was designed to strengthen the training arrangements for member nation student pilots at the Army Aviation Center. Also attending as observers were officers from Italy, Canada, and the United Kingdom. Center left is BG Charles W. Dyke, chief of the International Rationalization Office, Washington, DC. **(USAAVNC-PAO)**

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FROM JAPAN

Asahi has purchased a Soviet Mi-8 helicopter. (See November 1978 *Digest*, page 41.) Approval finally was granted by the Ministry of Transport for the transaction. Asahi is the largest operator in Japan and ordered the 28-seat helicopter some time ago but was delayed by lack of an import permit. Delivery is now expected in February 1980. Ministry of Transport requires a dual fuel system, more cockpit room and new avionics for compatibility with Japanese communications equipment. **(HELICOPTER NEWS)**

NEW TACTICAL LANDING

CPT James H. Boschma displays a rotating localizer antenna on top of MPSBLS round station. The rotating glideslope antenna is located behind the long vertical white aperture and the DME antenna is located behind the short vertical white aperture, both on the front of the box. The localizer antenna normally is covered during operation by the radome on display at CPT Boschma's feet

THE U.S. ARMY Avionics Research and Development Activity (AVRADA), of the Army Aviation Research and Development Command recently exhibited the Man Portable Scanning Beam Landing System (MPSBLS) and the 4-Cue Flight Director System for rotary wing aircraft. Development was pioneered by AVRADA.

This microwave landing system provides the guidance signals (localizer, glideslope, distance measuring equipment [DME] and range rate) to enable helicopters to land in confined, unprepared sites in zero ceiling and zero visibility weather conditions. To succeed in zero/zero landings in confined areas, the helicopter approach must terminate at a stabilized hover prior to touchdown. MPSBLS, with the 4-cue flight director, guides the helicopter during the approach so that the pilot can fly to a stabilized hover over the landing site. Currently a nondirectional beacon (NDB) system is the only system commonly used to guide helicopters to a landing zone (LZ) in a tactical environment.

With this system, there is no deceleration; the pilot flys a

SYSTEM

Joan C. Fair
Avionics Research and Development Activity
Fort Monmouth, NJ

At controls of helicopter, CPT James H. Boschma, Research and Development technical operations officer and project pilot, points to airborne instrument package used during MPSBLS approaches

constant speed, descending pattern until the landing area is in sight. In marginal weather or at night, helicopters may be unable to land in austere sites using NDBs. The MPSBLS (with the flight director) enables the helicopter to land in inclement weather or at night because the ground station transmits where the centerline of the approach is (localizer), what the angle from the aircraft to the ground station is (glideslope), and the DME range and range rate to touchdown.

This guidance information is processed through the flight director equipment located onboard the helicopter and commands the pilot's left-right cyclic, pedal and collective control inputs to land the helicopter successfully. Even if the ground is not in sight, the pilot can land if the needles on the flight director are centered. A pilot can land in any visibility, light or dark, without any visual reference on the ground.

The ground station, which consists of a 59-pound Ku-band microwave transmitter set and a 24-volt battery, can be set up and made operational in less than 10 minutes at most unprepared sites.

The MPSBLS offers accurate, reliable, highly mobile and extremely flexible operations. The flight director, which integrates command and situation information into a single instrument, reduces the number of different indicators the pilot must scan, thereby reducing pilot workload and cockpit overcrowding. The flight director command signals also can be coupled to a full authority four axis autopilot for fully automated decelerating approaches to a hover.

The 4-cue flight director system has been demonstrated with MPSBLS, the Federal Aviation Administration Phase III Basic Narrow Microwave Landing System, The Army's Tactical Landing System, and presently is being configured to fly with the Marine Remote Area Approach and Landing System through a joint U.S. Army/U.S. Marine Corps effort.

Left Hand Traffic For 35R ?

Major H. Edward Ziegler, USA, Retired
Operations Officer
Butts Field
Fort Carson, CO

LTC Charles W. Abbey's article "Unsung Heroes I Have Known" [January 1978 *Digest*], inspired me to relate a true happening that took place during the night cross-country phase of my flight training when I was stationed at the Field Artillery School at Ft. Sill, OK in 1949.

Picture the typical black moonless nights that only Oklahoma can produce, coupled with 20 student pilots and 1 instructor flying 10 L-17s (that's a Navion to the new guys), from Fort Sill to Tulsa and return on a night cross-country.

In reality the flight from Sill to Tulsa was quite uneventful. You know the minimum number of lost pilots and missing engines due to failure to apply carburetor heat or switch tanks on schedule and practically no reports of "Night Knocks." The traffic pattern and subsequent landing at Tulsa was a horse of a different color.

The flight was accompanied by an instructor in one of the aircraft and "buddy pilot students" in the other aircraft. The instructor must have elected to fly with the two weakest students so he chose me and some other unlucky individual. As a result of this organization I got this story first hand for the most part.

I might suggest to anyone who may take the time to read this (if it's printed) that reference to a Tulsa approach plate might help sort it out in one's mind, because believe me having been there doesn't make it any clearer to me.

First, envision that a flight from Fort Sill to Tulsa brings you into the airport traffic on a general heading of 055 degrees more or less. Keeping in mind this was the days before radar, VHF omnidirectional range (VOR) or any of that other good stuff like gyro instruments, etc. The L-17 did have an engine driven horizon but it was really lost on most of us; besides, in this situation it wouldn't have helped any at all.

It all started routinely enough when the instructor in my aircraft called Tulsa tower 15 miles southwest for landing instructions. Perhaps from here on the story is best told by breaking down the transmissions to the tower and the aircraft involved:

Tower: Roger Army 123, 15 southwest for landing, you are cleared to enter left hand traffic for runway 35R.

Army 123: Roger.

At this point the instructor took over the controls saying, "I've got it," so I sat back in awe to watch the "master" show us how it's done. Just about then the next aircraft called in and was told:

Tower: Roger Army 456 you are cleared left traffic, landing runway 35R, call base.

Army 456: Roger.

A point of interest here is that the reason for landing on runway 35R was because runway 35L was torn up for resurfacing.

The next three or four aircraft called in routinely and received the same landing instructions as we did and everything seemed to be going well. It was! But then, much to my horror, my instructor crossed *over the field* on our heading of 055 degrees and turned *right* onto a *right downwind* for runway 35R. This didn't get too noticeable until we were on base and facing the next aircraft that had properly entered on *left* downwind and *left* base. There was a little excitement while the tower operator instructed the second airplane to go around and cleared us to land, in spite of the improper entry.

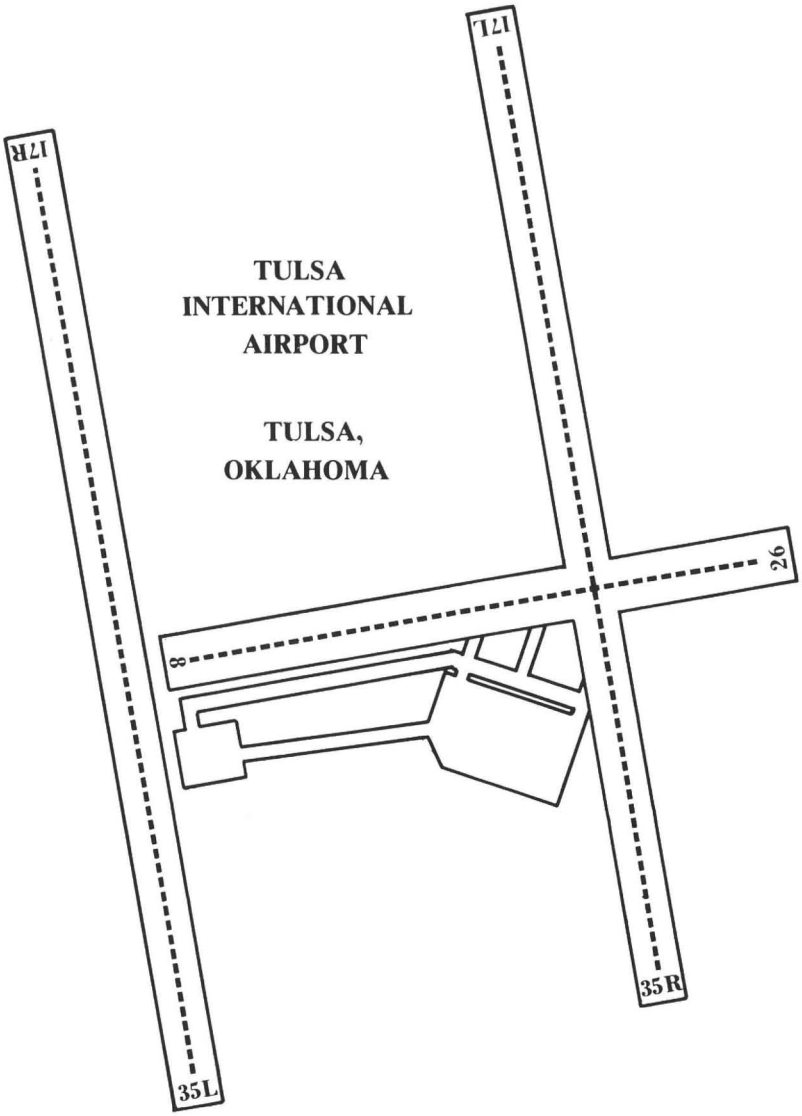
Now this in itself would not have been too bad except the next two or three aircraft called in to verify:

Army 678: Did you say left traffic for 35R, or right traffic for 35L?

Tower: Negative, negative Army 678, I said left hand traffic for 35R.

Army 678: Roger I am on left base for 35R.

Now that was a routine transmission wasn't it? Right . . . er . . . *correct* that is. What could happen next



. . . . here's what could happen next and did!

After landing we were to taxi to the west side of the airfield to the National Guard ramp for refueling. We landed short and were able to make the turn off to the Guard ramp with no problem. The next airplane, however, landed long and was unable to make the taxiway and worse than that he was unable to *find* the taxiway after he did a 180 back to it.

To keep traffic flowing the tower operator very thoughtfully turned off the taxiway lights (with us on it) and turned on the brighter lights on runway 8/26 so that the pilot could use the runway and get over to the Guard ramp "more faster." This was a big help to the pilot on the ground but to the student pilot who had just turned downwind for 35R (he hoped) seeing the lights go on for runway 8/26 thought that he had made a mistake and was really on base for runway 35R. Therefore he turned left and reported final for 35R and proceeded down.

This created quite a problem for the tower operator, because he already had an airplane on the ground on runway 8/26 and one on short final for runway 35R (with the lights out) and two or three others had just checked in for landing information and they all questioned the left downwind 35R or right downwind 35L.

At this point the harrassed tower operator screamed at the top of his voice, "EVERYBODY PULL UP AND GO AROUND, CALL UPON REENTRY INTO TRAFFIC!" — unquote. All calls for landing and the landings were routine after that sage bit of advice.

"Rock Haul"

Crews from the 19th flew 615 hours (2,285 sorties) and delivered 12,000 tons of material for construction of bunkers or installation of radio relay and radar equipment

ONE OF THE most unique missions flown by the CH-47 Chinook pilots of the 213th and 271st Assault Support Helicopter Companies, 19th Aviation Battalion (Combat), 17th Aviation Group (Combat), is known as "Rock Haul."

The "Rock Haul" is a requirement for CH-47 support to the Armed Forces of the Republic of Korea. It consists of moving construction and barrier material to mountaintop locations for construction of bunkers and/or installation of radio relay equipment or radar sites.

The delivery of these materials is virtually impossible by any means other than the Chinook. The sites are built on terrain that affords the Republic of Korea Armed Forces the best tactical locations for enhancing their readiness posture. There are tremendous savings in manhours provided by the helicopter support versus other means of transportation.

To complete this most challenging mission, pilots must perform at peak proficiency. The terrain of the Korean peninsula presents some of the most demanding mountain flying found anywhere in the world. "Rock Haul" missions are routinely flown from landing zones located in the numerous mountain valleys to landing zones as high as 4,500 feet mean sea level (MSL). The landing zones are small, usually just large enough to accommodate the CH-47, and most are quite dusty. Keeping the aircraft stable is made even more difficult by the turbulence caused by the ever-present winds. Loads, mostly external, are about 12,000 pounds in weight and consist of sand, cement and rocks—thus the nickname "Rock Haul."

All of these missions are located near the demilitarized zone (DMZ) between North and South Korea. Meticulous flight planning and precise navigation are an absolute must. Some of these missions are so near the DMZ that the aircraft is required to carry a Korean navigator on board. All precautions must be taken when flying in proximity to the border which is manned by a heavily armed enemy force.

In support of the "Rock Haul" mission during FY 77, the 19th Battalion flew 615 CH-47 hours delivering nearly 12,000 tons of materials to mountaintop sites in 2,285 sorties. The pilots of the 213th and 271st Aviation Companies (ASH) do not underestimate the training value of these missions. The enthusiasm displayed by the Korean troops and the professional insight gained by working with our allies on a mutually beneficial mission makes "Rock Haul" a most rewarding experience.

The mission will task the Chinook and its crew to their limits, but when they are finished there is a great feeling of accomplishment. They know they have been put to the test and have accomplished a most important mission. If you can fly the "Rock Haul," doubtless you can fly any mission required of the Chinook.

THE THREAT

Test Your TAQ*

*Threat Awareness Quotient

TRUE or FALSE

1. Soviet Helicopter Transport Regiments feature Mi-12 HOMER battalions.
2. Despite the Soviet ratification of the Geneva Convention, they can be expected to employ chemical and biological weapons.
3. The ZU-23 antiaircraft artillery (AAA) gun is prevalent in front-line, ground forces' AAA batteries.
4. The T-72 tank has four support rollers, whereas the T-64 has three.
5. The term GSFG, Group of Soviet Forces Germany, is synonymous with Warsaw Pact Forces.
6. The SA-9 missile, known as the GHECKO, provides low altitude, mobile air defense to motorized rifle regiments and tank regiments.
7. The newest threat surface-to-air missile (SAM) is the SCALEBOARD which has an approximate range out to 800 kilometers (km).
8. Certain Soviet garrison troops, usually under warrant officer supervision, grow tulips, gladiolas, roses, tomatoes, cucumbers and onions.
9. The Soviets like to launch attacks under the cover of darkness. But once the battle is joined, they prefer to illuminate the battlefield to facilitate their assault and to "dazzle the enemy."
10. The ZSU-57-2 is the AAA follow-on to the ZSU-23-4.

ANSWERS

1. FALSE
2. TRUE
3. FALSE — The ZU-23 is more often found defensing fixed SAM sites, etc., and has been replaced largely by ZSU-23-4 and other systems in front-line AAA batteries.
4. FALSE — The T-72 incorporates three return rollers and the T-64 has four.
5. FALSE — GSFG is just what the name implies — Soviet forces stationed in Germany. Warsaw Pact forces describe troops of Eastern European countries which are members of the Warsaw Pact alliance.
6. FALSE — The SA-9 is not the GHECKO (the SA-8 is) but carries the NATO designator — GASKIN; the rest of the narrative is true.
7. FALSE — The SCALEBOARD is a *surface-to-surface* with an approximate range of 800 km.
8. TRUE — The Soviet Army traditionally has grown much of its own food — from vegetables to livestock.
9. TRUE
10. FALSE — The ZSU-57-2 is a twin 57 mm selfpropelled automatic antiaircraft gun that first appeared in the Soviet Union around 1957. With a muzzle velocity of 1,000 milli/second, each of the two barrels is capable of firing 120 rounds per minute out to about 4,000 meters.

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IN THE MARCH 1978 issue of the *Aviation Digest,* the Aviation SQT Hands-On Testing Device was introduced. Since, there have been a few minor changes to the device to make it more dependable and easier to work with. These minor changes do not warrant a lengthy mechanical explanation here; however, the change in the name of the device needs to be mentioned.

The previous name of the device was the *CMF 67 Composite Testing Device* which did not completely describe its function inasmuch as the device also will be used for individual training conducted in the unit. So, to align the name of the device with its *primary* function of training, the device now is called the *CMF 67 Composite Training Device.* The device still will be used for SQT hands-on testing, but for terminology's sake it will be considered a "training aid" available to all aviation units in the field.

The device is expected to increase the physical skills required of aircraft mechanics and component or systems repairers to perform their jobs better and to pass the hands-on component (HOC) of their skill qualification test.

Early in 1978, Ft. Eustis, VA sent a message worldwide notifying commanders that blueprints were available from the Ft. Eustis Training and Audiovisual Support Center (TASC) so that the device could be fabricated locally. However, due to the overwhelming number of requests received by the TASC, blueprints could not be provided to everyone requesting them.

More recently Ft. Eustis has sent another message to allow local TASCs to get the blueprints and make copies for units with field fabrication capabilities. Local TASCs should have received master blueprints for reproduction last June and commanders with units having field fabrication capabilities should contact local TASCs (TASOs) for the blueprint copies. This is an interim method of getting the training device because it is being procured by contract at Ft. Eustis in sufficient quantities for use in unit training programs and the SQT. The availability date and method of distribution of the device is yet to be determined, but we will keep you posted as information becomes available.

This article is intended to familiarize the Soldier, supervisor and unit commander with the hands-on training and skills required for the SQT. The information here will enable the unit commander and supervisor to more effectively understand what needs to be taught, and the Soldier can determine what he or she needs to learn (and practice). Even though this information is intended to be useful to unit commanders and supervisors, it is directed mainly toward the E-5 and below with any aviation MOS (except 67W or 68G) since passing the SQT is the ultimate responsibility of the individual.

All MOSs have a basic cycle they go through to form individual training and evaluation as a part of the Enlisted Personnel Management System (EPMS). Referring to figure 1, note that this cycle is started as soon as you receive your Soldier's Manual (SM).

If you are to do skilled work in your MOS, you must know *what* you are

Glossary

ARNG	**Army National Guard**
CMF	**career management field**
EPMS	**Enlisted Personnel Management System**
HOC	**hands-on component**
ITED	**individual training evaluation directorate**
MOS	**military occupational specialty**
NBC	**nuclear, biological, chemical**
PCC	**performance certification component**
SM	**Soldier's Manual**
SQT	**skill qualification test**
TASC	**Training and Audiovisual Support Center**
TASO	**Training Aids Service Office**
TCO	**test control officer**
TM	**technical manual**
USAR	**U.S. Army Reserve**
WC	**written component**

Figure 1

Key Events In The Individual Training And Evaluation Cycle

Event	When Does Event Occur?
1. Soldier receives Soldier's Manual.	At least 6 months before Soldier takes SQT (18 months before for USAR and ARNG).
2. Soldier trains on tasks.	As often as feasible and necessary to learn and maintain the task to standard.
3. PCC is distributed to soldier's supervisor.	During the year before the SQT test period.
4. Soldier is rated on PCC.	Any time during the year before the SQT test period.
5. Soldier receives SQT notice.	At least 60 days before Soldier takes SQT (12 months before for USAR and ARNG).
6. Soldier takes WC and HOC.	Any time during 6-month SQT test period.
7. PCC Answer Sheet is returned to TCO.	By suspense date set by TCO.
8. Answer sheets for WC, HOC, and PCC are sent to ITED.	As soon as possible after Soldier takes last component of SQT.
9. Soldier receives Individual Soldier's Report.	Within 30 days after Soldier takes last component of SQT.
10. Unit commanders receive Summary Reports.	Within 30 days after end of each quarter in the test period.

Training
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McGinnis
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Developments
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expected to do (the task), *how well* you are expected to do it (the standard) and in what *environment* it is to be done (the conditions). Your Soldier's Manual tells you all of these. The Soldier's Manual does not describe everything that you should know, or should be able to do; the tasks that it specifies are those considered most critical to successful performance in your MOS. For each of these critical tasks, the manual outlines the specific steps that you must follow for skill development. It also gives key references that will help improve your ability to do your job and measure progress in your MOS.

Figure 2 is a page extracted from the 67Y Soldier's Manual which shows these conditions, standards, steps for accomplishing the task and the references for the task.

Some tasks you will learn on your own (perhaps through studying references or through independent on-the-job training). Others will be learned through *training conducted by your unit.* Many of the tasks will require constant *practice* in order for you to master them. What is important is not where you learn a task but how often you practice it and how well you perform it.

Remember that the HOC of the SQT

Figure 3

HOC Matrix For CMF 67

	67G	67N	67U	67V	67X	67Y	68B	68D	68F	68H	68J	68M
Select Micrometer & Measure Shims		1237	2078	2179	2416	1202	2052	1008	1140	2080		2185
Measure Angle With Propeller Protractor	2252	1196		2150		1243		2189				
Torque Nut & Install Cotter Pin	2074	1165	1335	1120	2416	1268		1023		1029		
Lockwire 4 Bolts In Vertical Pairs		1189	2182	1120	2169	2137	2054		1043	2074	2003	2018
Lockwire 3 Screws	1119	1117	2182	2214		1144		1040	1046	2076	2003	2033
Torque & Lockwire Tail Rotor Mount Bolts					1266							
Lockwire Bolt to Structure	1123		2137	1120		1702						
Measure Inside Dimension	2077		2078		2287			2164		2085		
Determine Thickness Using Vernier Depth Gage							2052	2164	2164	2085		2085
Adjust Cable Tension Tension	2282 2263	2154			1210							
Lockwire With NBC Clothing On	1119	1198	2182	1120	2169	2137	2052	1040	1043	2074	2003	2018
Put On Protective Mask	0002	0002	0002	0002	0002	0002	0002	0002	0002	0002	0002	0002

Figure 2

FM 55-67Y
551-67Y-1243

TASK: Perform minimum blade angle check

CONDITIONS: (Refer to standardized conditions (para 1-7).) The following manuals, tools and equipment are necessary to complete this task:
1. TM 55-1520-221-20,
   TM 55-1520-234-23 or
   TM 55-1520-236-23 as applicable
2. General mechanic's toolbox
3. Propeller protractor
4. Torque wrench
5. Lockwire

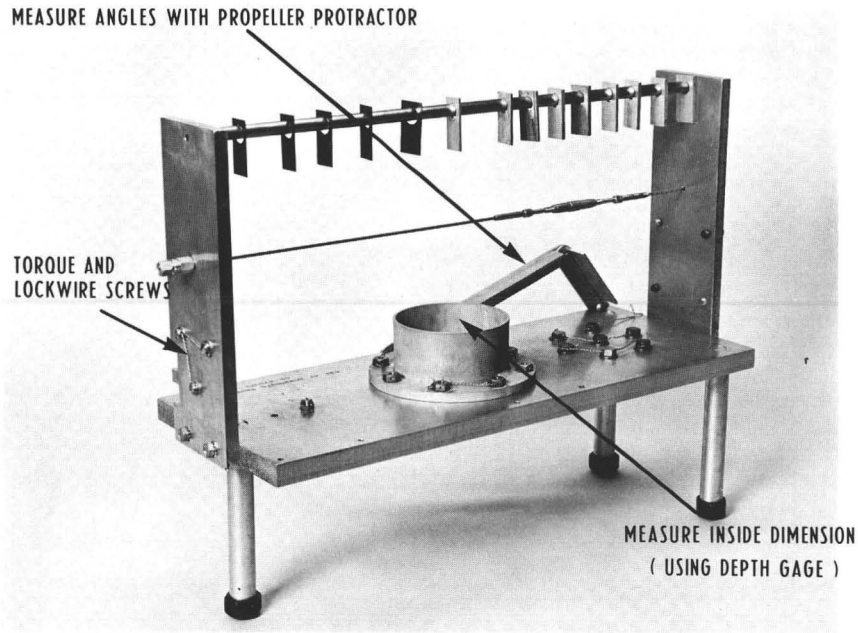
STANDARDS: The minimum blade angle must be set to 8½° (±½°).

STEPS FOR ACCOMPLISHING TASK:
1. Place the cyclic stick in the center position and the collective stick full down.
2. With the rotor head about level, use a prop protractor to measure the angle of each blade.
3. Adjust the pitch change tubes to obtain the correct angle.

REFERENCES: TM 55-1520-221-20, chapter 8; TM 55-1520-234-23, chapter 5; TM 55-1520-236-23, chapter 5.

NOTE: Must know use of prop protractor.

Figure 4



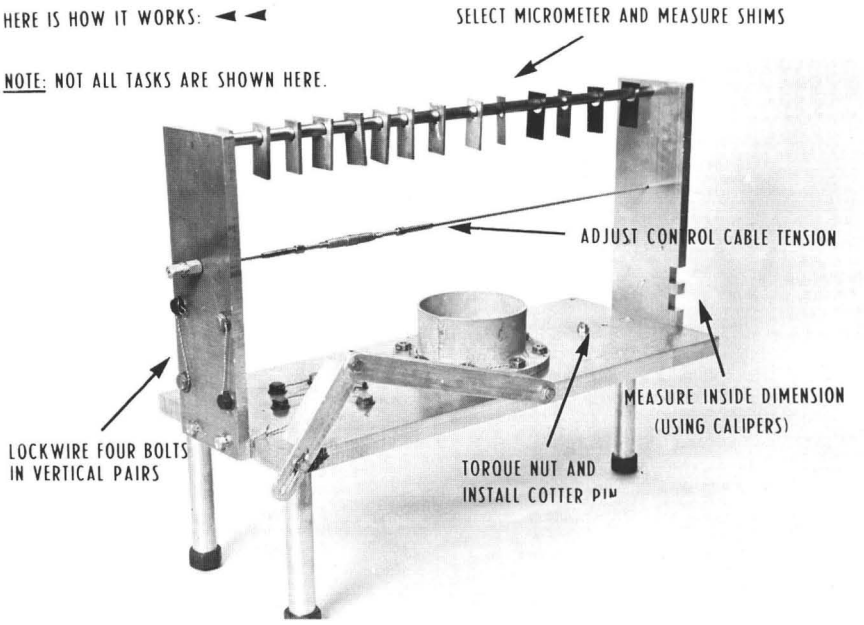


Figure 5

is designed to test Soldiers on tasks that require physical skills. This part of the test will be taken under conditions that are similar to those on the job. At present, the hands-on component consists of 1 to 16 scorable units (tasks) but will increase in numbers as test developers at the Transportation School gain experience with this kind of test. This is because we have found that a written test tends to favor the Soldier who is "test wise" or more comfortable with sit down paper-and-pencil tests. We also realize that many Soldiers may be good at their jobs, but may not be good at taking paper-and-pencil tests.

For this reason, the goal is to increase the number of tasks tested in the HOC and reduce the number tested in the written component. Some of the tasks *presently* in the hands-on component for aviation MOSs are:

- *Select Micrometer And Measure Shims*
- *Measure Angles With Propeller Protractor*
- *Adjust Control Cable Tension*
- *Torque And Lockwire Screws*
- *Lockwire Four Bolts In Vertical Pairs*
- *Torque Nut And Install Cotter Pin*
- *Measure Inside Dimension*

Each task is conducted under conditions prescribed in the Soldier's Manual and scored using the standards in the same Soldier's Manual. However, every MOS will test at least one task on the device with the Soldier wearing nuclear, biological, chemical (NBC) protective clothing. This is to determine the Soldier's ability to perform the task in an environment where protective clothing must be worn. Additionally, you will be required to don your protective mask in 9 seconds.

For the hands-on component you *will not* be asked any written questions, so to relate the tasks listed above for aviation MOSs to tasks in your Soldier's Manual, refer to HOC Matrix For CMF 67, figure 3, page 25.

From the list of tasks above, let's take the task of *Measure Angles With Propeller Protractor* and follow it through event number 2 in figure 1, which is: Soldier Trains on Task. To train for this task, you will need:

- The CMF 67 Composite Training Device
- All TMs listed in item number 1 of the Soldier's Manual extract page (figure 2)
- A serviceable propeller protractor (item number 3 under the conditions section of the Soldier's Manual extract page, figure 2)
- A Soldier's Manual (figure 2 will be used here for an example to simulate a Soldier's Manual)
- TM 55-1500-204-25/1 with all changes posted

NOTE: Items 2, 4 and 5 under the conditions section of the Soldier's Manual extract page do not apply when "training" on the device. They are necessary only when actually performing the task on the aircraft. Now, let's get acquainted with this new training device. Due to space constraints, detailed explanations will not be provided on all tasks that can be performed on the device, but the two photos (figures 4 and 5) should give you some idea how it is used. After studying figures 3 and 4, and the concepts presented in this article, you should be able to apply this knowledge to the rest of the tasks.

Now back to the task of *Measuring Angles With A Propeller Protractor.* In performing this task, you should proceed in the following sequence:

- Ensure training device is fairly level and is stable on the workbench or table you are using
- To familiarize yourself with the operation of the propeller protractor refer to paragraph 6-1115 of TM 55-1500-204-25/1
- On the propeller protractor, lock ring to disc by dropping the lock pin in the deepest slot
- Zero the protractor on the flat surface of the training device (this is

Figure 6

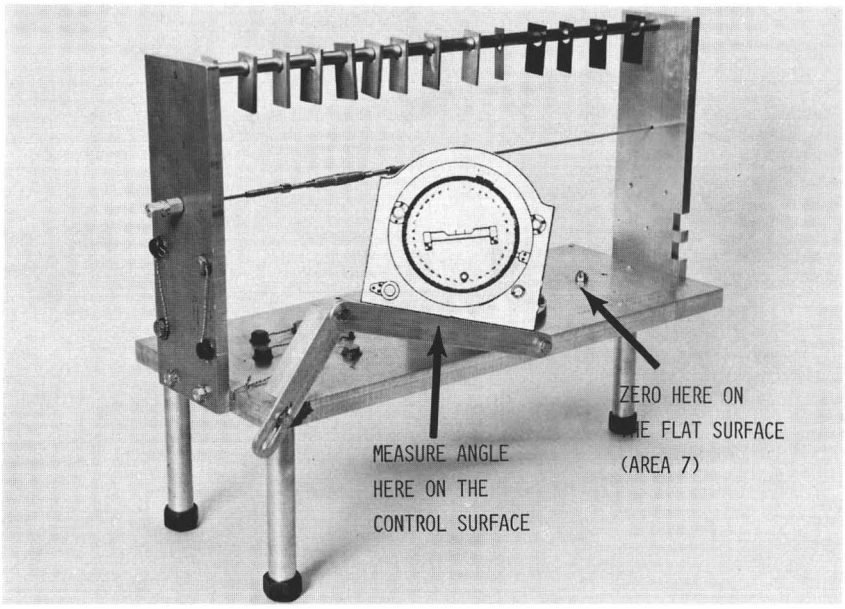


Figure 7

SCORESHEET

UNIT 2 PERFORM MINIMUM BLADE ANGLE CHECK (TASK 551-753-1243) (MEASURE ANGLE WITH PROPELLER PROTRACTOR)

INSTRUCTIONS FOR THE EXAMINEE: (Read these exact words out loud.) AT THIS STATION, YOU WILL USE AND READ A PROPELLER PROTRACTOR. IN AREA 7 OF THE TESTING DEVICE, POSITIONED ON THE WORKBENCH BEFORE YOU, YOU WILL FIND AN ADJUSTABLE BAR WITH A PRE-SET ANGLE. YOU ARE REQUIRED TO USE THE PROPELLER PROTRACTOR AND MEASURE THE ANGLE OF THE LONG BAR. ZERO THE PROTRACTOR ON THE FLAT SURFACE OF THE TEST AID, PARALLEL TO THE ANGLE BAR. AFTER YOU COMPLETE THE MEASUREMENT, TELL ME THE READING. ALL THE NECESSARY EQUIPMENT IS FURNISHED. I CANNOT HELP YOU DURING THE TEST. IF AT ANY TIME DURING THE TEST YOU THINK YOU HAVE AN EQUIPMENT MALFUNCTION, TELL ME AND I WILL STOP THE TEST. IF YOU ARE RIGHT, I WILL SEE THAT THE PROBLEM IS CORRECTED AND YOU WILL START AGAIN FROM THAT POINT. IF THERE IS NO MALFUNCTION, YOU WILL RECEIVE A NO-GO FOR THIS TASK. YOU HAVE 5 MINUTES TO COMPLETE THIS TASK. WHEN YOU COMPLETE THE TASK, TELL ME. DO YOU UNDERSTAND WHAT YOU ARE REQUIRED TO DO? (If the examinee does not understand the requirements, repeat the instructions. If the examinee still has questions, say, "DO THE BEST YOU CAN.") YOUR TIME STARTS NOW.

EXTRACT-PAGE 1

Area 7) — use ring adjusting screw for zeroing

- After zeroing the protractor, place it on the adjustable control surface of the training device and turn lock for ring until it is finger tight
- Turn the disc adjusting screw until the bubble in level is centered
- Remove the protractor from the device and read angle in degrees

Some of these steps are depicted in figure 6.

Some of the steps just mentioned are considered performance measures and during an actual hands-on component SQT the scorer will grade these steps in the process of determining the angle. These steps (performance measures) will be listed on the HOC Scoresheet in the SQT Notice (this is event number 5 of figure 1).

Figure 8

PERFORMANCE MEASURES: (Sequence is not scored.)	PASS	FAIL
1. Zeroes propeller protractor on flat surface of test aid.	_____	_____
2. Measures angle and tells scorer results within ±1°. (Scorer measures angle after examinee to determine whether the examinee results were correct within ±1°.)	_____	_____
3. Completes task within 5 minutes.	_____	_____
4. Performs task safely.	_____	_____
NOTE: The propeller protractor is a precision tool and must be handled with care. Deliberate mishandling is grounds for safety violation and a NO-GO.		
	GO	NO-GO
	_____	_____

STANDARD: The examinee is scored GO if he passes all the performance measures. The examinee is scored NO-GO if he fails any of the performance measures. If the examinee receives a NO-GO, tell him why and record here the performance measures failed and a brief explanation to show the cause of the NO-GO. ____

_____

_____

_____

SCORER'S SIGNATURE

EXTRACT — PAGE 2

Figures 7 and 8 are two pages from the 67Y SQT Notice for the task we have been doing here. These two pages are actual extracts from the HOC and they illustrate the format used in the HOC for most aviation MOSs. Pay particular attention to the second page of the extract and observe that the PERFORMANCE MEASURES are basically the same as those already discussed.

We could not feasibly cover here all the aviation MOSs and the tasks for each one that will be tested on the HOC portion of the SQT. For that reason only one example appears in this article. However, we have provided you with a MATRIX (figure 3) of the tasks for all the aviation MOSs (for E-5 and below, except MOSs 67W and 68G).

When using this MATRIX, simply find your MOS code and follow the column straight down to the task number listed for your MOS, then go to your Soldier's Manual and study the task as we have done. Remember to practice the physical skills, because that is what you will be tested on.

Depending on your MOS, you should be able to proficiently use the following tools during the HOC portion of the SQT (see MATRIX for applicability): Micrometer, tensiometer, propeller protractor, torque wrench, calipers, depth gauge, duckbill pliers and diagonal sidecutters. The last two tools, along with safety wire and cotter pins, will be used to test *safetying* skills. If you have any doubt as to your ability to use any of these tools proficiently, or perform any of these tasks, *now* is a good time to get started *practicing* for your SQT. If these skills cannot be performed correctly, there is little chance of passing the SQT.

Questions regarding this article, aviation MOS, Soldier's Manuals and SQTs developed by the Transportation School may be directed to: Commandant, U.S. Army Transportation School, ATTN: ATSP-TD-ITD (WO1 McGinnis), Ft. Eustis, VA 23604 or call AUTOVON 927-5405/5044.

It Looks Like A Huey

Nanse Grady
U.S. Army Transportation Center
Ft. Eustis, VA

INSIDE, IT LOOKS like a Huey. It flys like a Huey. It vibrates like a Huey. It has the "feel" of a Huey.

It ain't a Huey.

Aviators at Ft. Eustis, VA, have begun logging instrument flight time on the new 2B24 UH-1 Huey helicopter flight simulator at Felker Army Airfield.

The complex simulator which cost the Army more than $2.5 million was built by the Link Division of the Singer Corporation, the same people who produced the old Link pilots' trainers.

The new simulator is impressive. Four truncated "Hueys" sit atop platforms that look as if they had been constructed by a mechanically inclined child using an Erector set. From the Huey cockpits and the structures on which they rest stream hundreds of yards of cable. These objects surround another platform boasting computer equipment that could easily have appeared in a futuristic science fiction movie.

A pilot climbs a ladder and enters one of the Huey cockpits. The ladder moves back and the cockpit "takes off" as its Erector-set platform moves the Huey 8 to 10 feet up in the air. There is a slight movement, a tilting, a rocking . . . up, down, from side to side.

Inside the cockpit the pilot can't see out and is flying blind. There's the typical whup-whup of the Huey's honeycombed rotors. The craft vibrates like a Tahitian dancer. The pilot's hand grasps the stick, making small, rhythmic movements. The pilot has a long-practiced feel for the craft. Hueys are sensitive. A light move turns the chopper. A heavy hand can crash it.

The pilot watches the instruments. Everything's fine, the flight is going smoothly. The airspeed increases from 80 to 90 knots.

There's an accompanying build-up in vibration. "Whup-whup-whup-whup" the Huey repeats. Easy flight, some minor turbulence, but. . . .

The tailrotor falls off.

"We can simulate 104 emergencies, five at a time, including moderate turbulence," Captain Clinton M. Kounk, the flight simulator's facility chief, said. "We can simulate complete loss of a tailrotor, for example. This couldn't be done in a real aircraft because the chances of the pilot's survival are slim. But, the pilot's safe here and can at least get some idea of how to control the aircraft."

The computer and the two operators and instructors behind its console can give a pilot a challenge a minute as well as help if a problem develops.

The simulator at Ft. Eustis, one of 19 in the Army, has two disk packs featuring "gaming areas" — one of Ft. Rucker, AL, the other local. These may be shown on video display screens at the computer console and in each cockpit.

There are three variations in scope. The 12.5 by 12.5-nautical mile (NM) chart of the local area, for example, shows Patrick Henry Airport and Langley Air Force Base as dominant sites. The area also can increase to 25 by 25 NM and the 100 by 100 NM diagram depicts facilities as far away as Patuxent Naval Station. Felker, Langley and Patrick Henry appear as pinpoints on that projection.

Using the gaming areas, a pilot can fly around Eustis and Rucker. The disk packs, large reels of magnetic tape, can be changed in less than 10 minutes. CPT Kounk hopes to obtain another pack on Europe to give pilots experience in flying overseas. This, like the other packs, would be programed and provided by the U.S. Army Aviation Center at Ft. Rucker.

Besides giving the pilot experience in handling emergencies such as mechanical failure and adverse weather and flying flight plans, the simulator may be used as a self-help tool.

There are cassette tapes programed with specific problems that can be plugged into the computer. "Let's say an aviator wants to know how to handle an engine failure," CPT Kounk said. "The aviator can call it up on a specific tape. This provides instructions on how to handle it. Then the cockpit will simulate the failure and the tape will talk through it as the pilot's flying." The simulator also records the last 5

minutes of the flight, which can be played back to the pilot. If the aviator thinks there's been a mistake, the flight can be stopped and the last 5 minutes of whatever's been done, including radio calls, can be played back. If the pilot really wants to study the details, the tapes are played in slow motion.

An automatic copilot is another feature of the simulator. "If I'm flying by myself and I want to stop and make some calculations, I can call up the auto copilot and the craft will fly itself while I make the necessary calculations," CPT Kounk said.

The simulator can be stubborn on what's the right and the wrong way to fly a Huey. Instrument flying is done normally at 90 knots. If the pilot exceeds that speed and doesn't make the necessary corrections, the machine will provide a warning. The pilot gets three warnings before the simulator begins giving instructions on how to pull back.

But, the job isn't all the computer's. The two men who run the console also are busy. They serve as computer operators, instructors, air traffic controllers, ground control approach controllers and pilot mentors.

Between them Willard W. Pelesz and Dave Auman have years of trainer experience. Mr. Pelesz hasn't decided yet how much he likes the new simulator. He thinks it might be too impersonal. With the old trainers, he could open the cockpit door and talk things over with the pilot. It's impossible with the new simulator. The cockpit is, after all, 8 to 10 feet in the air.

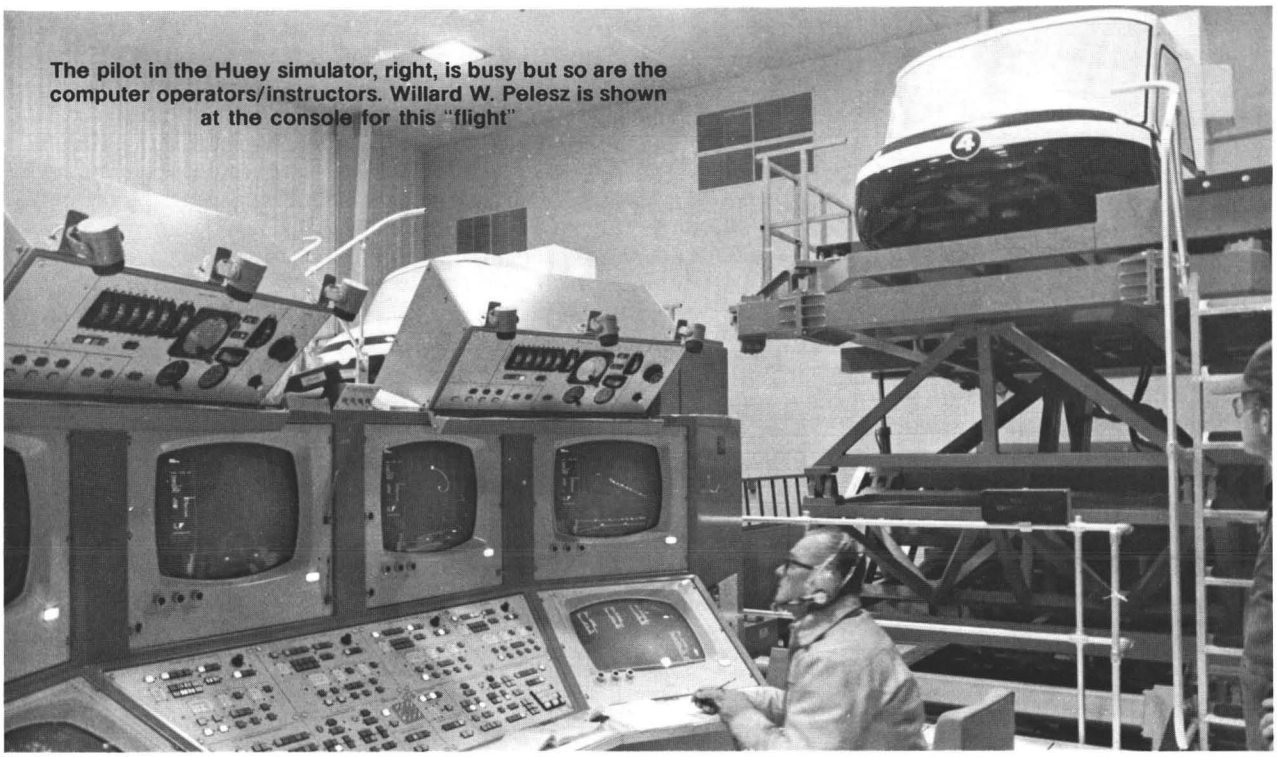
Other important simulator people serve on the permanent five-member maintenance team contracted from Singer. The expensive piece of hardware gets their daily attention.

Yes, expensive. Two and two-thirds million dollars represents a sizeable investment. Yet CPT Kounk estimates that the simulator will pay for itself in a little more than 7 years. It's to be used by pilots from Forts Eustis, Monroe and Lee plus those from Army Reserve and National Guard units in Virginia.

"It costs $64 an hour to fly the trainer against $156 to fly a real aircraft," CPT Kounk said. Calculating the required instrument flight time for active duty pilots, Reservists and National Guard personnel, the captain estimates the simulator will "probably save $375,000 in 1 year."

With the Army looking to the UH-60A Black Hawk as the Huey's replacement, will the simulator soon become obsolete? CPT Kounk doesn't think so. "Instrument procedures learned in one aircraft are applicable to all. The Huey is vastly different from the CH-54 Skycrane, yet the 355th (a heavy helicopter unit at Ft. Eustis) will use the simulator as an instrument procedure trainer."

The simulator was dedicated 21 July as a memorial to the late Colonel Paul F. Anderson who was director of combat developments at the U.S. Army Transportation School at the time of his death.



The pilot in the Huey simulator, right, is busy but so are the computer operators/instructors. Willard W. Pelesz is shown at the console for this "flight"

Building A Team

SFC James E. Petersen
Directorate of Training
Training Management Division
Fort Rucker, AL

TODAY'S CONCEPT of warfare, and the role of Army aviation in meeting the challenges involved, demand that the most professional, dedicated and knowledgeable Soldier possible be placed upon the field of battle. The role of aviation has expanded to where only the best of our efforts will allow us to function effectively and victoriously should we be called upon to put our training to use. How then do we put that effective Soldier-aviator in the best possible posture from which to emerge victorious?

First, let us take a look at those Soldiers who are required to get an aircraft from point A to point B so that it may accomplish the mission dictated by the demands of the occasion. Flight operations personnel and air traffic controllers hold that vast responsibility to assist aircraft and provide that service.

Without the flight operations specialist, paperwork and planning would consume the pilot's time to such an extent that the effectiveness of the mission would be jeopardized. Without controllers, aircraft and crews would fly through skies where another uncontrolled aircraft under the same situation, friendly or not, could be more hostile than the enemy below. Only with properly trained and capable people in the role of flight operations specialists and air traffic controllers can the aviation mission be accomplished in a safe, orderly and expeditious manner.

Given that we do need these people, in fact cannot do without them, how do we ensure that they are available? Who holds the responsibility for supplying capable, fully qualified and operationally effective men and women to perform the complex tasks required? Is it the recruiter? Is it the service school? Is it the first, second and third line supervisors? The answer to all of these questions is an unqualified *yes!*

It is not possible to supply the finished product if we miss any of the steps involved in the molding and processing of the raw materials. First, the recruiters and their supporting elements employ the machinery to single out individuals who one day will be the professional Soldiers operating as competent members of the air traffic control (ATC)/ flight operations team.

The school system at the U.S. Army Aviation Center, Ft. Rucker, AL, holds the immense responsibility of ensuring that graduates have the basic knowledge and background needed to transition smoothly from classroom to operational units in the shortest possible time. Commanders and staff personnel are responsible for placing the newly graduated specialists in the facility or unit where they are most needed. This ensures that the new graduates have the best equipment and the most professional supervision available. They progress rapidly and soon become an integral part of the team.

The first, second and third line supervisors must share their expertise with the novices and assist them in reaching their full potential. The importance of these steps must never be ignored. A failure or an effort that is less than maximum at any stage could spell disaster, if not defeat, for the overall aviation mission.

For a little closer look, we should take into consideration what is being done along the route that the Soldier follows, and suggest what might be done in the future.

Recruiters are the first point of contact in providing our finished product. They work within the system to attract individuals whom they believe can contribute successfully to the mission of the Army. Through mental and physical testing, their support elements determine the applicant's eligibility. Counselors guide the applicant into the system in the proper military occupational specialty (MOS) at the proper time to achieve continuity in the school system.

In the case of air traffic controllers, the Class II flight physical should be administered. Perhaps, too, some type of testing to ensure that the correct psychological attitudes are present would be beneficial. After an applicant has spent months in school or in the field, it is far too late to discover deficiencies in these areas.

The flight operations and air traffic control schools at Ft. Rucker are charged with giving students the basic knowledge they must have once they leave the school and arrive in the field. This applies to ad-

vanced course students as well as those just entering the program. In the case of the Soldier new to the field, he or she is taken from very basic rules, regulations, procedures and concepts, up through simulated situations and problems, to actually performing on the job duties in the field under the close scrutiny of the instructor.

The students learn how their jobs are related to the overall picture. The realistic conditions of the school environment afford the students the best possible opportunity to learn. As for the advanced student, either in Advanced Noncommissioned Officer's Education System (ANCOES), the Officer/Warrant Officer ATC Course, the Aviation Commander's Readiness Course, the Advanced Warrant Officer's Course, or the Flight Surgeon's Course, the individual is taken to that point of proficiency required by the position held within the aviation scheme.

The ANCOES students are trained for duty as senior NCOs in either air traffic control or flight operations. They are given the material they need to assist the commander in providing a fully functional team. On the air traffic control side, the students are provided, through extensive work with terminal instrument procedures (TERPS) and other important administrative details, the skills needed to take a plot of ground and mold it into an airfield which is operationally sound.

The Officer/Warrant Officer ATC Course students are familiarized with concepts and procedures which they must follow to give their units maximum capability. They learn where to go for the proper resources needed to accomplish the mission. They also learn about human resources problems by actually familiarizing themselves with many of these duties, which include tower, ground controlled approach (GCA) and manual approach control operations.

The student in the Aviation Commander's Readiness Course, the Advanced Warrant Officer's Course and the Flight Surgeon's Course are given a thorough briefing on the capabilities of ATC/flight operations team support and how to use it.

As part of the school's obligation to provide training and support to the field, an ongoing effort updates the training and provides for more realistic situations for the student's benefit. Work is underway to update the already superb system of training using the radar simulators, not only in the classroom, but also in the exportable programs which provide training at field sites using the computer at Ft. Rucker. Tactical motifs are planned for classrooms with murals depicting the layout of the combat environment which will give the student a ready reference in relation to the overall picture.

LZ Wolfpit provides the latest of equipment and procedures for training the Soldier in need-to-know operations at the tactical level. At LZ Wolfpit, tactical operations, being of prime importance to Army aviation, are applied realistically by allowing the student to control and assist live traffic in the actual environment of the forward area refueling and rearming point.

This is accomplished by using control tower, GCA, flight following and unit operations procedures. Using student controllers and student operations specialists in conjunction with student aviators, we begin to develop the coordination required to do the job in the tactical environment.

New equipment is evaluated to tie the needs of the field to the available resources. Field training and classroom work are under constant study to locate and update those areas which can provide the field with better personnel.

Finally, we come to the operational units where the obligation becomes more stringent. It is in these units, supplied with the best product that the recruiter and the school can provide, that the real training begins and culminates. The commander and staff, the air traffic controllers and operations officers, and the first, second and third line supervisors all become critically involved in the training process.

Each unit is different. Each has its particular mission and objective. Once the newly assigned specialist arrives, either novice or old hand, the training begins. All members of the team who supervise must lend their every effort and expertise to bring the new members up to speed so that they may effectively function at maximum capability.

Assignments must be made to ensure that all newly assigned individuals fill the gap they are intended to fill. Time and equipment must allow the new member to become familiar with and proficient in the skills required to do that job peculiar to the new assignment. As they change, concepts and mission objectives must be fed into the team effort to remain at peak effectiveness.

Supervisory personnel must be responsive to any training needs new members may require. This training may be accomplished on the job or the individual may return to the school system as required within the progression of each MOS. Reorganization is being instituted to provide the needed lines of supply and communication to assist in all of these programs.

Both tactical and fixed base operations will play increasing roles in the future of Army aviation as it expands and updates with the requirements of the ever changing world situation. The need for continued training in these areas must be seen and heeded. It is imperative that our aviation forces at all levels be continually provided with the best possible advantage in our mission to support and defend the people of the United States. Training is the key and must be given top priority throughout the Army.

Aviation Warrant Officer Advanced Course Restructured

Rod Gibson
Course Development Division
Directorate of Training Developments
Fort Rucker, AL

FOR THE PAST several months, the U.S. Army Aviation Center, Ft. Rucker, AL has been looking into the aviation warrant officer professional development training. The warrant officer (WO) was introduced into Army aviation in the early 1950s with the prime purpose of releasing commissioned officers to their respective branches for maintenance of branch proficiency.

More than a decade later a requirement to provide training in officer-type skills and knowledge was identified to facilitate better use of warrant officers in a wide range of aviation assignments. In 1969 warrant officer career courses were established at the Aviation Center to satisfy this need. Since then these courses perennially have been subject to refinement and modification.

DA Pamphlet 600-11, "Warrant Officer Professional Development," provides guidance for career training. When aviators enter career status, they may choose between career specialization in one of three functional tracks: operations and training, flight safety, or maintenance and resource management.

They still must maintain military occupational specialty (MOS) qualification, but their assignments and training will be programed to develop their expertise and employ their services in the chosen subspecialty. Also, extremely well qualified aviators may seek entry into the Experimental Test Pilot Program.

The intention of the Aviation Center is to provide an aviation warrant officer advanced course curriculum that includes resource management, general aviation subjects, combined arms organization and operations, and general military subjects. The purpose of the course is to provide aviation warrant officers with knowledge of the role of Army aviation as it relates to the missions and functions of the Army, aviation unit staff functions and procedures, and familiarity with combined arms operations. In addition, the course allows meshing with ongoing subspecialty training to meet the requirements of the Army in the specialty career fields described in DA Pamphlet 600-11.

Beginning with Class 79-1, the Aviation Warrant Officer Advanced Course (AWOAC) will be reduced from 21 weeks to a 15-week, 3½-day curriculum. Individuals who have demonstrated outstanding performance of duty and who meet other criteria will be selected to continue training in the flight safety career field. Career field entry training consists of the 8-week Aviation Safety Course conducted by the U.S. Army Agency for Aviation Safety, located at Ft. Rucker, normally followed by a tour as an aviation safety officer.

For personnel entering the operations and training track, career field entry training will be as an instructor pilot or instrument flight examiner in the utility/observation helicopter. After an initial career field utilization tour, the individual may opt for additional mission category aircraft training. Those selected will receive training in either cargo helicopters, attack helicopters or fixed wing aircraft. They normally will serve the remainder of their career in that aircraft system, advancing in both skill level and position responsibility and progressing through the basic pilot and instructor pilot skills in their respective systems. Individuals in the operations and training field who remain in utility helicopters — and are selected for further training — receive subsequent training and utilization tours such as instructor pilot, instrument flight examiner, nap-of-the-earth or night vision instructor. This training is conducted at the Aviation Center and will be provided prior to or immediately after completion of the AWOAC.

Personnel who are accepted for entry into the maintenance and resource management field of career specialization, following an initial career field utilization tour, may apply for training in additional mission category aircraft. Those selected will be trained in either cargo helicopters, attack helicopters or fixed wing aircraft. Training in the Aircraft Maintenance Officer Course, conducted at Ft. Eustis, VA will be provided prior to or upon completion of the AWOAC.

Reducing the present advanced course by 6 weeks generates a potential savings by eliminating the present 21 weeks advanced course and then receiving subspecialty training at a later date. This also will allow the U.S. Army Aviation Center to move forward in refining an aviation warrant officer advanced course curriculum, to include subspecialty training, that will provide WO training to enable WOs to better meet the needs of the Army.

Aviation Personnel Update

LTC Jacob B. Couch Jr.
Aviation Management Branch
Officer Personnel Management Directorate
U.S. Army Military Personnel Center

OPMS Specialty Designation For Year Group 1972 Officers. The Officer Personnel Management Directorate (OPMD) has started the file review to determine OPMS specialty qualifications of all captains in year group 1972. Factors being considered include: Time served in various OPMS specialty areas, the manner of duty performance while serving in these areas, and civilian and military education. Year group 1972 officers will have the opportunity to provide their preferences prior to the final selection.

Three items will be evaluated prior to a final determination of a specialty combination. These are: Army needs, the officer's experience and education, and his/her personal preferences. The Army's requirements must be the primary factor to be considered.

The current and projected company grade aviator shortage (see "Long Term Commissioned Aviator Career Policy," ***Aviation Digest,*** November 1978) will require high use of officers in aviation positions. Because of this, the majority of aviators in this year group can expect to receive specialty 15 (aviation) as either their primary or alternate specialty.

Female Aviator Utilization. Since this subject was last addressed in the ***Digest,*** OPMD has continued to receive questions. The current Department of the Army policy was transmitted (via message) to the field in December 1977. This message addressed specialty skill identifiers (SSI) and the additional skill identifiers (ASI) associated with commissioned officers and how they apply to female aviators.

Female aviators may be assigned to 15B, combat aviation officer duties, but may not be assigned to pilot a helicopter in an attack role. Therefore, a female aviator may be assigned to a combat assault helicopter organization but may not be assigned to an attack helicopter unit. Females also are restricted from holding the ASI of 1R-aerial scout. However, women may be assigned to all other commissioned officer duty positions (15A, C, D) without any restriction.

U.S. ARMY

AVIATION STANDARDIZATION

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 558-3617 or commercial 205—255-3617. After duty hours call AUTOVON 558-6487 or commercial 205—255-6487 and leave a message

Evaluation of Utilization & Training Preparation for *Female* Army Aviators

ON 13 JUNE 1977, the Directorate of Evaluation and Standardization at the Aviation Center began an evaluation of the training and the unit utilization of female Army aviators. The evaluation was prompted by allegations that a female aviator student in the Aviation Maintenance Officer's Course was having trouble controlling the UH-1H Huey with the hydraulic system turned off.

The evaluation is to determine how female aviators are being used in field units and whether the training they received in the Initial Entry Rotary Wing Aviator Course adequately prepared them for their jobs. Findings and conclusions are those of this directorate and are based on an analysis of the school performance of 29 of the 30 female aviators trained through September 1977. Other findings and conclusions were based on an analysis of the responses to questionnaires by 18 female graduates and 19 of their supervisors.

Assessment of the female aviators' performances during training required comparison with their male classmates. Differences are shown in figure 1.

Female officers are .7 years older than their male counterparts while female warrant officer candidates (WOCs) are .1 year younger than male WOCs. The female officers have only .3 years more education than the males as compared to female WOCs who have .1 year more education than the males. These differences are not significant at the .05 level. Not enough Flight Aptitude Selection Test (FAST) scores were available for a valid comparison.

The primary reasons for the differences shown in figure 1 are that the test for WOCs and the test for officers are not identical and that the acceptance score is 300 for WOCs and 155 for officers. The two groups were matched in marital status and in having previous flight experience. They were matched ± 6 months in date of enlistment. Overall, there was little difference in the two groups when they began training.

Approximately 50 percent of the

Figure 1

Differences Female vs Male Aviation Students Prior to Training

	Female		Male	
	OFF	WOCs[1]	OFF	WOCs
Age, Years	26.2	22.3	25.5	22.4
N=	13	16	13	16
Education, Years	16.9	13.4	16.6	13.3
N=	13	16	13	16
FAST[2] Score	227	303	315	342
N[3] =	11	12	4	10

[1] WOCs — Warrant Officer Candidates
[2] FAST — Flight Aptitude Selection Test
[3] FAST Scores were not available for two female officers, four female WOCs, nine male officers and six male WOCs

warrant officer candidate applicants fail the FAST while only 8 percent of the commissioned officers fail it.

(Note: The FAST provides a selection technique for warrant officer candidates. It includes 390 questions. Self-description data questions total 190. The remaining questions are distributed among the following areas: instrument comprehension, complex movement, helicopter knowledge, cycle orientation, mechanical functions, and visualization of maneuvers. The FAST administered to commissioned officers omits the 190 self-description questions. Since officers have been commissioned after being submitted to highly selective techniques, the FAST results simply provide Army management personnel with an additional managerial tool.)

Performance data for the two groups of 29 aviators was collected from student academic and flight records. Figure 2 shows the differences/similarities in the performance of the two groups in eight areas of flight training.

The final course grade is no more different than might occur by chance in such a small sample; overall flight grades are almost identical, and the number of hours required to solo also is close. In fact, differences depicted in figure 2 are considered negligible.

Two other areas assessed were class standing at graduation and rates of elimination from training. The trend for both the males and females in these areas is similar. The finding for the student performance was that female aviator students performed at generally the same level as their male classmates with the males achieving only a slight edge.

Questionnaires were developed and mailed to the 25 female graduates whose current address could be determined. Similar questionnaires were mailed to the supervisor of these graduates. The final returns produced responses from 18 female aviators and 19 supervisors. Both questionnaires provided information about female aviator utilization and performance on selected flight maneuvers while the graduates' questionnaires included information on the aviators' opinions of their flight training.

Responses of the aviators to 21 opinion questions were evaluated

Figure 2

Differences Female vs Male Aviation Student Performance During Training

	Female N=29	Male N=29
1. Final Course Grade		
Average	84.74	85.6
Standard Deviation	2.67	2.96
2. Overall Flight Grade		
Average	84.14	84.17
Standard Deviation	2.89	2.47
3. Hours to Solo		
Average	13.79	13.3
Standard Deviation	2.08	1.64
4. Additional Flight Time, Hours		
Average	6.77	5.05
Standard Deviation	5.32	2.77
5. Total Flight Time, Hours		
Average	204.3	201.4
Standard Deviation	8.84	6.88
6. Pink Slips Awarded*		
Total	111	96
Average	3.8	3.3
7. Instructor Pilot Changes		
Total	73	81
Average	2.5	2.8
8. Down Grades (C & U)**		
Total	505	453
Average	17.4	15.6

*A pink slip is a report of an unsatisfactory daily flight
**C grades are flight grades between 70 and 79; U grades are unsatisfactory

to determine the group opinion about school training, utilization in their unit, and the degree of acceptance of female aviators in the school and in the unit. The evaluation consisted of comparing the actual number of responses to the question choices. No statistical manipulation was employed. In summary, the primary findings about the opinions of the female aviators concerning flight school were:

- They felt their training was as good as that of their classmates.
- They felt as competent an aviator at graduation as their classmates.
- They felt there was some discrimination towards them because of their sex — some of it being positive and some negative.

Responses to the question concerning utilization in the unit showed that about two-thirds of the females felt they received the same missions in their units as the male aviators. All 18 females responded affirmatively to the question inquiring if they could perform a given mission as well as a male with the same experience and training.

Unit utilization of female aviators is further described by their answers to the questions in figure 3. Results indicate that female aviators felt they needed more training missions and fewer support missions. Responses of the supervisors to the same question also are shown and they believe more training missions and fewer support missions are needed.

In conclusion the findings on unit utilization of the female aviators include the following:

- Most report that they perform the same tasks as their male counterparts.

Figure 3

What types of missions have you flown and how many hours in each category?

	Female	Supervisor
Support	156.6	140.1
Training	70.2	57.1
Tactical	62.4	80.8

What types of missions do you feel you should have flown?

	Female	Supervisor
Support	113.5	108.1
Training	85.8	95.9
Tactical	63.6	81.1

(Note: 16 out of 18 female aviators reported this data and 18 out of 19 supervisors reported. Reports from the supervisors included data about some female aviators who did not respond to the questionnaire.)

- All feel as competent as the males.
- Both the aviators and their supervisors feel a need for more training missions and fewer support missions.

Analysis of responses to questions about how females were accepted as aviators resulted in the following findings:

- There was an initial problem of female aviators being accepted both by classmates at school and by their supervisors and fellow aviators on their first jobs.
- The female aviators felt a more than average need to prove themselves to their supervisors and counterparts.
- After being on the job a while they felt they were accepted as trained and qualified aviators.

Response of the aviators to estimate their degree of skill in performing 14 selected maneuvers required some statistical analysis. The aviators estimated their levels of performance as *Extremely Well, Very Well, Pretty Well, Not Very Well* and *Poorly.* Values of 5, 4, 3, 2 and 1 were assigned to the performance levels in the order listed above. Multiplying the number of responses for each level by these values and totaling the products produced a total score for each maneuver.

One more step was needed to permit comparison of the aviators' performances on one maneuver to that on another maneuver and to permit comparison of the aviators' estimates of their performances to the estimates made by their supervisors on the same maneuvers in the Questionnaire of the Supervisors. That step required conversion of the total scores to standard scores.

The Questionnaire for Supervisors provided an estimate by supervisors of the aviators' ability to perform the same maneuvers. Data was converted to total scores and standard scores as described above. The standard score on each maneuver as estimated by the aviator is compared to that estimated by the supervisor in figure 4.

Before attempting a comparison the following data should be noted. Only 15 aviators made an estimate of their ability. There were 18 super-

female aviators felt . . . their training was equal to that of classmates; they were as competent as their classmates; there was some positive and negative discrimination

visors who rated female aviators on their ability. Of the 2 samples only 14 were common. Three supervisors of the 17 female aviators did not respond to the questionnaire and there were four supervisors who rated aviators that did not return a questionnaire.

In summary the supervisors' estimates of the performance by the female aviators on 14 selected maneuvers led to the following findings:

- The supervisors and aviators agree on the two maneuvers where performance is poorest. They are the right and left fixed pedal setting maneuvers.
- There also is agreement on the two maneuvers where performance is best.
- As shown by the standard scores there is a wide difference of opinion between aviators and supervisors on performance of the following maneuvers. Differences range from 7 to 14 in standard score points.

✓ Emergency Procedures (Oral)
✓ Hooded Flight or Flight in IMC
✓ Hydraulics Off Running Landing

- Differences in the remaining nine maneuvers ranged from one to five standard score points.

Performances of female aviators in other schools also was evaluated and is summarized as follows:

- *Aviation Maintenance Officers Course at Ft. Eustis, VA.* Eleven female aviators have attended and satisfactorily completed this course. The course includes three phases, the last phase requiring qualification as a test pilot. Satisfactory completion of the course is achieved when the average of the grades for all three phases is passing. Phase grades for the 11 graduates were not available. Free response comments from supervisors of the female aviators indicate that at least one of them did not satisfactorily complete the test pilot phase.
- *Fixed Wing Multiengine Qualification Course.* Three female aviators have completed this course at the Aviation Center. Final flight grades for those three were 81, 96 and 88.

Figure 4

Aviator vs Supervisor Estimates of Female Aviator Performance on Selected Flight Maneuvers Converted to Standard Scores

		1	2
Right Fixed Pedal Setting		29	27
Left Fixed Pedal Setting		29	35
Emergency Procedures (Oral)		49	58
Terrain Flight Navigation		49	53
Steep Approach		49	50
Hooded Flight or Flight in IMC		51	58
Standard Autorotation		51	46
Terrain Flight		51	50
Max Performance Takeoff		53	51
Normal Approach		53	55
Hydraulics Off Running Landing		55	41
Hovering Autorotation		55	53
Normal Takeoff		62	62
Hovering Flight		63	60
	Average	50	50
	SD	10	10

How scores were derived

- Aviators estimate based on average — 64.29
  Standard Deviation — 5.74
  N = 17
- Supervisors estimate based on average — 67.21
  Standard Deviation — 5.65
  N = 18

- *OH-58 Instructor Pilot Course.* One female aviator completed this course at Ft. Rucker and currently is training students in the OH-58 Aviator Qualification Course.

The major findings of the evaluation are summarized below:

- There was little difference in the performance of the female aviators and the male aviators during training.
- Female aviators believed the training they received was as good as that received by their male classmates.
- Female aviators did not feel accepted initially either in school or on the job and felt they had to prove themselves. After the proving period they felt accepted in both areas.
- Of the female aviators 72 percent believed they received the same missions as the male aviators and 28 percent of them did not.
- A small number of the female aviators had difficulty in completing the Aviation Maintenance Officers Course at Ft. Eustis.

The evaluation reported above is indicative of the type of work done by the Evaluation Division of the Directorate of Evaluation and Standardization. This division performs those functions associated with quality assurance of the Aviation Center's product and is vitally interested in obtaining feedback from the field. Such feedback will be used to evaluate the quality of training materials and training developed and conducted by the Aviation Center. Problems identified will be forwarded to the appropriate agency for corrective action. Please send your responses to DES at the address listed at the beginning of this article.

VIEWS FROM READERS

Continued from page 1

radar signatures equate to low detectability. In all four areas the 500 M-D presents a significantly lower signature than the AH-1S. Additional factors which contribute to the survivability of the 500 M-D are its small size, crashworthiness and agility.

From a cost standpoint equipping the Reserve components with the 500 M-D is an attractive alternative to the AH-1S. The initial procurement cost of the 500 M-D is about half that of the AH-1S. Over a 15-year life cycle operation and maintenance (O&M) costs are one-third that of the AH-1S.

Since there are almost 400 OH-6As in the Reserve component inventory, initial procurement costs could be reduced by retrofitting the existing OH-6As to the 500 M-D configuration. The proven reliability, availability and maintainability features of the 500 M-D contribute significantly to its low O&M costs. An example of this is the low maintenance manhour per flight hour (MMH/FH) ratio of 1.4/1 for the TOW equipped 500 M-D. The development costs for this system would be negligible since we could buy off an existing production line.

The Army needs the attack helicopter AH-64 and we must upgrade our medium fleet of AH-1Ss, but there is a definite need for the light helicopter today. Equipping the Reserve component attack helicopter and air cavalry units with the 500 M-D/TOW now is a low cost alternative to upgrading these units. Additionally, it provides an effective, survivable, fighting force that can be relied upon in the event of mobilization of the Reserve component.

Major Joe Beach
TSM, Attack Helicopter Office
Ft. Rucker, AL

Editor:

With regard to your request in the January 1978 issue for information about the use of blue and amble goggles for simulating IFR flight, the following may be of interest.

While stationed at Davison Army Airfield, Ft. Belvoir, VA as a UH-1H SIP, I had the good fortune to work with CW4 Roger Gould. In 1976, he and I were tasked by the MDW Standardization Board to devise some way to get rid of the cardboard we had been using in the pilot's windshield, yet still maintain good IFR simulation. We tried different color plastic transparencies and for one reason or another (too dark — too light), found them unsatisfactory. Then, just before Roger's retirement in June, he suggested that I try polarization.

I contacted the people at Polaroid in Massachusetts and told them my requirements. They were kind enough to send some sample pieces and I secured permission from our commander to purchase enough material for a few test articles. Once it arrived I began cutting, fitting and experimenting. I found I had to make a frame from sheetmetal (about 1 hour's work) and suspend it from the glareshield and the center post so the polarized plastic would lie flat, but vertical. I then attached a smaller piece to the hood in such a way that the inside of the aircraft was clear with an unobstructed view of the instruments, but the windshield became a deep purple and very difficult to see through. I flew the device myself for approximately 15 hours and used it while giving a number of instrument checkrides. I got no negative comments from anyone who flew behind it, with regard to its effect on their flying. The only real problems I encountered were in mounting it and getting rid of reflections, both of which were eliminated.

I then suggested it formally through the Army Suggestion Program along with drawings, specifications, etc., through Ft. Belvoir. CW4 Lester (Ike) Isenman was selected as the evaluator. He has forwarded me copies of the action on it thus far and I have included these for your information. The last word I have received is that it was sent forward from USAAAVS to USAAVNC with recommendation for approval.

Since I've been in Europe (Sep 77), I've shown a copy of the device to the Standardization people at Schwabisch Hall and got it approved for use here. As we began looking into the fabrication of it on a large scale, the proposed change to AR 95-1 came out restricting us from placing anything in the windshield. So, we're back to square one. I'm hoping to get that clarified soon.

If anyone would like more detailed information, I'd be more than happy to make up a packet. Just give me a few weeks to put it together.

CW3 David A. McAdams
205th Aviation Company
APO NY 09185

NOTE: The *Aviation Digest* appreciates your offer to prepare an article. I am sure it will be of value to our readers.

Editor:

The U.S. Army Aviation Museum at Ft. Rucker, AL is in need of several items to complete displays. They are:

- Russet brown low quarter shoes, brown (Government issue type) jump boots, officer's garrison cap, headset with chamois skin pads, gray leather flight gloves, major's rank insignia, old style chief warrant officer, CW-3, sew-on insignia and khaki ties.

The Aviation Museum needs many of each item and any other related contributions.

Items can be sent to the U.S. Army Aviation Museum, Ft. Rucker, AL 36362.

Thomas J. Sabiston
Museum Curator
Ft. Rucker, AL 36362

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

A Christmas Gift

The best Christmas gift that you could have is to find yourself in a survival situation with a full complement of aviation life support equipment (ALSE).

Many aircrewmembers have survived crash situations because they had the forethought to be wearing their survival equipment at the time an emergency arose.

Every year two or three aircrewmembers find themselves on the ground, or in the water, with no survival equipment except what they have on their person. We should take the advice of "those who have been there" and protect aircrews accordingly. True, not many aircrews desire to wear the survival vest, and many will complain of its bulk and weight and that it is too hot. For those of you who can remember that far back, we did wear the vest in most aircraft in Southeast Asia, and it proved beneficial. It also can be of great help in peacetime if given the proper emphasis. We in the life support community have a responsibility to convince commanders and aircrews that constant wear of the vest is in their best interest.

Our purpose for conducting accident investigations is to take advantage of these experiences and attempt to improve the next person's chances. A survival vest, properly fitted and equipped with such basic necessities as radio, flares and a signal mirror will encumber no one, while providing maximum protection to the aircrew.

The Army recently experienced a helicopter crash in the southwest part of the country. Both pilots escaped with bruises, but without serious injury. *All* survival equipment remained in the aircraft, since neither aircrewman was wearing his survival vest. The aircraft did not burn, and the aircrewmen were able to crawl back to their damaged craft and retrieve part of their survival equipment. We now have two more converts when it comes to wearing your ALSE during every flight.

We've said it before, and we're going to say it again. ALSE is available, order it, inspect it and above all, wear it at *all* times during each flight, no matter how short you *plan* the mission duration to be. The equipment that you physically have attached to your body (or ejection seat) is all that you can depend on having once you are on the ground.

Honest Mistake

Are there such things as "honest mistakes"? Recently an aircrewman with 20-20 vision was going through a routine flight physical examination. The doctor applied an opthalmic solution to the eyes of

the aircrewman. Someone made a mistake and had put a highly caustic mixture in the bottle of eye medication. The aircrewman may be permanently blind or unable to ever fly again because someone did not take care to do the job right. This is probably what could be considered an honest mistake, but honest, careless, etc., the end result is the same regardless of who made it.

Screw Loose

Many of you have reported losing the two screws that hold the boom microphone plug on the rear of your SPH-4 flight helmet. We recommend that you locally procure some "Lock-Tite" or similar thread locking materiel and apply to these screws to ensure that they do not become lost. Lock-Tite also can be added to other nonmaintenance significant screws of the helmet.

Replacement screws (NSN 5305-00-152-2681) are available from S9I (Defense Industrial Supply Center, 700 Robbins Avenue, Philadelphia, PA 19146). The cost of these screws is 11¢ each, and an "off-line" requisition must be submitted to obtain them since they are not listed in the Army Master Data File.

Look Out

A recent survey showed that more air-to-air misses occurred at lunchtime than any other time of the day or night. Now, many theories have been put forward as to why this could be so, but the one I go for is too many people with their eyes on their lunch and not outside the aircraft. Be warned. Looking out is your last, and most effective, line of defense. The statisticians have now proved that you need your eyes most at lunchtime.

Medical Aid

The Air Force has published TO 00-35A-39 (1 March 1978) "Instruction for Procurement, Issue, Use and Maintenance of Medical Kits." This is an excellent source of information on your medical kits.

True Form

The Air Force maintains a record on each piece of their ALSE, which is an outstanding idea. This is the only way to maintain a current readiness status of your ALSE equipment. Forms used to record this information are: Form AFTO 334, Helmets and Oxygen Mask; Form AFTO 406, Survival Vest Inspection Record; and Form AFTO 338, Survival Kit Records. We recommend that you visit the nearest Air Force facility life support shop. They will be happy to let you have these forms.

Debbie Fuentes
Photo by:
Tom Greene

LES Fear

For you Cobra drivers there is a linear explosive substance (LES) that explosively removes the canopy of your aircraft in an emergency. There have been accidents where the crew had a fear to detonate the LES, because the cockpit area had a strong odor of JP-4 fuel.

An intense test program was conducted with the cockpit area saturated with JP-4 fuel and fumes. There is no danger of fire if you use the LES to remove your canopy.

The force of the detonation is outward and presents no danger to the crewmembers. There could be some danger to those who may be within 20 feet of the outside of the aircraft. The only precaution the crewmembers should take is to ensure that their face mask is down before detonation.

The Army Regulation Sez

The new AR 95-1, October 1978, paragraph 3-23 requires that all aircrewmembers wear leather boots, approved flight helmet, cotton or cotton/wool blend underwear, fire resistant outer garments (Nomex) with the sleeves down, collar up and pants legs secured around the boots.

It also is now a requirement that all aircrewmembers *wear* survival equipment appropriate for their mission. You folks can read between the lines, this new AR was written for a very good reason, and that is to help save your life.

Restricted List

Air Force publication TO 11A-1-1, change 7, August 1978, "Ammunition Restricted or Suspended," lists certain lot numbers of the foliage penetrating flare, NSN 1370-00-490-7362, as restricted. Excessive failures have been experienced with lot number DEI-2-09. This lot number should be used for training purposes only. Lot number PAI-5-2 explodes upon firing, and may cause injury to the user. We recommend that you dispose of this lot number of flares.

USAAAVS

Static Electricity

and Hot Refueling

A RECENT accident vividly illustrated the destructive potential of static electricity during fuel handling operations.

The mission of a flight of four aircraft was to demonstrate the firepower of the AH-1S. After the firing was completed, the four returned to the field site for dearming and then flew to a rapid refueling point. The No. 4 aircraft taxied into point 6 of the 10-point hot refueling site. The copilot took the controls and the pilot connected the grounding cable to the wing and bonded the fuel nozzle to the aircraft. He then removed the filler cap from the fuel port and began refueling. About 30 seconds later, the pilot stepped up on the skid cross tube and side step below the pilot's canopy so he could see the fuel gauge. While looking at the gauge, the pilot heard a crackling noise in his helmet and was suddenly dislodged from his position. He was unable to immediately release the fuel nozzle trigger and sprayed the engine with JP4 fuel. The engine compressor stalled and the transmission and hydraulic compartments caught fire.

The fireguard reacted by spraying a short burst of CO_2 at the pilot. The fire extinguisher then failed. The pilot took it and got it back in working order. Signaling to the copilot to shut down the engine, the pilot continued to extinguish the fire.

After all theories had been explored, it was generally concluded that static electricity generated within the fuel discharged from the fuel surface to the fuel quantity transmitter (spark promoter), igniting the vapor air mixture within the fuel cell and causing an explosion and fire.

The American Petroleum Institute (API) lists four conditions that must be present for an electrostatic charge to be a source of ignition:

- A means of electrostatic charge generation.
- A means of accumulation of an electrostatic charge capable of producing an incendiary spark.
- A means of discharging the accumulated electrostatic charge in the form of an incendiary spark.
- An ignitable vapor-air mixture in the spark gap.

All of these conditions were present at the time of the mishap.

The refueling point setup was not in violation of FM 10-68 or FM 10-69. The equipment was in better-than-average condition, much of it new, having been issued specifically for a demonstration for dignitaries. The refueling point had been inspected three times by members of the division aviation safety office. Minor deficiencies were noted and corrected on the spot. The refueling point was not inspected on the day of the mishap. The physical layout of the point, designed for efficiency, served to generate, store, and regenerate enough electrostatic charge in the fuel to cause a static arc from the fuel surface in the aircraft fuel cell to a spark promoter (the fuel quantity transmitter within the cell).

Generation of static electricity in the refueling point system was caused by the use of two 350-gpm, 80-psi pumps coupled in parallel to produce a high fuel flow rate designed to efficiently fuel 10 aircraft concurrently. These pumps produce static electricity by their pumping action of the fuel. The high fuel flow rate through the hoses in excess of 3 feet per second, according to an American Petroleum Institute publication and POL handling experts from the Navy, creates a dangerous static charge by movement of fuel molecules against the inner hose surface. The fuel flow rate at the refueling point was 5 feet per

second in the 4-inch hose and 9 feet per second in the 3-inch hose. The refueling point was also fitted with two filter separators in parallel immediately following the pumps. The filters, depending on the type filter used, can produce as much as a 200 percent increase in static charge in the fuel. The filters were considered by Air Force, Navy, and Army authorities to be the major source of static electricity.

The API describes filters as a "prolific static generator." Micromesh filter elements were in use. The static charge is generated as a result of the fuel molecules passing around foreign particles in the filter. Static electricity was stored in the system by continuously recirculating the fuel at a high flow rate through a closed circulating system. The constant movement of the fuel did not allow it to rest a sufficient amount of time to leak or dissipate its charge. The API recommends a minimum of 30 seconds relaxation time after passing through the filters. Therefore, the constant flow of the fuel at a rate of more than 3 feet per second served to store the electrostatic charge. The regenerating of the electrostatic charge took place as the fuel recirculated through the pumps and filters on its way around the closed system.

U.S. Forces in most parts of the world operate within the flammable temperature range for JP4. FM 10-68 states that "JP4 will retain more impurities than AVGAS and so is more likely to build and hold a static charge than AVGAS. Because JP4 builds up a greater charge than AVGAS, it is more likely to discharge its electricity through a spark." As the recirculating, static or positive charged fuel begins to enter the fuel cell at a high flow rate, the positive charge starts to build faster than it can dissipate to the negative charge contained in the walls of the cell and protruding items. In this case the transmitter sending unit provides a smaller surface and contains more of a negative charge by surface area than does the large surface area of the tank walls. As the positive charge builds like a capacitor, it reaches a level at which discharge or arcing will occur. The positive charges will, by their nature, seek to balance or reach equalibrium with the negative charges. A spot on the fuel quantity transmitter located at the approximate level of the fuel prior to ignition, and unlike any other spots on the transmitter, showed evidence of arcing.

The problem of static electricity continually exists and must be incorporated and stressed in the training of the people involved with handling POL products. More attention should be directed to the problem because of the large number of aircraft refueling at rapid refueling points.

How do we solve the static problem? The Navy and the API recommend the use of a relaxation tank between the filter and the outlet of the fill pipe. A relaxation tank is nothing more than a grounded metal drum where the fuel comes to rest for a specific period of time. The size of the tank and amount of time required depend upon the flow rate of the fuel. While the fuel is in this tank, the positive charge in the fuel has a chance to dissipate or leak to the walls to ground before continuing downstream to the aircraft.

The Air Force is testing the use of an antistatic additive, Shell ASA 3, to reduce electrostatic charges building up in JP4 fuel. The Canadians have been using this additive since 1968 with no accidents attributable to static ignition since that time. The Air Force has also introduced and highly recommends the use of a grounding plug similar to that used for the nozzle to ground the aircraft. This additional grounding plug provides a substantial means of grounding the aircraft to a grounding wire. In many cases, and it is believed probable in this case, alligator clamps such as the ones being used by the Army do not penetrate paint or annodized surfaces or the metal to properly ground an aircraft.

Since antistatic additives and/or relaxation tanks are not currently available or authorized, fuel flow and excessive splashing in the fuel tank can be controlled by partial opening of the fuel nozzle during initial refueling in accordance with FM 10-68.

Other recommendations include:

- All crewmembers and fuel handlers receive documented training on environmental conditions present at refueling points with special emphasis on the dangers of static electricity during hot refueling.
- Install only one filter separator per system when a closed loop recirculation fuel system is used.
- Keep open port hot refueling for training purposes to a minimum to prevent spills and fuel vapor escape, to keep contaminants from entering aircraft fuel systems, and to reduce the possibility of combustion within the fuel cells.
- Refueler position himself with both feet securely on the ground and both hands on the hose/nozzle assembly so he will be braced for sudden back pressure.
- Refueler reduce the fuel flow rate at the nozzle by at least 50 percent during initial phase of refueling.

Mission of the cavalry is to engage and determine the enemy's intentions. Deployed in conjunction with the attack helicopters, the scouts are the "eyes" through which the commander "sees" the battlefield and keeps up with the fast moving enemy situation. [Key to symbols on page 46]

THE OVERLOOKED WARRIOR

Major Harold D. Pierce
Office of TSM, Advanced Scout Helicopters
Fort Rucker, AL
and
Major Richard S. Evans
Concept and Organization Division
Directorate of Combat Developments
Fort Rucker, AL

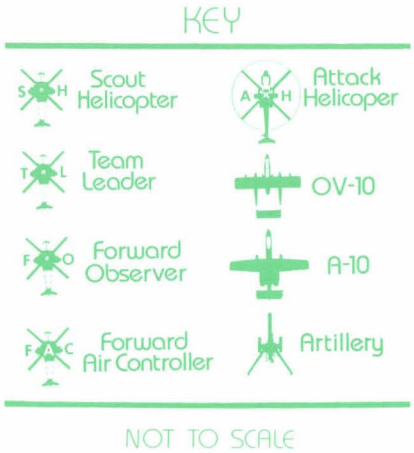
THE CHALLENGE for North Atlantic Treaty Organization (NATO) alliance in Europe today is to stop the armor-heavy, numerically superior Warsaw Pact countries if hostilities break out and Western Europe is invaded. How will this challenge be met? The U.S. Army believes that the answer lies with the total effort of each member of the combined arms team.

The newest member of the combined arms team, Army aviation, makes a significant contribution to the total success of the NATO forces, and depends heavily on the most important, yet overlooked, piece of equipment — the scout helicopter. Let's look at the role of the scout in a typical scenario.

0800 hours: Enemy forces are massing across the political border. Friendly forces have been alerted and are hurriedly preparing to move to their general deployment positions (GDP). Ground units of the covering force already are on the move. Air cavalry and attack helicopter units attached to the covering force have departed and are en route to their assembly areas.

1500 hours: Covering force units have arrived at predesignated locations and await signs of the enemy. Scout aircraft supported by attack helicopters conduct a detailed area reconnaissance.

1800 hours: Massive enemy artil-



lery firings begin, followed shortly by a smoke screen. Through the smoke, scout aircraft observe the lead elements of the enemy crossing the border.

Now, let's stop the battle, freeze the situation and digress for a moment to focus our attention on the scout helicopter and the four major users of this combat asset which are air cavalry, field artillery, attack helicopter and Air Force forward air control (FAC).

Air Cavalry: Prior to the onset of hostilities, the ground commander deploys air and ground cavalry units in a covering force operation to determine the location of the major enemy thrust. The cavalry is given the mission of engaging and determining the enemy's intentions. The scouts of the air cavalry are the "eyes" through which the commander "sees" the battlefield and keeps up with the fast moving enemy situation.

The major enemy force is sighted and engaged by the cavalry. The enemy forces are concentrated to breach what the friendly commander believes to be the forward edge of the battle area (FEBA). The aerial scouts that forced the enemy to deploy leave the defense of the FEBA to the ground forces and attack helicopter units. The air cavalry next receives a screening mission. The scouts in the screening force secure exposed flanks and augment the friendly units that are displacing to blunt the enemy attack and stop any penetration.

During the screening mission the scouts cover large amounts of real estate making sure the enemy does not use the lightly defended area of the flank for another attack route. These scouts also provide an important human link to the ground commander in both covering force and screening operations.

Assuming a portion of the battle area has been breached by the enemy, let's examine the main battle area or breakthrough point. The breakthrough point has become more defined, and the ground commander calls the aerial forward observer to concentrate artillery fire on the lead elements. As the friendly artillery begins to fall and tactical air (TACAIR) is brought to bear, the enemy air defense weapon and tanks may be forced to button up, thereby severly restricting visual observation and fighting capability.

With this in mind let's look at another element of the scout helicopter and how this user fits artillery into the battle.

Aerial Forward Observer: The aerial forward observers (FOs), employing supporting fire from scout helicopters, also have access to sophisticated target location equipment and laser designators for the cannon launched guided projectiles (CLGP). Since the enemy has been forced to button up, the aerial observer greatly expands the capabilities of the ground forward observers.

Aerial observers fill the voids caused by terrain interference on the ground artillery observers. As the ground laser designators are destroyed or displaced to occupy new positions, the aerial FO assumes full control of the artillery and continues to employ conventional artillery and precision guided munitions (PGM).

This fast, initial firepower response to the enemy main attack is the first step in building the added coverage and sustained firepower required to attrite the penetration.

Now that artillery and the Air Force have degraded the enemy air defense system, let's look at another part of the battle element that uses scout helicopters.

Attack Helicopter Unit: To stop the penetration the attack helicopter unit employs three attack helicopter teams (AHT) composed of advanced scouts and AH-64 advanced attack helicopters. The AHTs have been called in to maintain sustained killing power on the enemy force. This killing power comes in the form of 16 Helicopter Launched Fire and Forget (HELLFIRE) missiles that can be employed directly by the AH-64 or indirectly by the laser designating scout.

To successfully blunt the attack several actions must be accomplished, and each action directly affects the scout. The scout must be the eyes of the battlefield and locate prime targets for destruction, concentrate the AH-64s for maximum killing power and control its use for maximum effectiveness. The leaders of the attack helicopter teams are the scouts, and all battle information on employment of the AH-64s comes directly from the scout.

The next question should be, how does the scout get the timely information needed to properly employ the AHT? This information comes from another scout helicopter crew known as the "battle captain." Let's examine the battle captain's role in the overall picture of defeating the enemy at this specific point of the battle.

Battle Captain: Since the term "battle captain" is not universally familiar, it is necessary to clearly define it. The term was coined to identify the leaders of the attack helicopter teams. They are located in scout helicopters and are additional members of established attack helicopter teams. They may be any rank from warrant officers to lieutenant colonels and must possess leadership abilities. Their primary responsibilities are to coordinate the battle with ground commanders and manage all supporting fires de-

livered from or controlled by aerial platforms. Part of this coordination involves the designation of kill zones, sectors of responsibility for the AHTs and priorities of targets.

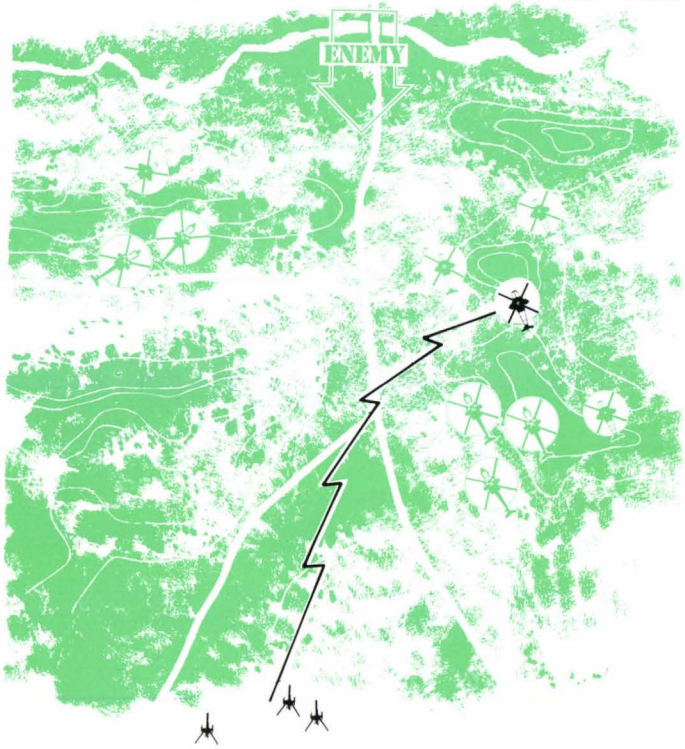
Any scout pilot of the AHT may have to assume the role of battle captain in a given situation, but the real battle captain is the one designated to be the leader of the AHTs. At a given time the battle captain works directly with or monitors the aerial observer, attack helicopter teams, Air Force ground (G)FAC and the ground commander being supported. Duties include:

- Coordinate the mission and available assets, and determine friendly and enemy situations.
- Acquire and identify targets and render reports.
- Confirm or select attack positions for AH-64s.
- Assist AH-64s in moving to attack positions.
- Provide local security to AH-64s while they are engaging targets.
- Request artillery fire and tactical air as required.
- Ensure engagement continuity and direct replacement AHT to assume the mission of those lost in combat or disengaged to rearm/refuel.

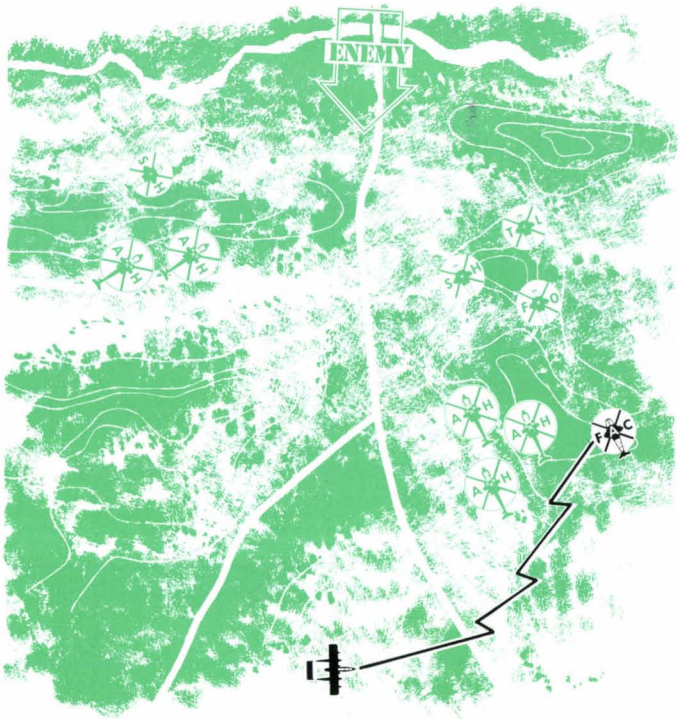
The modern battlefield is highly mobile, and the battle captain is required to maintain constant contact with the situation. One element that falls short in mobility is the Air Force GFAC. The FACs are assigned to each maneuver battalion and are provided an MC-107 1/4-ton vehicle for movement about the battlefield. We quickly see this cuts their mobility to a point of becoming ineffective. To keep FACs as the valuable assets they are, we must place them in aircraft capable of operating within the same environment as the battle captains who are the controlling element of the air. Naturally these aircraft are an advanced systems scout, and this gives us a chance to discuss the contribution of close air support (CAS).

Ground Forward Air Controllers: It is vital that the ground FACs be given scout helicopters dedicated to their use. Their unique responsibilities require that they have mobility independent of another scout or the battle captain. Colocating

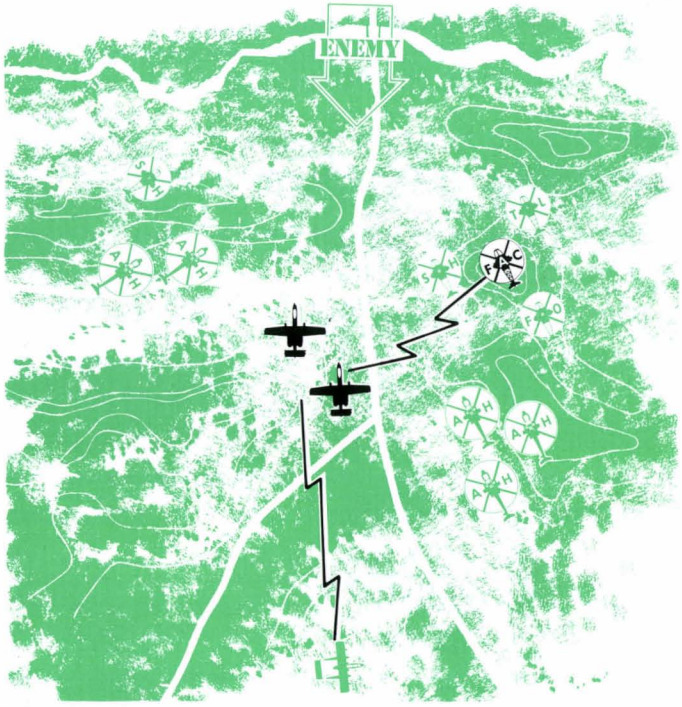
The attack helicopter company is comprised of three teams of three OH-58 scout and five AH-64 attack helicopters each. While one team is deploying, another team is at the FARRP and the third team is en route to the FARRP from the battle area. The scout must be the eyes of the battlefield and locate prime targets for destruction, concentrate the AH-64s for maximum killing power and control its use for maximum effectiveness [Key to Symbols on page 46]



Aerial forward observers (FOs) fill the voids caused by terrain interference on the ground artillery observers. Employing supporting fire from scout helicopters, FOs also have access to sophisticated target location equipment and laser designations for the cannon launched guided projectiles (CLGP)



Through the FAC the CAS pilots are able to "see" the battlefield before they arrive on station. Operating NOE, the FAC informs the battle captain of the CAS team location and intentions after the ground commander requests CAS [Key to symbols on page 46]



The FAC provides target location and information to the CAS team and assists by designating air defense weapons that may be a threat to the attacking aircraft. The FAC remains in close contact with the CAS team and continues to support by designating targets for destruction

them in a scout with another element would not be complementary and degrades the mission of both.

The GFAC is the CAS pilot's link to the battlefield.

Through the GFACs the CAS pilots are able to "see" the battlefield before they get there. Even though the GFACs are airborne, they still are operating in the nap-of-the-earth (NOE) environment. After the ground commander requests CAS, the GFAC informs the battle captain of the CAS team location and intentions. The GFAC provides target location and information to the CAS team and assists by designating air defense weapons that may be a major threat to the attacking aircraft. The GFAC remains in close contact with the CAS team and continues to support by designating targets for destruction.

The scout helicopter is the common denominator throughout the battle from identifying the enemy's major thrust to the total destruction of the enemy.

The U.S. Army has no scout aircraft in its inventory that can perform the missions discussed. U.S. forces in Europe are operating with the OH-58A Kiowa. This aircraft is not equipped to navigate, employ weapon systems or communicate on the modern battlefield. The technology of the new family of aircraft has long passed the OH-58A. The OH-58C (an improved version of the OH-58A) will fall several hundred pounds short in its ability to carry the essential pieces of equipment required to perform its mission of continuous warfare against a sophisticated enemy — 24 hours a day in fair weather or foul.

Even now the OH-58C is only marginally complementary to the AH-1Q/S Cobra. The situation will become more critical because of the increasing disparity in capabilities between the present scout and the advanced attack helicopter.

Can Army aviation perform its role in the combined arms team without the *advanced scout helicopter.* I DON'T THINK SO!

ATC ACTION LINE

UNITED STATES ARMY AIR TRAFFIC CONTROL ACTIVITY

When is the Army going to do something about our ancient VHF omnidirectional range (VOR) ground stations?

Glad you asked about that! The news is pretty good! We've got about 17 of the old terminal VHF omnidirectional range (TVOR) ground transmitters still out there grinding away. These transmitters are nearly 20 years old and are being replaced with new equipment.

Since when does the Army get *anything* new?

Since September 1977 when the Army contracted for 30 new terminal VHF omniranges from E-Systems in Salt Lake City, UT. These TVORs are solid state technology items and have a high reliability. They will be equipped with an Automatic Terminal Information System (ATIS).

Hold it — just what is ATIS?

O.K., it's a tape recorder upon which the control tower operator voice records the latest airfield data and weather information. Things like the active runway, wind direction and speed — stuff like that. At regular intervals the recording is played back and transmitted over the TVOR identification channel. When ATIS is not being transmitted, the regular morse code ident signal is transmitted. This gives aircrews the capability of tuning in the TVOR and getting the latest airfield poop without having to call the control tower. Saves everyone time and effort!

Sounds good but when are we gonna get these things?

We've already got two of them installed. One at the Signal School at Ft. Gordon, GA for training maintenance personnel; the other one is installed at Libby Army Airfield, Ft. Huachuca, AZ, and is undergoing an operational test. The remaining TVORs are being delivered and we hope to have them all installed by the end of 1979.

Are they just putting them at Continental United States (CONUS) locations?

No. Twenty-six are going in CONUS, three in Europe and one in the Pacific. The locations are too numerous to list here.

What about distance measuring equipment (DME)?

There will be two locations getting DME ground installations, Amadee AAF, CA, and Seneca AAF, NY. These are being installed to meet Air Force mission requirements at these locations. We considered installing DME at every location but our analysis showed that the high cost of DME ground equipment and the small number of Army DME-equipped aircraft were factors against installing DME.

Anything else?

Keep your eyes open during 1979 and you'll see these international orange and white TVORs going up. Better yet, tune in on one of them; check out the Army's move into solid state TVORs.

Readers are encouraged to send questions to:

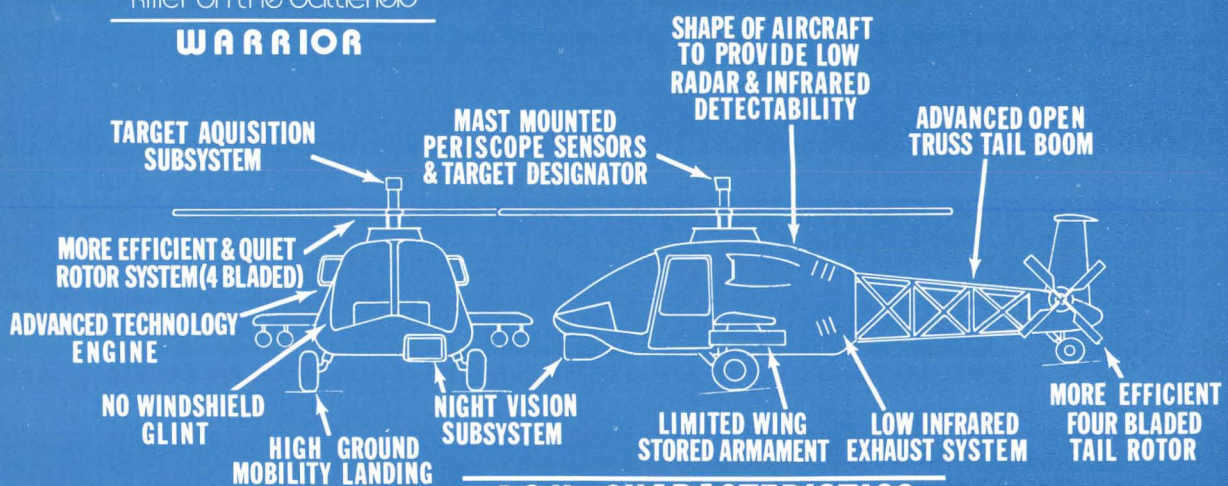
Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

THE OVERLOOKED

possibly the greatest killer on the battlefield

WARRIOR

SEE PAGE 45



ASH CHARACTERISTICS

MG Merryman

MG Smith

Hail and Farewell

Major General James H. Merryman succeeded Major General James C. Smith as commander of the United States Army Aviation Center (USAAVNC), Ft. Rucker, AL, this month.

MG Merryman, a veteran of more than 27 years of military service, came to Ft. Rucker from Fort Monroe, VA, where he served as Deputy Chief of Staff for Combat Developments, Army Training and Doctrine Command (TRADOC). MG Smith, who has commanded USAAVNC since July 1976, will become Director of Training, Deputy Chief of Staff for Operations, Department of the Army, Washington, DC.

MG Merryman began his military career in 1951 after being graduated from Henderson State College, Arkadelphia, AR. During his first 5 years of service he was an Infantry officer. He transferred from Infantry Branch to Armor in 1955 and was integrated into the Regular Army as an Artillery officer in 1959.

He served two tours in Vietnam. During his first tour in 1967, he was commanding officer of the 269th Combat Aviation Battalion. In 1971 MG Merryman commanded the 17th Combat Aviation Group. One year later he was selected to serve as Executive Officer and Assistant for Air Mobility to the Assistant Secretary of the Army (Research and Development).

MG Merryman became the Director of Army Aviation, Office of the Assistant Chief of Staff for Force Development, Department of the Army, in September 1973. In June 1974 he was assigned as the assistant division commander of the 3rd Armored Division and as community commander of Hanover, Germany. In March 1976 he became the Chief of Staff of V Corps in Frankfurt, Germany.

He was promoted to major general in December 1976 and became Deputy Chief of Staff for Personnel, TRADOC. In October 1977 MG Merryman was assigned as TRADOC's Deputy Chief of Staff for Combat Developments.

MG Smith enlisted in the Army in June 1942. He was commissioned as a second lieutenant in January 1943 after completing officer candidate training at the Cavalry School, Ft. Riley, KS.

His association with Army aviation began when he received his rating as a Liaison Pilot (fixed wing) from the Artillery School, Ft. Sill, OK, in November 1946. He later trained as a helicopter pilot and is now a Master Army Aviator.

In December 1965 he was assigned to Vietnam as executive officer and later commander of the 1st Cavalry Division (Airmobile) Support Command. The following May he became commander of the 1st Squadron, 9th Cavalry, 1st Cavalry Division, at the time of the Army's only air cavalry squadron. MG Smith completed that tour in Vietnam in April 1967 as commander of the division's 1st Brigade (Airborne).

He returned to Vietnam in August 1968 as deputy commander of the 1st Aviation Brigade. Later he served as assistant division commander of the 101st Airborne Division. In August 1970 he became commander of the Army Flight Training Center at Ft. Stewart, GA. From March 1971 until January 1973 he was commanding general of the 1st Cavalry Division at Ft. Hood, TX.

In January 1973 MG Smith became deputy commander of Fifth U.S. Army Reserve Forces Northern Area, and commander, Headquarters, Fifth U.S. Army Coordinating Element Northern Area. He became commander of Headquarters, U.S. Army Readiness Region V in July 1973.

Prior to assuming command of Fort Rucker, MG Smith was Chief of Staff, Eighth U.S. Army, United States Command, U.S. Forces, Korea.