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AVIATION DIGEST

9TH CBAA HIGH TECH LIGHT DIVISION AIR CAV SQUADRON

NOVEMBER 1983 • VOLUME 29 • NUMBER 11

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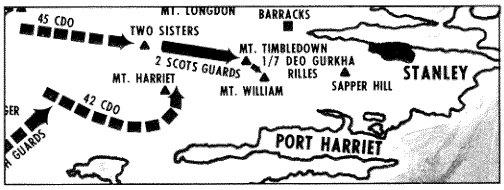

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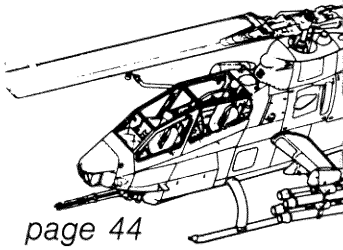

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Richard K. Tierney
Editor

Honorable John O. Marsh Jr
Secretary of the Army

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

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IN ORDER TO inform you about a concept for employment of Army Aviation that has evolved to reality, the lead article by MAJ William Frederic describes the Air Cavalry Squadron of the High Technology Light Division of the 9th Infantry Division, Ft. Lewis, WA. The squadron's mission is to provide real time tactical information. Its unique organization, tactical concept and reinforced structure for combat are protrayed to give an excellent picture of this unit which has been favorably field tested.

LTC David W.A. Swan continues with his informative article about "British Light Helicopters Operations During The Falkland Islands Campaign." This in-depth account reveals how helicopters were successfully employed and why they could not be used in some situations. LTC Swan pays tribute to the helicopters and crews: "...helicopter established its unchallengeable place on the battlefield...crews gave magnificient and courageous support."

"Bring 'em Back Alive" cautions us to learn in advance what edibles and materials are available for survival on the terrain over which we fly. True survival experiences are cited—successful and others; associate with and consider these as personal experiences *you've had;* and, learn by them, for your sake, you family's and the Army. There's nothing more tragic than loss of life that could have been avoided through proper planning and preparation.

MAJ James Nielson informs us about the "Cold Weather Survival School." This is a timely article from which we can learn specifics for cold climate operations. Aviators must be prepared to survive indefinitely across the environmental spectrum, if not rescued early.

Mr. Raymond Birringer's article "Combat Search and Rescue" tells us of concepts and equipment oriented to the immediate recovery of downed aircrews within the framework of AirLand Battle doctrine. The proposed CSAR effort encompasses rescue in areas uncontested, contested and beyond our forward line of own troops into the enemy's rear area.

In this month's Threat article, "Controlled Substances That Can Kill You," SSG Janet Garofalo warns us of Soviet chemical warfare (CW) capabilities. She discusses their organization, chemical agents, delivery equipment and self-protection systems already in the Soviet combat and combat support vehicles. Considering the extent of Soviet preparation for CW, we must also be prepared in this area.

Aviation Performance In A Chemical Environment, "APACHE," by LTC Michael McCormack and MAJ E.E. Whitehead reviews our efforts to ensure CW survivability and continued capacity to fight for our aircrews and support personnel. The author's report measures to improve our MOPP gear and the subjective appraisals made by those aviators who took part in the test.

I invite constructive comments about subjects in this month's *Digest* as well as your concepts concerning any area of Army Aviation that you believe will improve our Branch's capability for the AirLand Battle.

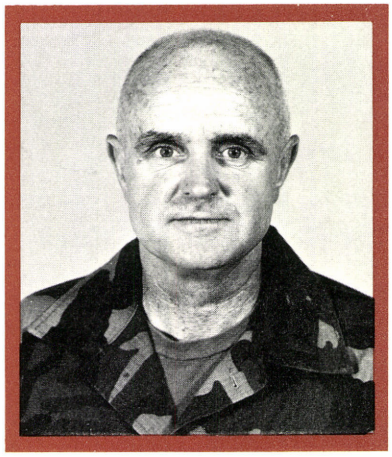

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FIGURE 1: Division '86 Armored Cavalry Squadron.

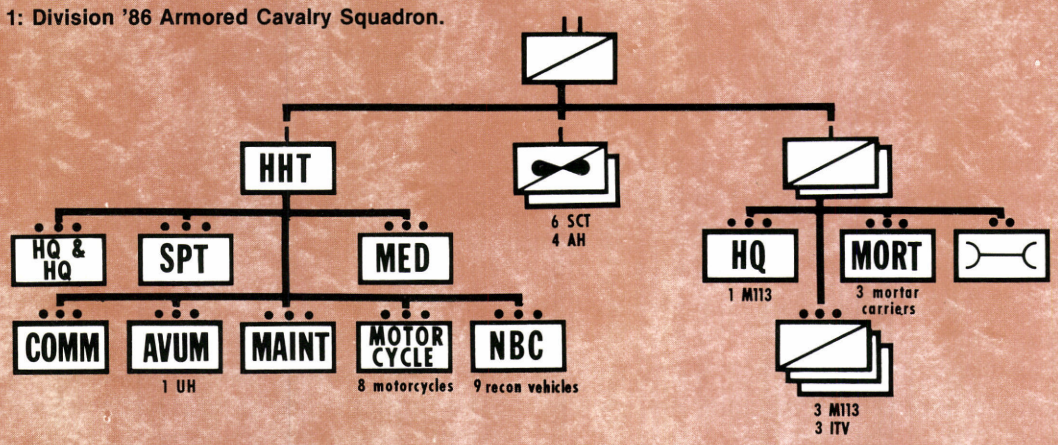
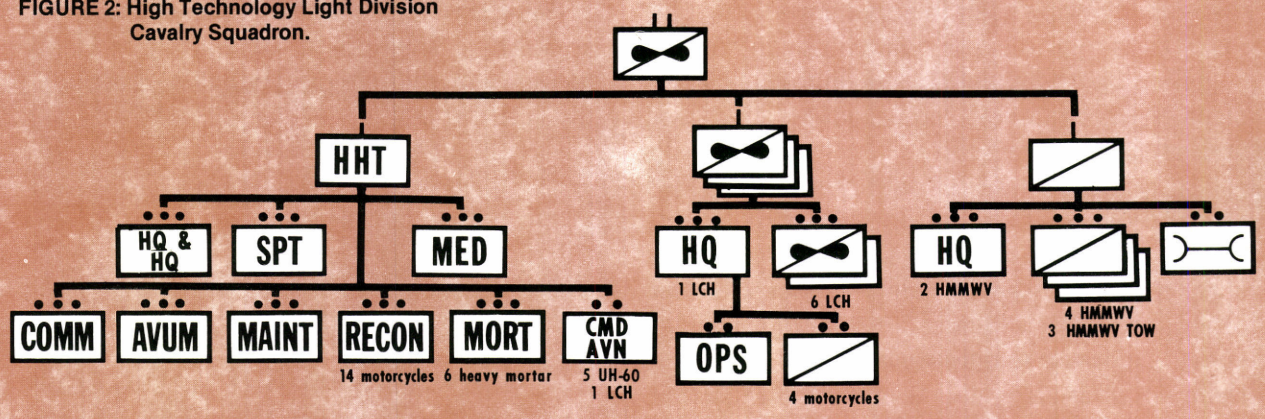


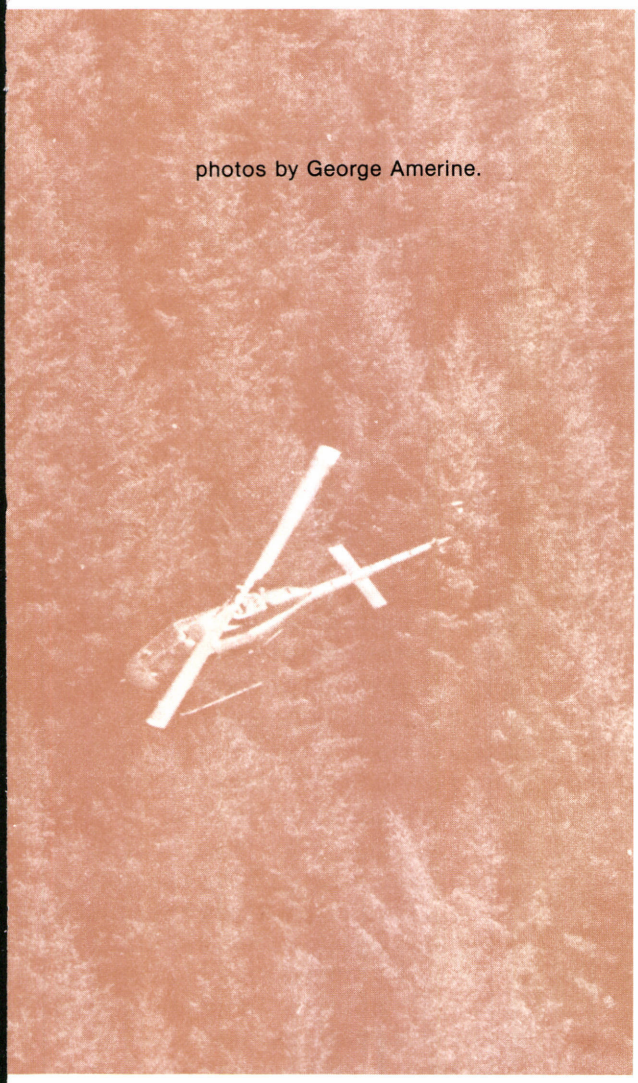
FIGURE 2: High Technology Light Division Cavalry Squadron.



THE BLACK KNIGHTS of the 3d Squadron, 5th (U.S.) Cavalry, Ft. Lewis, WA, have undergone two major reorganizations during the past 2 years. Organized as an air cavalry squadron (TOE17-205H) in the 9th Infantry Division, the squadron began its transition to a Division '86 armored cavalry squadron (TOE17-305 TEST) when it was assigned to the 9th Cavalry Brigade in April 1981.

Equipped as illustrated in figure 1, the squadron underwent testing in the spring of 1982 at Yakima Firing Center, WA.

It must be understood that the mission was changed drastically along with the organization. Designed as a reconnaissance unit and used over broad frontages and in large areas, the weapons sytems and organization facilitated self-protection only. The ability to strip the enemy recon forces and cause the main body to deploy was lost. The removal of the ground scouts from the air cavalry troops severely limited their employment, staying power and security. The High Technology Light Division (HTLD) squadron (figure 2) was built



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9TH CBAA HIGH TECH LIGHT DIVISION AIR CAV SQUADRON

to overcome the recognized shortcomings and to return the fighting capability to the squadron, yet further reduce the airlift requirements to deploy the squadron and, in particular, to be able to rapidly deploy an air cavalry troop on C-130 aircraft.

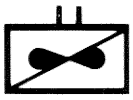
The squadron underwent another reorganization in October 1982. The ability of the LACT (Light Air Cavalry Troop) to accomplish its mission was tested during the spring of 1983. The following discussion of missions, organization and capabilities has been executed and field tested with favorable and desirable results.

The mission of the HTLD Air Cavalry Squadron is to provide real time information to the front, flank, rear and within the division area to the division commander, or Cavalry Brigade (Air Attack) (CBAA) commander as appropriate. The squadron can initiate a fight to determine enemy strengths and intentions and can maintain contact without becoming decisively engaged. It can perform rear area combat operations (RACO) and maintain the division's lines of communications.

Organization

The squadron is assigned to the CBAA and contains:

- Headquarters and Headquarters Troop (HHT)
- One cavalry troop
- Three light air cavalry troops.

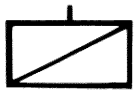


The *squadron headquarters* consists of the squadron commander and principal staff people for command, control and administration of the squadron. At the *headquarters troop,* the commander, who is a major, directs all special staff sections and provides administrative, supply and maintenance of weapons for troop and squadron headquarters personnel, and decontamination apparatus and cadre for nuclear, biological, chemical (NBC) decontamination for the squadron. The *communications platoon* operates the squadron wire communications system, with a two-net retransmission capability, and performs organizational maintenance on the signal equipment assigned to the headquarters and air cavalry troops.

The *support platoon* requests, secures and issues supplies. It also transports the squadron's basic load of ground use class III and V, and provides three mess teams for the squadron. The *medical platoon* operates the squadron aid station and provides a medical aid and evacuation team to the cavalry troop. One additional team can be provided to an air cavalry troop when detached. The *maintenance platoon* performs organizational maintenance, repair and evacuation of all vehicles and weapons; while the *aviation unit maintenance (AVUM) platoon* performs organizational maintenance on all aircraft in the squadron. It requests, receives, issues, stores and maintains aviation supplies/petroleum, oils and lubricants (POL) and ammunition.

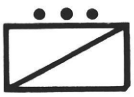
The *mortar platoon* uses six heavy mortars to deliver smoke and limited indirect suppressive fire to extract the scout platoons. It is organized with a platoon leader, two fire direction centers and two sections of three mortars. The platoon can provide echeloned fire support to the squadron and to other brigade elements in sector (attack helicopter battalions); can give direct support to each cavalry platoon on extended frontages through task organization.

The *reconnaissance platoon* provides a limited air assault and ground reconnaissance capability. Mounted on 14 motorcycles, the platoon is immediately responsive to the squadron commander. It is best suited for reconnaissance between gaps in friendly lines and lines of communication missions. The *command aviation section* provides tactical mobility for the scout sections from each of the air cavalry troops and the reconnaissance platoon. The section provides a command and control aircraft (LCH) to squadron headquarters and performs logistics functions to include forward arming and refueling point (FARP) displacement and resupply, and maintenance recovery.

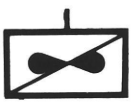


The *ground cavalry troop* is organized with three scout platoons

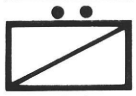
in HMMWVs (high-mobility multipurpose wheeled vehicles), and a headquarters section which includes organizational maintenance. The troop commander is provided a scout vehicle to command from forward positions while not providing a battlefield signature different from the scouts. The troop executive officer, in a command post vehicle, operates the troop headquarters and is responsible for collating and reporting information generated within the troop. The troop has the capability to receive and employ surveillance sensors such as ground surveillance radars and remotely emplaced and monitored sensors. The cavalry troop is employed under squadron control as a tactical entity.

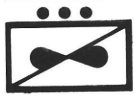


The three *scout platoons* of the cavalry troop are a standardized seven vehicle, four-man, scout-crew configuration. Each four-man, scout-crew can establish an observation post, dismount scouts, use night vision or radar sensing devices, conduct reconnaissance by fire with the vehicle's MK-19 grenade launcher, emplace and employ sensors, and report information in a timely manner. Three vehicles have tube-launched, optically-tracked, wire-guided (TOW) missile systems. The scout crews can operate individually, as a member of their squad or as a platoon. The mission, enemy terrain and frontage to be covered will dictate the employment techniques.



The three *air cavalry troops* are organized with a troop headquarters, operations section, scout





section and two aeroscout platoons. Troop headquarters provides administration and command control. The operations section performs liaison and coordination for tactical requirements and monitors combat operations of the troop. The scout section provides a limited air assault and ground reconnaissance capability. Two *aeroscout platoons* are each organized with six light combat helicopters (LCH) and provide the primary reconnaissance, surveillance and light attack capabilities. The light combat helicopters are armed with "bolt on/off" weapons systems, to allow commanders to tailor their weapons to the factors of mission, enemy, troops, terrain + time (METT +T). Weapons systems include antitank missiles, folding fin aerial rockets, air-to-air missiles, machineguns and mine dispensers. Sighting systems and weapons capabilities provide for maximum stand-off for both observation and weapons firing. Night vision equipment permits 24 hours operation; however, observation beyond 500 meters at night is limited and must be considered in mission planning. Note: There is not an approved requirements document for a light combat helicopter with the mentioned weapons systems. The concept has undergone testing at Ft. Lewis and Yakima Firing Center, using JOH-58C surrogate aircraft with weapons systems. The organization and employment of the squadron is based on the desired HTLD cavalry squadron of the future.

The squadron may be reinforced with maneuver company/teams, Air Defense Artillery, Field Artillery, Engineer, Military Intelligence, Army Aviation and combat service support units. It normally maintains unity of command and organizational integrity of the troops, and attached or supporting units by centralized planning and decentralized execution. The squadron operates under both CBAA and division control and the squadron or one of its troops may be temporarily attached to or placed under the control of a brigade. Headquarters and Headquarters troop is used tactically in two echelons: command posts (CPs) and trains.

The squadron commander controls and coordinates operations using a tactical CP and a tactical operations center (TOC). The tactical CP consists of the commander, S3, fire support officer, the air liaison officer, in their fighting vehicles, forward of the TOC to enable the commander to get on-the-spot knowledge and exercise personal leadership and control. The commander's LCH is used for this function over extended frontages.

The TOC normally includes the executive officer, the S2 and S3 sections, the fire support element (FSE) and liaison personnel from attached and supporting units. The TOC is lean and moves frequently for passive self-defense. Communication and coordination with higher, subordinate, adjacent and supporting units is accomplished by the TOC. The TOC is a current operations and planning center.

Trains. The squadron uses two echelons of trains: *combat* and *field.* The *combat trains* normally include the S4 (officer in charge (OIC)), the S1, the aid station, and a ground maintenance contact team, ground POL, prisoner of war (POW) collection point, and is where the attached units (engineers, NBC platoon, etc.) laager while in reserve.

Field Trains. The HHT commander (OIC), air troops (when not deployed forward), command aviation, flight operations, maintenance, communications platoon, AVUM, support platoon and mess teams are located in the *field trains.* The command aviation section leader directs the positioning and operation of the FARPs based on guidance from the S3.

The *cavalry troop* normally maintains platoon integrity and task organization is accomplished at the troop level. The mortar platoon colocates and provides direct support to the troop with either three or six heavy mortars. On extended frontages, mortar squads can be attached to the cavalry platoons. Additional maneuver and combat support units may be placed under operational control or attached (air cavalry platoon or engineer squad).

Command control is exercised by the troop commander from his fighting vehicle, and he is normally accompanied by the fire support team (FIST) chief. The troop CP locates behind the platoons with the executive officer. The troop first sergeant leads the unit trains which has the maintenance section, mess team, class III, V and vehicles from the support platoon. The cavalry platoon leader may form two or three teams depending on METT + T. The platoon normally will organize into two teams. Team A consists of the platoon leader, two scout squads and an antitank squad. Team B consists of the platoon sergeant, one scout squad and one antitank squad.

Air cavalry troop. The troop normally maintains platoon integrity, and task organization is accomplished at the troop level. A UH-60 Black Hawk helicopter normally is operational control (OPCON) to the troop, and an appropriate package of support personnel and equipment will be attached when the troop is placed under operational control or attached to a brigade. The 11-man scout section, moved by the UH-60, has 4 motorcycles, 2 machineguns, 3 PPS-15 ground surveillance radars, and night vision and communication equipment to accommodate 24 hours surveillance and security missions.

The air cavalry platoon, equipped with six LCHs, each with a complete set of bolt-on, bolt-off weapons, can be task organized in many different ways. Each LCH is flown by two pilots, and one configuration is shown in figure 3.

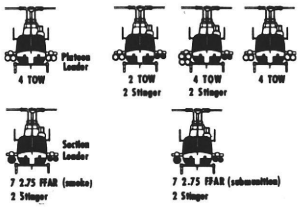


FIGURE 3: Air Cavalry Platoon with six command and control aircraft.

Concept of Tactical Operations

Offense. Cavalry is used by the division commander during offensive operations to retain the initiative. Before joining the main battle the cavalry identifies enemy locations and strengths. The cavalry then continues reconnaissance to find the enemy flanks, unit boundaries and weaknesses. When weaknesses are found, the division commander can concentrate forces rapidly, exploit the weakness and fight in the enemy's rear area. The cavalry has standoff firepower to initiate a fight without becoming decisively engaged, and can conduct a hasty attack to determine the strength of an enemy force, seize a limited objective, be augmented with additional combat power, or conduct a feint to confuse and surprise the enemy.

Movement to Contact. The squadron acts as part of an advance covering force when the larger unit is moving to contact. Route and zone reconnaissance are moves to contact. The squadron attempts to make contact with the smallest unit. Once contact is made, some other operation is required. An air troop conducts a hasty reconnaissance forward of the ground troop, by-passing enemy outposts and small recon units in an effort to identify the main body's locations and dispositions. The ground troop conducts a detailed route or zone reconnaissance, but more rapidly than if done independently.

Attack. A hasty attack is initiated rapidly by the troop commander using fire and maneuver and maximum standoff of the weapons systems. If an enemy force is not quickly eliminated, the squadron commander will employ attack helicopters, field artillery and/or joint air attack team (JAAT) to neutralize the enemy.

When contact is established by an aeroscout, the team immediately returns fire, deploys, reports and develops the situation. Contact with the enemy is maintained, and the size and posture of the enemy is determined. The troop commander determines whether the troop can destroy it or if additional forces are necessary. The troop commander normally has one platoon onstation in the area of operation (AO) at all times and one platoon at the FARP. The platoon onstation maneuvers one team to the flank or rear of the enemy to destroy him. When effectively neutralized, one team continues the reconnaissance while the other turns over the battle site to the ground troop commander who will gather detailed enemy information, capture POWs and confirm neutralization of the enemy force.

Route and zone recon—moves to contact.

If the enemy force is more than what the air cavalry platoon can dispatch, the squadron commander requests attack helicopters and/or JAAT. If an attack helicopter unit is employed, the air cavalry platoon hands over the battle to the attack commander. Should close air support become available simultaneously, the attack commander controls it. The cavalry maintains enemy contact throughout the emploment of the attack units unless ordered to bypass. When feasible, the ground cavalry mops up the battle.

If the ground cavalry establishes contact without air cavalry, the troop commander assesses the situation and either maintains contact without becoming engaged or maneuvers to gain the tactical advantage. All appropriate and available combat support elements are used against the enemy force.

Exploitation and Pursuit. The squadron, acting as part of a larger force, conducts these operations. During an exploitation, the squadron operates the same way it moves to contact but with a higher likelihood of direct combat. Therefore, the weapons systems on the LCH carry full loads, and fuel is reduced, if necessary. An air troop frontage or less would be assigned to the squadron, and air troops would relieve air troops onstation using the one-third rule (one troop on the mission, one troop en route and one troop at the FARP).

During a pursuit, the squadron is in the encircling force. Employment considerations, as stated in the exploitation, are used.

Defense. The squadron is not assigned an area to defend. It conducts reconnaissance, screens, acts as a rapid reaction force and participates in rear area protection operations. It screens stationary and moving forces during delays, counterattacks, withdrawals and reliefs. The screening force is normally task organized with one ground platoon attached to each air cavalry troop, and each air cavalry troop is assigned a sector. Actual task organization is dependent on the factors of METT +T.

As a rapid reaction force, the squadron provides the division commander the flexibility to gain time and reduce or slow the enemy's follow-on forces. The wide mix of weapons available on the LCH allows the commander to arm for the threat. For example, the division is defending against an armored threat, and the enemy has used air assault operations. One troop is armed with all TOW missiles, one with Stingers and machineguns, and one with a mix of Stinger/7.62 mm machineguns, 2.75 inch rockets and TOWs. The LCH is not as protected as an attack helicopter and should not be used where deployed enemy troops can place effective ground-to-air fire. The air troop can be effective against units moving up to reinforce or pass through engaged units.

During rear area protection (RAP) operations, the squadron can maintain lines of communications, provide a rapid reaction force and perform limited RACO missions. Troop integrity is maintained during RAP missions.

Role In Deep Attack. An air cavalry troop normally is OPCON to a brigade for deep attack. The troop provides reconnaissance and air defense protection for the air assault force into the objective and to the ground force. The troop establishes a 3 to 6 km circular screen around the ground force until extraction or relief. The troops conduct a reconnaissance out to the screen line to determine actual enemy dispositions in the AO. When the unit is extracted, the troop provides air defense coverage for the air assault force. The squadron, as a whole, does not normally participate in a deep attack.

Role in Lodgement. An air cavalry troop is augmented with an aviation support package to include a FARP and AVUM contact teams. The troop is attached to the lead brigade on the lodgement. Deploying on C-130 or larger aircraft, one to two teams land with the lead elements of the brigade. They are airborne within 15 minutes and begin an area recon of the airhead site. The remainder of the troop closes on the lodgement site within 6 hours.

The troop's initial mission is to establish a 3, 6, 9, 12 and 20 km circle around the airhead. A screen is established at each circle then expanded as assets become available. The troop's scouts are used as much as possible to conserve aviation assets. A troop FARP area is established in a geographically secure area away from the airhead but close enough for an immediate security response. The troop deploys with its complete complement of armament to allow the troop commander to change weapons as the situation develops. Initial weapons mixes will be Stinger, 7.62 mm machineguns and TOWs.

The squadron (minus) closes on the airhead within 36 hours and either relieves the troop, augments it or begins the movement to the objective. On the squadron's arrival, the detached air troop reverts to OPCON status to the supported brigade or returns to squadron control.

Troop sets up 3 to 6 km circular screen around the ground force.

Combat Support

Fire support is provided to the squadron through normal established channels. Division artillery provides both FSE and FIST for the squadron and the ground troop. All scouts and aeroscouts can call for fire support.

Mortars can be used for both squadron support and for use by the CBAA. The basic load is weighted in illumination and smoke relying on field artillery for most destruction missions.

Field artillery is used whenever possible. A tie-in with tactical fire (TACFIRE) is established by the SE, FIST and each LCH. The electronics on the LCH allow aeroscouts to designate or pick a target, automatically determine its location and pass the fire mission to the field artillery battery through TACFIRE in seconds, without verbal communications.

Close air support is most frequently accomplished using JAAT techniques. The simultaneous engagement of enemy forces provides mutual security, rapid target identification and increased target effectiveness; may see burning enemy vehicles in target area.

Air Defense. The use of Stinger air-to-air missiles on the LCH has given the squadron a measure of security not normally expected. When an air threat exists, each team will have a minimum number of Stinger missiles mounted.

This degree of security can be expanded to a brigade or the division for periods when tactical air superiority has been lost. For example, during an exploitation, an air cavalry troop could be OPCON to the lead brigade for air-to-air combat and flank screen missions. The small size of the LCH makes it difficult to be seen and tracked by other air platforms. The air defense battalion may provide Chaparral, Vulcan and Stinger on a mission basis. The squadron has no dedicated air defense support.

Engineers. The squadron gets its engineer support from the general support engineer company and additional assets on a mission basis. Engineers are normally in direct support when the squadron is conducting a movement to contact. Traveling with the ground troop, the engineers improve mobility and break obstacles in sector. Engineers are used, whenever possible, to slow the enemy while other combat support elements are employed.

Combat Service Support

The S4, working from the combat trains, plans for and coordinates the logistical support of the squadron. He locates the combat trains about 20 minutes by ground from the ground troop (if forward) command post. The field trains are located 1 hour by ground from the combat trains. Logistical support for all assigned and attached ground units is forwarded through the field trains. The field trains receive all logistical support from the CBAA Forward Support Battalion (FSB). Downed aircraft recovery is effected by the FSB upon request. Bulk class III, V will be drawn from the closest FSB.

Aviation Class III/V. The squadron can operate two FARPs simultaneously and have trucks on the road for resupply. To increase mobility and decrease vulnerability, the FARPs will reposition every 3 to 6 hours. The S3 instructs the HHT commander as to where, when and how large the FARPs should be. He, through the command aviation section, executes the FARP repositioning and replenishment. Each FARP has a position locating and reporting system station (PLRS) and reports its status through the PLRS bulletin board. Also, the AVUM armament section works at the FARP sites conducting simultaneous rearming while refueling is in progress. Ground use III/V is pushed forward to the units from the field and combat trains to logistics release points, and air resupply is accomplished when the situation is critical.

With two major exercises successfully completed in the last 2 years, the Black Knights of the 3d Squadron, 5th Cavalry are ready to meet the challenges of the 1990s.

LCH—Stingers for security.

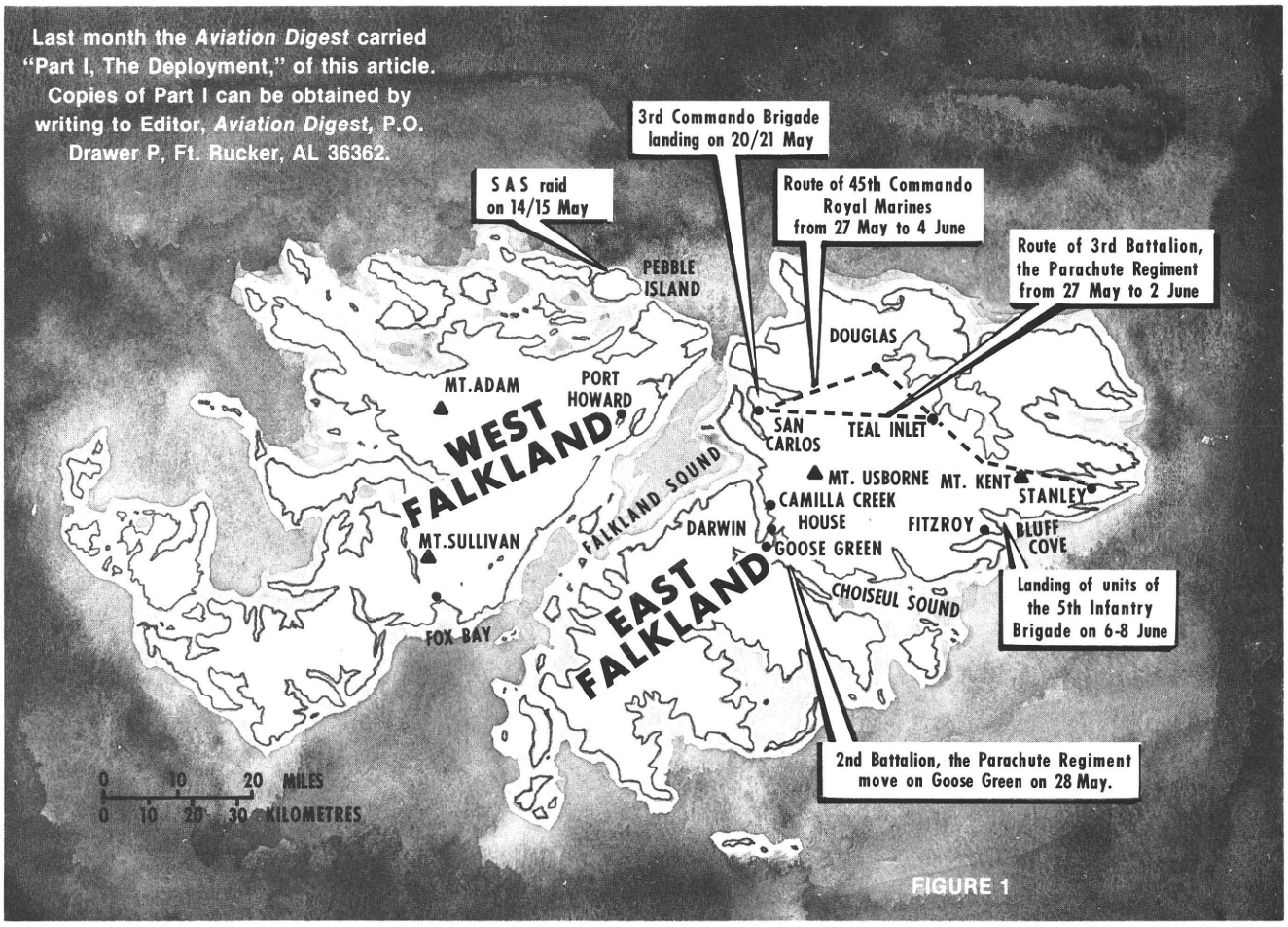


FIGURE 1

British Light Helicopter Operations during the Falkland Islands Campaign

PART II : The Battle

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TURNING THIS MONTH to the landing over the beaches at San Carlos and the subsequent advance to Port Stanley, I will quickly remind you of the overall pattern of events and then discuss the tasks of the helicopters. 3rd Commando Brigade (3 Cdo Bde) came ashore at San Carlos in the early hours of 21 May and secured the beachhead and the high ground surrounding it. During the following 5 days the position was consolidated, and the buildup of men and materiel continued, notwithstanding repeated air attacks by the Argentinian Air Force.

The breakout from the beachhead started on 26/2/ May with 2nd Battalion, The Parachute Regiment

(2 Para) moving south to Goose Green and Darwin where it successfully defeated an Argentinian force three times its own size. The Argentinian position posed a threat to the beachhead and to the flank of the advance to Port Stanley. In the meantime 45 Commando Royal Marines (45 Cdo) and 3rd Battalion, The Parachute Regiment (3 Para) started to advance along the northern route, east toward Douglas Settlement and Teal Inlet (figure 1). The 50-mile march, the celebrated "yomp," over difficult terrain and in appalling weather was completed in 3 days with both objectives secured. 42 Cdo was then leapfrogged forward by such helicopter lift as could be made available and secured Mount Challenger and Mount Kent on the western approaches to Port Stanley.

5 Bde came ashore on 1 June and Major General Jeremy Moore, having assumed command of all land operations, committed the brigade to the south.

The brigade was moved to Fitzroy which had been secured by 2 Para after a rapid advance when it was discovered that the Argentinians had evacuated the settlement. The loss of three HE1 Chinooks in the *Atlantic Conveyor* was one of the factors which prevented the bulk of the brigade being moved by air (the bad weather being another) and it was during the sea move that our heaviest casualties were sustained when the Argentinian Air Force attacked the landing ships, the Royal Fleet Auxiliaries (RFAs) *Sir Galahad* and *Sir Tristam,* in Bluff Cove. Both ships had to be abandoned.

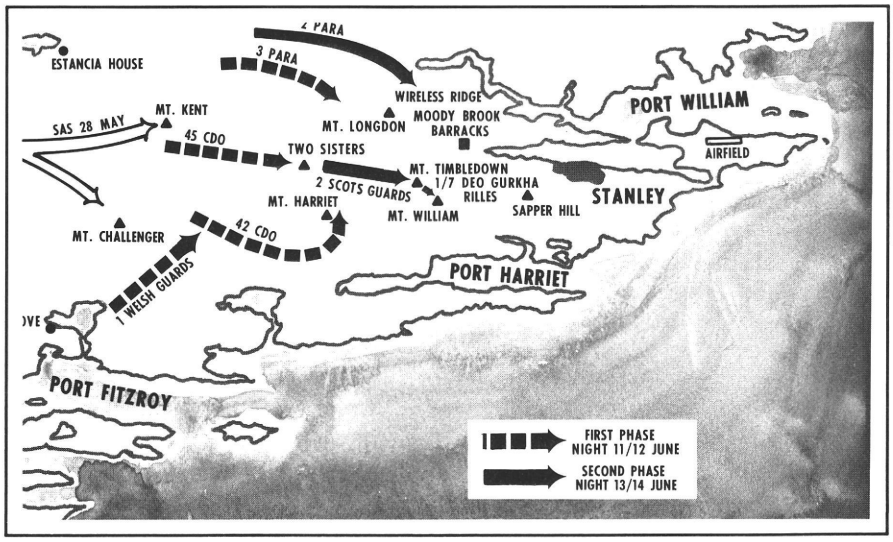
The final battle for Port Stanley was to be in three phases and 3 Cdo Bde began Phase I during the nights of 11/12 June (see figure 2). Phase 2, with 5 Bde, took place during the nights of 13/14 June. Fighting was stiff and the two brigades had to overcome fierce resistance from the regular elements of the Argentinian land forces. The third phase was never launched as the Argentinian defence collapsed and two battalions were launched in pursuit and closed up to the outskirts of Port Stanley. General Moore accepted the Argentine surrender during the night of 14 June 1982.

With that quick review of the overall campaign, let me now describe in more detail the tasks the helicopters undertook in support of the operations. The tasks given to the Cdo Bde Air Sqn during the initial landing were, from first light, to provide reconnaissance and observation and/or armed aircraft to support the assaulting units, the artillery, the Naval Air Squadrons and the Commander 3 Cdo Bde. The squadron had to be prepared for airborne Forward Air Control (FAC) and Aerial Observation Post (AOP) tasks, or Field Artillery Aerial Observation (FAAO) in U.S. terms, and to establish forward arming and refueling points (FARPs) and individual Flight Forward Operating Bases ashore when ordered. Finally it had to be ready to mount Close Air Support (CAS) missions with the 68 mm "SNEB" rocket-armed Gazelle, if no other CAS was available.

These tasks were allocated to the various flights of the Cdo Bde Air Sqn of which C Flight had the most difficult. The proposed Rapier AD sites were on the hills surrounding the beachhead and the Rapiers themselves were to be airlifted in by Sea King helicopter. However in the time available after the landing it would not be possible for the infantry to clear all the AD sites before daylight. The question was whether to wait for the infantry to get up the hills to secure the sites in the daylight before moving the AD weapons ashore, or would the threat of Argentine air attacks during the 2 or 3 hours delay after daybreak justify using other ways of checking to see if the sites were clear. The air threat was such that it was decided to use the Gazelle to prove the security of the fly-in routes ahead of the FLOT (forward line of own troops), to confirm that the sites were clear and then to escort the Sea Kings as best they could.

Confirmation that the sites were clear was carried out successfully but on one of the escort missions two Gazelle were shot down and a third hit when they were fired on by a group of undetected Argentinian infantry retreating from Port San Carlos. One crew was killed in the air and the crewmembers of the other Gazelle came under fire as

FIGURE 2: The final assault.



they swam away after successfully ditching the aircraft. The pilot died in the arms of his aircrewman just after they got ashore.

These were the only casualties of the landing force on D Day but they served to underline the fact that this was going to be a real war. The lessons from this incident were that the aircraft were operating in a role for which they were not designed, i.e. as quasi gunships, and, secondly, if they had been fitted with an observation sight, ideally with thermal imaging, they could have stood back and observed the enemy instead of having to seek them out at close quarters at considerable risk to themselves.

The next phase, the battle for Goose Green and Darwin, was to set the pattern for subsequent light helicopter operations in support of the troops on the ground. The open nature of the Falklands' terrain, which was devoid of any natural cover, would have exposed the larger support helicopters to unacceptable risk from enemy fire in the forward area. They were also heavily committed to the movement and ammunition resupply of the artillery batteries as well as to other logistic support. All helicopter support of the forward units therefore became the responsibility of the light helicopters.

Two Scouts and two Gazelle from the Cdo Bde Air Sqn were placed under command of 2 Para for this operation and a liaison officer put into the battalion headquarters to control them. During the 3 days of the battle these aircraft flew in all the ammunition and rations that were used by the battalion and flew out all the casualties, including the Argentines, often from forward positions under fire, by day and by night. It was during this operation that we suffered our third casualty.

The two Scouts were flying forward to collect casualties when they were attacked by two Pucara fixed wing aircraft which appeared out of the overcast. The Pucara is a small twin engined, two seat aircraft designed for counter insurgency duties in Argentina. It is armed with two 20 mm or 30 mm cannon and four 7.62 mm machineguns and is capable of carrying 3,300 lbs of stores on three pylons. It is a relatively slow flying aircraft with good manoeuvrability, ideal for anti-helicopter combat. One Scout was able to twist and turn and get back to the cover of an AD area but the other was caught by a burst of cannon and machinegun fire which killed the pilot. The aircrewman was thrown clear when the aircraft hit the ground but he survived, although with major injuries. *The incident was watched by the crews of the two Gazelle who were flying only 1,500 meters away but they were unable to assist as their aircraft did not carry an air-to-air self-defence weapon.*

The need for an air-to-air weapon is the obvious conclusion to be drawn from this incident but there are others which emerged. When the pilot, who escaped the attentions of the Pucara, was debriefed he made two points. Without the help of his aircrewman giving directions, who on this occasion happened to be in the back of the aircraft preparing to receive casualties, he would not have been able to take the appropriate evasive action when the Pucara were behind him. The second point the pilot made is that in taking evasive action at low level his concentration was totally on flying the aircraft ("standing it on its ear"!) and he would have been in no position to make use of any self-defence weapon on board his aircraft. This suggests that aircraft, particularly Scouts, should operate as pairs both being equipped with air-to-air weapons for mutual support.

As the ground troops moved rapidly forward to Port Stanley, it became necessary to install radio rebroadcast stations to maintain the radio link between them and San Carlos. These were inserted by the helicopters of 656 Sqn Army Air Corps (AAC). The rapid advance also made it inevitable that small pockets of enemy would be bypassed and helicopter pilots accordingly varied their routes when in transit to avoid establishing a pattern. Nevertheless a Gazelle became the prey of one of these bypassed enemy groups when it was brought down by a missile at night whilst carrying a repair team to one of the rebroadcast stations. All on board were killed.

Although no armoured threat materialised, good use was made of the SS-11 missile systems on board the Scouts in knocking out enemy bunkers and even gun positions on the outskirts of Port Stanley. On two occasions they were used in direct support of infantry assaults when no artillery support was available. Although the SS-11 missile is an old first generation system, it nevertheless proved to be quite reliable. Out of 17 occasions when the weapon was used there were three missile system malfunctions and two rogue missiles.

There was one amusing incident when a small airmobile group of one Gazelle armed with SNEB rockets, one Scout armed with SS-11 and two Scouts carrying Gurkha troops, was involved in clearing small groups of enemy thought to have moved south into the Lafonia Plain. The group approached an isolated farmhouse whereupon some 10 infantrymen were seen to rush outside and take cover in a nearby gully. There was a pause—and then the Scout fired an SS-11 missile into the gully to flush out the enemy. They came out with their hands in the air waving a white flag—and the AAC is claiming it to be the first time infantrymen have surrendered to a

helicopter in flight in the Corps' short history!

The final battle for Port Stanley repeated the pattern set at Darwin and Goose Green. Light helicopters lifted out all the casualties and 85 were moved in this manner on 12 June alone; this included some by night. One aircraft using night vision goggles was guided in by a single torch [flashlight] to lift out 3 casualties from a raiding party on the outskirts of Port Stanley, which was still occupied by the enemy forward of our own troops.

Before I leave the battle itself and discuss some of the other aspects, I must make further mention of the work of the support helicopters. During the voyage south they were used extensively in transferring stores from one ship to another, or cross decking as it was called. Over 300 cross decking movements were carried out at sea, often in frightful weather. Once the beachhead had been established they were constantly ferrying stores from ship to shore. As the troops moved forward the support helicopters moved up the supporting artillery and ammunition. They lifted in some 18,000 rounds of 105 mm ammunition during the preparations for the final battle around Port Stanley.

The single RAF Chinook, which was being air tested when the *Atlantic Conveyor* was sunk with the 3 other Chinooks, did sterling service. It carried some 80 men in one lift during 2 Para's rapid advance to Fitzroy. It flew 109 hours in combat conditions without spares or group support, all of which had been lost on the *Atlantic Conveyor.* It was an impressive peformance.

The attack on the two RFAs at Bluff Cove epitomised the courageous efforts of the support helicopter crews as they took their helicopters close in to the burning ships amongst the smoke and flames to rescue the survivors and prevent greater loss of life.

LESSONS LEARNED

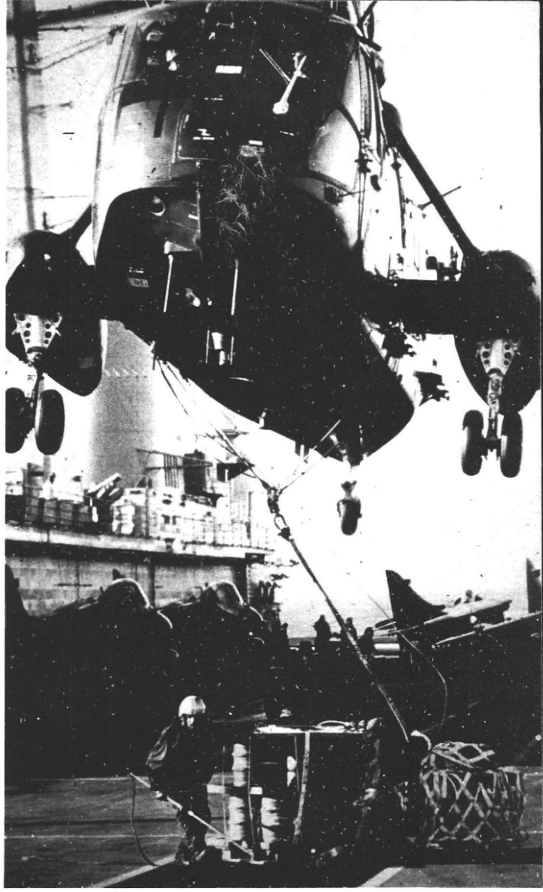
I am not sure whether this section should be titled "Lessons Learned" or "Lessons Re-learned and Re-emphasised." In many ways very little that was actually new came out of our experiences of Operation Corporate but we were sharply reminded of some old and traditional lessons, and the campaign also emphasised some of the theories on the use of aviation which had not been put to the test. It certainly gave further support to our current proposals to improve our aircraft and equipment.

Aircraft Maintenance

The two aviation squadrons constantly achieved more than 90 percent availability of aircraft during the operation. They managed this because of a number of factors:

- High peacetime standards of maintenance.
- The aircraft themselves were relatively simple to service under very primitive conditions.
- The sensible delegation of powers to senior NCOs to extend servicing intervals and the high degree of effort, skill and resourcefulness of the technicians themselves.
- The imaginative application of new learned skills in Battle Damage Repair (BDR).
- Servicing at night using torches under makeshift covers so as not to reveal locations to the enemy. In this respect there is a pressing need for a portable, light proof servicing shelter.
- All aircraft were cleared of major assembly changes for 200 hours.

The aircraft on occasions flew, out of necessity, above their maximum all up weight (AUW). A number of Scout tail rotors were changed due to cracking at the roots, possibly as a result of overloading. It is vital that the dangers of operating above maximum AUW are understood and reported and that technicians are fully aware of the symptoms on the aircraft which may result. The diligence of our technicians prevented what may have been subsequent disaster.



A Sea King lifting supplies.

Aircraft Manning and Flying Rates

The two squadrons flew some 2183.4 flying hours, of which the Gazelle's share was 1218.3 and the Scout's was 965.1. Pilots were in the air for 6 to 8 hours in every 24 hours by day and night.

The Cdo Bde Air Sqn was able to achieve a manning ratio of 2 pilots per Gazelle and just over one pilot per Scout. 656 Sqn's manning ratio was just over one pilot per aircraft throughout. In both squadrons there was one aircrewman per aircraft. The difference in ratios was accounted for in that the Cdo Bde Air Sqn was unable to take all its Gazelle due to lack of shipping space, as I mentioned earlier.

Both squadrons were able to maintain 24 hour support for most of their operational periods.

However in the case of 656 Sqn this was only possible through very careful monitoring of aircrew fatigue. For longer operational periods a ratio of 3 pilots to 2 aircraft is considered essential. The aircrewman to aircraft ratio of one to one proved acceptable.

Refueling

Due to the impossibility of moving fuel by vehicle on the boggy ground, resupply was also totally carried out by air. Stocks of aviation fuel in 45 gallon drums, with small aircraft powered portable pumps, were positioned as far forward as possible. These were flown in by the support helicopters whenever possible but the supply was intermittent due to limited aircraft availability. On occasions the squadrons uplifted their own fuel but they had only a limited capability and as the units moved farther inland this no longer became feasible. Use was made of captured Argentinian fuel, both in 45 gallon drums and in a pillow tank with its own pump, at Goose Green.

A refueling base was eventally established at San Carlos and Fitzroy and use was also made of readily available fuel on board ships. In the latter case, however, this caused some problems as ships tended to move without warning which caused one or two pilots a temporary moment of panic when faced with a near empty tank and a patch of open sea where last was seen a ship showing no signs of preparing to move.

Aeromedical Evacuation

The movement of casualties from forward units to the Field Dressing Station (FDS) was almost entirely by light helicopter. After initial treatment and some cases, surgery, they were then flown back to the hospital ship by Sea King. An estimated 200 casualties were rapidly extracted from forward areas by the light helicopters and this contributed significantly to the morale of the combat troops.

There was some concern initially about quickly loading seriously wounded soldiers, usually without stretchers, into the back of small helicopters. Medical advice however was that whatever additional damage was done during the move was far outweighed by the boost to morale that a fast evacuation would give. This, in fact, turned out to be correct and only one casualty did not make it back to the FDS, and of those who did only two failed to survive.

The aircrewmen in the helicopters helped considerably by giving comfort to the injured, administering IV drips and in some instances mouth to mouth resuscitation. Our experience in this area pointed out the need to give aircrewmen more training in first aid than the basic training they normally receive. It is therefore planned to widen the scope of this training during the aircrewman's course.

The Air Threat

I mentioned the need for an air-to-air weapon and the tactics of scout aircraft being mutually supporting earlier in this article. Local air superiority was difficult to achieve and heavy reliance was placed on land and ship based AD weapon systems. Light helicopters operated at nap-of-the-earth levels which made their detection by fast jets very difficult. There was only one incident of a helicopter receiving the attention of an enemy fast jet and he successfully evaded the jet by using the well known tactics which are taught to both British and U.S. helicopter pilots. The situation is different, however, if slow flying fixed wing aircraft are the attackers as it also would be if engaged by other helicopters.

Inevitably helicopters were caught in areas which were subject to unexpected concentrated air attacks but by "going to ground" and using every scrap of cover (such as it was) and undulation in the ground they survived. Unfortunately three helicopters were heavily damaged when parked near a tactical headquarters which came under bomb attack—the lesson learned is obvious!

Light helicopters were instructed to switch off their identification, friend or foe (IFF) during air attacks to avoid the late identification of a friendly helicopter confusing the AD tracking equipment. This was possible because there was no perceived enemy helicopter threat. Additionally the need to change IFF codes at short intervals proved difficult and sometimes impractical; consequently crews tended to turn it off altogether. Future conflicts may not allow this luxury and much greater attention will need to be paid to IFF procedures and the command and control of AD weapon systems and light helicopters.

Refueling Scout helicopters from 45-gallon drums.

Night Flying

Night flying was a routine task and was only prevented by bad weather. Night vision goggles (NVG) allowed aircraft to operate farther forward and lower, including the casualty evacuation forward of our own troops that I mentioned earlier in the article, but there were insufficient goggles for all the crews and only the Cdo Bde Air Sqn used them operationally.

Night operations without NVG were flown in support of all the actions, including casualty evacuation. Whenever possible crews were tasked for night operations over the same ground, where they had operated during the day. Standard night approach aids were used but there were also some non-standard ones rigged with torches.

Role Equipment

The SNEB 68 mm rocket system and waist mounted machine guns were not used, primarily due to lack of suitable targets and lack of cover. The attack profile for the SNEB, a diving attack, would have exposed the Gazelle to undue risk to enemy small arms and missile attack. However, it may be possible to use the SNEB smoke rockets as a means of delivering smoke.

The flotation equipment was not used. On the Gazelle it was prone to undemanded activation and in the case of the Scout it was rendered unserviceable by corrosion in transit. Nevertheless flotation gear is essential for single engined helicopters when ship-borne operations are anticipated for long periods.

Radar altimeters and SASs (stability augmentation systems) made a major contribution to the safe operation of the aircraft at night and in bad weather when aircrew workload and fatigue were at their height. Likewise NVG are also essential. Radar altimeters are to be fitted to all our aircraft and an extensive purchase of NVG has been authorised.

Floor armour was fitted to all aircraft but there was the inevitable weight penalty. It could be argued that NOE flight rarely exposes the underside of a helicopter whereas the front, rear and sides are much more vulnerable. As an absolute minimum, without imposing undue weight penalties, helicopters should be fitted with armoured seats and the crew should wear body armour in load carrying jerkins (similar to a survival vest).

CONCLUSION

In this article I have tried to highlight the main features of the Falklands campaign as they affected the use of helicopters but there are many other points I could have covered. There is always a danger of trying to translate the lessons learned in one theatre to another and of drawing the wrong conclusions. Operation Corporate was fought some 8,000 miles from the United Kingdom in a hostile weather and terrain environment which required basic infantry techniques and extremely fit, highly professional troops. It was a simple campaign against a relatively unsophisticated enemy, although they possessed some excellent equipment which they did not put to the best use.

The long supply chain and the difficulty of off loading equipment and spares from the ships taxed the ingenuity of the maintenance crews. Although they worked under the most appalling weather conditions, the light helicopters they had under their care were relatively unsophisticated machines which were well proven in service. But that is not by any means to undervalue the brilliant work of these technicians who produced an unexpectedly high rate of serviceability.

This high degree of serviceability and the intensive rates of flying stretched the pilots to the limit of their fatigue, and sometimes beyond, to the extent that aircraft losses to other than enemy action could have become unacceptable. The argument that the aircraft unserviceability rate would permit adequate crew rest was proven to be wrong, therefore pilot to helicopter aircrew manning ratios must be adequate to give full operational coverage.

The enemy air threat was a new experience and does have implications as far as other theatres are concerned. No new lessons were learned and current tactics do work, but the need for a self-defence weapon against slow aircraft and helicopters and the tactics of operating scout aircraft in mutually supporting pairs has received added emphasis. The continuing problem of forward airspace and AD weapon control has not been satisfactorily answered and still needs a great deal of study.

The vulnerability of scout helicopters operating well forward without the benefit of a long range sighting system was brought sharply home in the first day of the land operation. The acquisition of a sight is top priority for the AAC and has been for some time, and we should be seeing one in service in the very near future.

Undoubtedly the helicopter established its unchallengeable place on the battlefield during this campaign. The Navy, the Marines, the AAC and the RAF helicopter crews gave magnificent and courageous support throughout, and the proportion of the overall total of medals and honours they were awarded testifies to their efforts.

I would finish on a quote from Major Andrew Eames' presentation to the U.S. Army Aviation Center which came from one of the reporters who went with the British Forces to the Falkland Islands: "No war is to be desired, but if they are inevitable, then this was a better one than most to be in."

Bring 'Em Back Alive

U.S. ARMY SAFETY CENTER

IN SPITE of survival training and life support equipment, aviators expect to fly—not crash. According to Dr. Robert Keller, Associate Director of the Trauma Center at Carmel (California) Community Hospital, a pilot in the familiar environment of the cockpit is abstracted from the reality of the ground below. If he crashes and survives he may need a period of adjustment before he can accept the reality of his environment. He may reject it emotionally, as one rejects bad news. Preparation and planning what to do if you crash will lessen the effects of the shock on your ability to survive.

The more you learn in advance about the ground environment, the better your chances will be. Find out what edible plants grow in the area and what kinds of wildlife you may encounter. Know how to make a basic shelter such as a snow cave, igloo or fighter trench. Properly constructed such a shelter, occupied by one person with a candle as a source of heat, will be as much as 80 degrees warmer than the fuselage of the downed aircraft. In wooded areas, learn how to make a "wicki up" shelter using a long pole between the crotch of two trees with dead limbs for walls. Branches, large leaves or parts of the aircraft can be used for shingles.

Survival gear

Your aviation life support equipment (ALSE) is designed to sustain you in an emergency or survival situation until you are rescued. The survival vest contains a compass; tourniquet; pocket knife; strike anywhere matches and plastic, waterproof container; gill fishing net; water bag; revolver and ammunition. It has a radio receiver/transmitter, signaling mirror, foliage penetrating signaling kit, signal flares, distress marker light and flash guard. The lightweight, foil, space blanket for element exposure control is either orange or olive drab on one side and silver on the other. It can be used as a distress marker. The survival vest, worn by all aviators (except OV-1 pilots who wear a vest designed for use with the rigid seat survival kit), is lightweight, adaptable to hot or cold climates and fits over body armor.

It is important that a unit's survival vests be configured uniformly. Items of equipment should always be located in the same places in the vest. There are two important reasons for this. When vests are inspected any missing item will be noticed immediately and replaced. Students in ALSE classes will be trained to locate the items in exactly the same place in the vest. If a survivor is injured or semiconscious, his hand will go automatically to the spot where the item he needs is located—**and it will be there.**

The 28-pound individual survival kit contains a magnetic compass; saw-knife-shovel assembly; first aid kit; wood matches and plastic, waterproof container; insect headnet; poncho; smoke and illumination signals; illuminating candle; food packets; water bag; plastic spoon; Trioxane compressed fuel; signaling mirror; frying pan; sleeping bag; snare wire; fishing kit; pocket knife; survival and operator's manuals. The individual hot climate kit includes sunburn preventive, additional drinking water and a paulin instead of the sleeping bag. **One kit should be on board for each person on the aircraft.**

The individual survival kit was developed and tested at considerable cost for one purpose—to increase your chances of survival if your

aircraft crashes. But how much will it increase your chances if it is back at your home base when you need it?

That is exactly what happened to the crew of a UH-1H which was itself on a type of rescue mission. An early snowfall had stranded herds of sheep and this aircraft, along with two others, was engaged in dropping hay to the hapless animals. On board were a crew of three and a civilian observer who was familiar with the terrain and location of the sheep. The pilot had failed to prepare a performance planning card and he was unaware of power requirements versus power available. As he began an approach into the mouth of a box canyon where a group of sheep huddled among the trees, his engine and rotor rpm began to decay and the rpm audio and warning light activated. He was 75 feet above the ground with an airspeed of 20 knots. The pilot was unable to gain engine and rotor rpm, the aircraft began a descending turn to the right and crashed in a clearing in 3 feet of snow, coming to rest upright.

Only the crew chief was injured slightly when bales of hay shifted and pinned him in the wreckage. He was freed and the crew and passenger exited the aircraft. They found themselves at 9,550 feet MSL, at 1834 hours on an October day, with the sun just going down. **There were no survival radios on board and only one survival kit.** This meant one sleeping bag for four people.

The crew used pen flares and the aircraft radios to direct search aircraft which located the crash at 2030. Sleeping bags were dropped and they were rescued by helicopter the next morning.

This crew was lucky—there were no serious injuries, the aircraft radios were operable and they were in a clearing. Although the aircraft doors were jammed open, the fuselage with hay piled around it provided some shelter. If the crew had received proper survival training prior to the accident, they could have possibly survived the night with minor cold injuries. By utilizing emergency survival techniques such as sharing the one sleeping bag using it for cover, and each placing his feet against the chest of another they might have avoided frostbite. The frying pan from the one survival kit, filled with dirt, could have been used as a stove, using JP4 from the aircraft as fuel. A windbreak built with bales of hay and a fire using hay and whatever wood they could find would have given some additional protection from the cold. The fire would have marked their location for search aircraft. Survival training and knowing all of the possible uses of equipment is of equal importance to having the survival gear on the aircraft.

Flying in mountainous terrain without cold weather survival kits was a serious error. Later investigation revealed the support facility had a little more than half of the authorized survival radios on hand. Some pilots were unaware the radios were available for signout although the unit SOP (which they were required to read) stated that they were available. The pilot of the UH-1H had initialed that he had read the SOP—but there were no radios on his aircraft.

Not so fortunate as this crew was the pilot of another aircraft which autorotated into trees. The main rotor blades hit the trees causing the mast and transmission to separate. The observer suffered fatal injuries—the pilot, cut, bruised and suffering with a broken ankle, pulled himself over to the base of a tree. Some of the items in his survival vest were worn, had been lost or damaged and the batteries in the survival radio needed replacing. Night was falling and an approaching cold front would bring snow, strong winds and rapidly decreasing temperatures. **There was no cold climate individual survival kit on board.** What would you imagine this aviator's chances of survival would be?

The Army Safety Center recommends that three briefings be given on life support equipment; one to unit aircrewmembers, one to noncrewmember and nonflying unit personnel and another to supported unit personnel, e.g., infantry or artillery personnel who would be transported in unit aircraft. The briefing should be targeted to the area in which flying operations are conducted; hot climate, cold climate, or overwater, and the related survival equipment components and operation. If that had been done, the outcome of the following accident could have been quite different.

An OH-58A was engaged in providing convoy cover and route reconnaissance for a tank tactical road march. The aircraft carried a crew of two as well as the tank unit commander and first sergeant. They were flying 20 to 40 feet above 80- to 90-foot-tall trees at an airspeed below effective translational lift. During a turn, the aircraft began spinning to the right. It hit the tops of the trees, the main rotor blades separated and the fuselage fell approximately 70 feet striking the ground in a nose down attitude. The tail-boom separated from the aircraft while it was falling through the trees and the cockpit and intermediate fuselage sections were totally destroyed upon impact with the ground.

The company commander had both thighs broken and a bleeding wound on his left arm

which was also broken. He found a piece of foam pad in the wreckage and bound his arm, using a pair of long underwear from a flight bag. He could feel fuel leaking from the aircraft. The other passenger was hanging by his waist and was unable to reach his belt to free himself. The captain cut him loose with his knife and he crawled out of the aircraft.

The passengers had been briefed on how to enter and exit the aircraft, the use of seat belts and how to use the intercommunication control system (ICS) radio box. **They were not briefed on the location and operation of survival equipment.** The passenger did not know where the first aid kits were located nor did he know that the pilots, who had both been killed in the impact, were carrying radios in their survival vests. The aircraft was not equipped with an emergency locator transmitter.

The aircraft crashed at approximately 1630 on a summer afternoon. The survivor could hear the other passenger moving but was unable to reach him. He located some pen flares and a strobe light in the pilot's flight pack and attempted to signal with flares when he heard a vehicle or helicopter. He put the strobe light up as far as he could reach and used a flashlight he had found to signal whenever a helicopter came near after it got dark. During a rainstorm, 7 hours and 15 minutes after the crash, searchers saw a red light and heard him banging with his pistol grip on the aircraft fuselage. **He was the only survivor.**

Search and rescue

Emergency locator transmitter (ELT) Since the early 1970s, when Congress enacted a law requiring emergency locator transmitters on general aviation aircraft, ELTs have been a source of constant problems because of inadvertent activations and failure to activate in an actual crash. During a conference at the National Aeronautics and Space Administration's Goddard Space Flight Center, problems with ELTs were discussed. It was evident that in a large percentage of malfunctions the problems stemmed from improper user procedures, improper mounting/installation and lack of quality control for some ELTs.

Numerous misconceptions about ELTs have produced some negative reaction for their installation in Army aircraft. The data does not differentiate between specific ELTs, but refers to ELTs as a whole. It is evident that only a few manufacturers have produced a high quality, reliable product. In one instance, the Federal Aviation Administration is quoted as saying that only about 1 in 10 downed aircraft were located by means of an ELT: "Flight plan information, plus ground signalling and good survival tactics, are still the predominant lifesaving factors," the article continues. The Rescue Coordination Center at Scott Air Force Base, Illinois, reports ELTs were instrumental in locating 29 crashes in 1980. The 35 survivors would, no doubt, have a quite favorable point of view about ELTs.

ELTs are now approved for selected Army aircraft where there is a legitimate requirement because of areas or type of operation and owning units have requested them. Requests for the ELT should be submitted through your MACOM to the DARCOM Project Office for Aviation Life Support Equipment, ATTN: DRCPO-ALSE, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120. Point of contact for the ELT is Mr. Ed Daughety, AUTOVON 693-3307.

Search and rescue satellite-aided tracking (COSPAS-SARSAT) Since the mid-1970s the United States, Canada, France and Norway have been exploring the feasibility of using satellites to detect and locate emergency transmissions from aircraft and ships in distress. Technical testing of the search and rescue satellite-aided tracking (SARSAT) and the Soviet Union's COSPAS-equipped satellites began on September 1, 1982, and ended December 31, 1982, at which time a 15-month demonstration and evaluation phase began. COSPAS-SARSAT will operate in two modes; regional and global. In the regional mode, detection coverage is provided on 121.5, 243.0 and 406 megahertz but is limited to those areas within a 1,250-mile radius of a local user terminal. In the global mode (operating only on 406), full earth coverage is provided by storing data in the spacecraft telemetry subsystem until it is transmitted to a ground station. This enables coverage of areas of the globe which are out of range of the ground terminals. In full operation, a series of satellites will orbit the earth and pick up whatever distress signals are broadcast. **An Army PRC-90 radio set on 243.0 megahertz will transmit a beep which the COSPAS-SARSAT will pick up and retransmit.**

In the United States, the Air Force, National Aeronautics and Space Administration, Coast Guard and National Oceanic and Atmospheric Administration have cooperated to equip a TIROS-N weather satellite with special components to receive and retransmit distress signals. The ground system consists of a U.S. Mission Control Center

(USMCC) manned by the Air Force at Scott Air Force Base, Illinois, and three satellite receiver stations or local user terminals. One is located at the USMCC and two are operated by the Coast Guard at San Francisco, California, and Kodiak, Alaska. A Canadian terminal at Ottawa, Ontario, extends coverage into the Atlantic Ocean. Thus, four North American terminals provide coverage over the continental United States, Alaska, Mexico, densely populated areas of Canada, and the maritime regions. Additional terminals in France, Norway and the Soviet Union provide coverage of Europe and parts of Asia. The United Kingdom has recently joined the program and Japan has expressed interest in COSPAS-SARSAT. The list of participants can be expected to grow.

Bernard J. Trudell, NASA's SARSAT mission manager credits the COSPAS-SARSAT with saving 60 lives in 23 incidents since the program began on June 30, 1982. "A single satellite equipped with search and rescue instruments can cover the entire earth every 12 hours," Trudell said. "A constellation of four such satellites cuts this time to a maximum of 3 hours." Both the U.S. and the Soviet Union plan to equip future satellites with SARSAT and COSPAS equipment so that coverage can be provided for the rest of the decade, to insure "an orderly transition from the present demonstration system to an effective, internationally funded operational system," he added.

Senator Slade Gorton (R.—Wash.), chairman of the Senate Commerce Science, Technology and Space Subcommittee opposes proposed cutbacks in the nation's weather services and significant changes in their structure—particularly the proposed sale of weather satellites to the private sector. Senator Gorton cites the effect on SARSAT as one of the reasons for his opposition.

An injured person's survival chances are reduced by 80 percent in the first 24 hours after the accident (Figure 1). Survival chances for the uninjured rapidly diminish after the first 3 days. If all goes well, COSPAS-SARSAT will significantly reduce the time from when distress occurs until the site is reached by rescuers. By reducing this time, chances for survival following an aircraft crash can be enhanced five-fold.

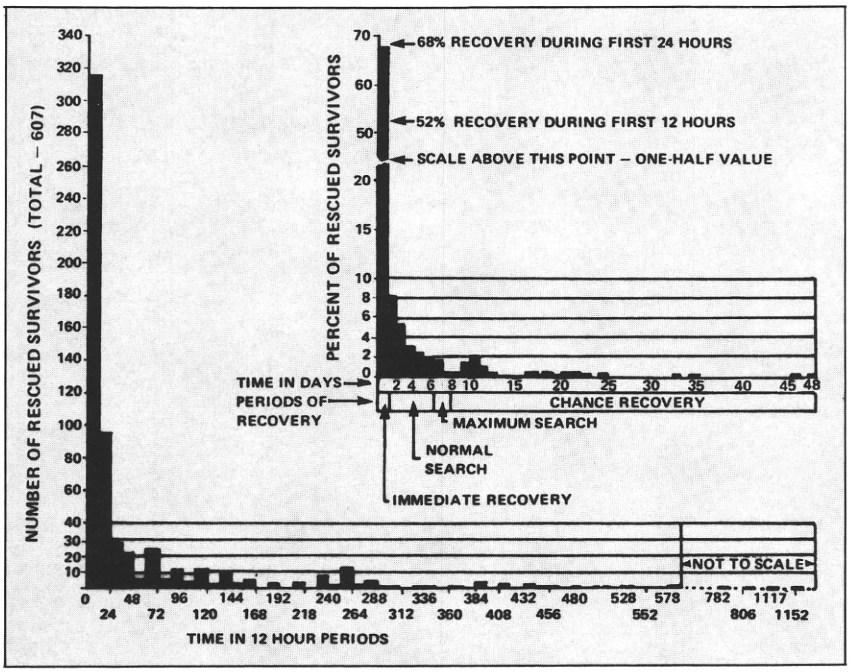


Figure 1

SURVIVOR RECOVERY TIME. Rapid response in a SAR effort is essential. An injured person's survival changes are reduced by 80% in the first 24 hours after an accident. As the figure shows, even for the uninjured, survival chances after the first 3 days rapidly diminish.

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PEARL'S

Personal Equipment And Rescue/survival Lowdown

Vivian Goshea photo by NoelKenya Atkins

Flight Clothing

Reference July 1983 PEARL article, subject: Nomex Flight Clothing. Until the Army adoption of the Air Force CWU-45/P Nomex winter flight jacket the N-2B winter parka is still the only Army jacket of its type authorized.

Inertia Reel Assembly

Back in December 1982 TSARCOM published Supply Letter #33-82 dtd 7 December. This letter advised all users that the inertia reel assembly, national stock number (NSN) 1680-00-775-4182, supply, maintenance and recoverability code had been changed to repair at depot level.

This information also appeared in the TSARCOM Materiel Readiness Information Bulletin for both first and second quarters of fiscal year 1983.

Please send all your unserviceables to Sharpe Army Depot (SHAD), Lathrop, CA (Routine Identifier Code A05, Supplementary Address WG2G2T). TSARCOM will establish and maintain an overhaul line, but it is up to *you* the field users to keep the pipeline filled. Check for unserviceables now. Appropriate stock fund credit for repairables will be given.

Magnesium Fire Starter

There is a new fire starter for your survival vest. The old butane lighter, due to its many problems, has been removed and replaced by the magnesium fire starter, NSN 1680-01-160-5618.

However, this is only an interim solution. We are attempting to find another butane lighter that will meet the requirements needed for your survival vest.

Sunglasses

Defense Personnel Support Center RIC-S9M does not stock nonprescription replacement lens for the standard FG 58 military aviator sunglasses, NSN 6540-01-099-2321 (Bayonett) and NSN 6540-01-096-4496 (Cable). Lenses may be local purchased however, by pair only not individual lens at a cost of $3.75 from:

American Optical
ATTN: Judi MacLaren
14 Mechanic Street
Southbridge, MA 01550
(617) 765-9711 X-2995

Special Measurement Clothing

To preclude delays in processing orders for special measurement clothing be sure to include correct height, weight and dimensional data. The nearest stock size and deficiency data are also required. Fill in all blanks on the DD Form 358 or DD Form 1111 correctly and forward with your requisition.

The completed forms should be mailed to: Commander, Defense Personnel Support Center, ATTN: DPSC-MC, 2800 South 20th Street, Philadelphia, PA 19101. The above information we hope will preclude numerous telephone calls to obtain the necessary information.

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN, DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120 or call AUTOVON 693-3307 or Commercial 314-263-3307

★TEC-PERIENCE

A Great Way to Learn

The Army Training Extension Course (TEC) is a great way to train soldiers. There are TEC lessons for common subjects that all soldiers need to know, such as Land Navigation, the M16A1 Rifle, Leadership, Intelligence, etc., as prescribed in the Soldier's Manual of Common Tasks. There are also TEC lessons for more than 100 MOS and CMF. TEC lessons help soldiers to prepare for SQT and everyday tasks. Many trainers use TEC to prepare themselves to train other soldiers. TEC is not the only way to teach critical tasks, but it is one of the best. Ask your commander, training NCOIC or discover TEC at the nearest Education Center or Learning Center.

COLD WEATHER SURVIVAL SCHOOL

Major James M. Nielsen

Did you know that if you build a shelter using snow as insulation it can warm the inside temperature to above 30 degrees even though the outside temperature is a frigid -25 degrees? Surprised? You can find out about this and other cold weather survival matters by reading the following article about a 4-day ARCOM Aircrew Cold Weather Survival Course that is offered four times each winter. Unit commanders interested in sending their people should contact Major Mike Hayes, 88th U.S. Army Reserve Command Aviation Support Facility, St. Paul Downtown Airport, St. Paul, MN 55107, AUTOVON 825-5110 and ask for offnet Commercial (612) 291-0218.

THE PILOT SLAMS the cargo doors shut and climbs into the cockpit. It's going to be an easy flight. Pick up a senior officer in International Falls, MN, and fly him back to the airfield in Duluth, MN.

"A good time today, John; practice a little dead reckoning and maybe do a little hood work on the way back."

Preflight completed, the UH-1 Huey lifts off and gains altitude. A beautiful day, clear, bright, 50-mile visibility and cold.

The rugged Superior National Forest passes beneath them. Its frozen lakes and snowy pines stretch to the horizon.

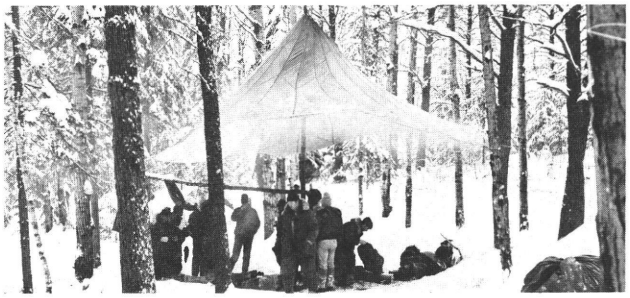
Lulled by the sound of the engine and the beauty of the forest, the crewchief gazes out the window and daydreams of past summers. The canoe trip, a pike fillet sizzling in butter, the smell of wood smoke, the piercing yodels from a family of loons echoing in the evening.

Suddenly the aircraft yaws left; the chief catches himself and looks to the cockpit.

"Low rpm!" the pilot says as he lowers the collective to the bottom stop.

"Airspeed 95 knots and climbing. We've got some trouble, guys."

The pilot applies some aft cyclic bringing the airspeed to 80 knots, and turns the chopper into the wind.



LEFT: CW2 Doug Maresh of Minneapolis, a pilot with Det 1, 185th Transportation Company, Ft. Snelling, builds a shelter of timber and pine boughs. When covered with 12 to 15 inches of snow the shelter serves as an excellent insulator against the coldest of temperatures.

TOP: With a fire built beneath a parachute canopy, the students gather together for coffee the morning after their first night in the forest.

ABOVE: The use of smoke, flares and other pyrotechnics will aid in an aircrews' rescue. The students shoveled a signal triangle on the lake ice, and added pine boughs to increase visibility.

"Make the call. Damn, we're going down."

The copilot turns on the emergency transponder and keys the mike.

"Mayday. Mayday. Army Copter 278, approximately 93 miles from Duluth, heading three-two-zero is going down."

All indications show an engine failure. No time to initiate an engine start. With the aircraft quickly losing altitude the pilot maneuvers toward a lightly wooded area. The crew briefs for landing and locks shoulder harnesses.

"Fuel off. Battery off. Hang on guys."

The tail and main rotor blades slap at the trees, jerking the aircraft to the right. The chopper hits. Snow and debris engulf the fuselage as the crewmembers slam into their harnesses from impact, then again as a tree crashes into the tail assembly.

Stunned, the crew pulls the emergency handles and the warmth of the interior vanishes as the frigid cold knifes inside.

Their exit is slowed by deep snow, and the chief needs help. Stumbling, they seek safety by distancing themselves from the aircraft. They fall together, turning their heads back to look at the wreckage.

It was quiet.

****

Army Major Mike Hayes, instructor pilot for the 88th U.S. Army Reserve Command (USARCOM) Flight Support Facility, turned the Army carryall down the steep hill past the Moose Lake public access, toward the Charles L. Sommers High Adventure Base, 25 miles northeast of Ely, MN. The base is a year 'round camp operated by the Boy Scouts of America, and each winter hosts the ARCOM's Aircrew Cold Weather Survival School.

Inside the carryall are seven students from across the nation—Army Reservists, Air Force Reservists and Air Guardsmen, about to begin 4 days of training to prepare for the unlikely yet real possibility of being forced down in a hostile, winter environment.

The ride through Ely and into the Boundary Waters Canoe Area is stunningly beautiful. Eight inches of powder had fallen the night before, and the branches of the pine trees hung low from the weight of the snow. A slight wind rustled the treetops, freeing a feather of snow that fell on the branches beneath, beginning a silent cascade that brushed to a small avalanche as it hit the forest floor.

The carryall was met at the camp lodge by Mr. Jerry Chapman, another instructor pilot for the 88th, and other coordinators of the survival school.

Carrying their gear, the students walked into the heated messhall, met the rest of the students and sat down. They waited for the confirmation that yes, indeed, they were going to spend 2 nights in the forest—at 20 degrees below zero.

COLD WEATHER SURVIVAL SCHOOL

The Aircrew Cold Weather Survival School, sponsored by the 88th USARCOM, is conducted four times each winter. Through the efforts of Mr. Chapman and MAJ Hayes, the school has earned the designation of a Fifth Army Area School. It's supported in part by the Army, Air Force and Navy aviation life support equipment programs, and benefits, to some degree, as a cold weather test facility.

Primary instructors for the course are two experienced Air Force survival instructors—Technical Sergeants Allan L. Bobst and Thomas Lutyens—from a combat crew training wing at Fairchild Air Force Base, Spokane, WA. The Scout Base director, Mr. Sandy Bridges, provides support for the program using the full resources of the Sommers High Adventure Base.

The course stresses realism in every respect. Survival is taught using only those tools, articles of clothing and equipment that would be available to a downed aircrew.

The first afternoon, evening and morning of the next day, the classes are conducted inside. The instruction covers treatment and prevention of cold weather injuries, clothing, pyrotechnics and signaling. Particularly stressed are perhaps the most important aspects of cold weather survival: proper shelter and securing water and food.

Ten to 20 students participate in each class, and following 1 day's instruction by Bobst and Lutyens it's time to load up the backpacks and move into the forest. By now most of the students have lost the feeling that, for certain, they're going to die.

CPT Winn Noyes, a student and a pilot with Army Readiness and Mobilization Region Five at Ft. Sheridan, IL, describes the training:

"One of the first things you notice when you step outside is how cold it really is. Take a good, deep breath and your nostrils stick together. But the scenery of the lakes and forest deep in winter is incomparable.

"The hike out with your backpack gives a graphic lesson on working in the cold. You quickly realize how overdressed you are, and unless you stop and remove a layer or two of clothing, you start to sweat. And as we were told back in the classroom, wet clothing is one of the greatest dangers.

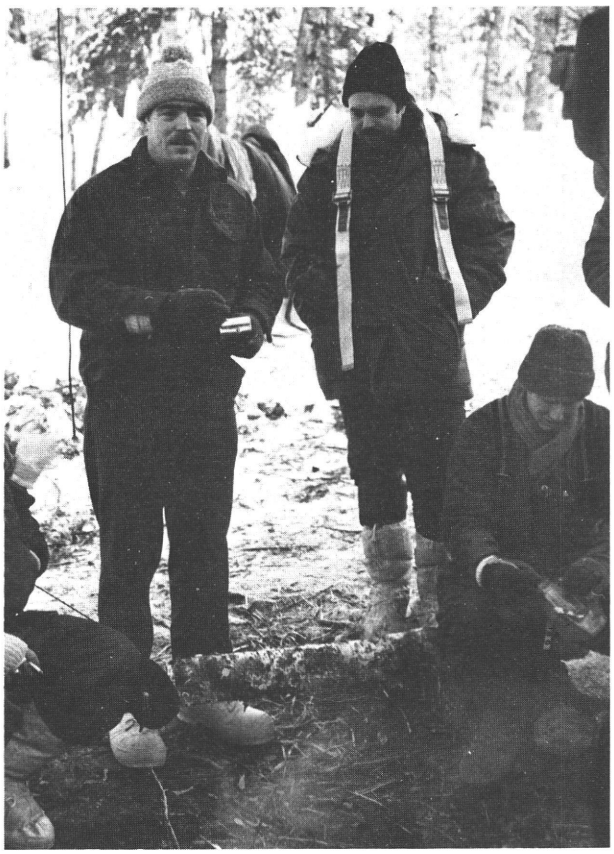
"The day and evening are spent building a collective shelter with the other members of the group. And it was surprising how warm and comfortable the shelter really was.

"The survival food is as revolting as it is intended to be, but that ensures you don't eat it all at once. Swapping war stories around the campfire during the evening is fun, and it is a real chance to meet and talk to pilots from other units who share many of the same problems and concerns as you do. You sleep surprisingly well that night, considering you're packed like sardines inside the community thermal shelter, while temperatures outside drop to -30 degrees Fahrenheit.

"The third day begins when the guy with the weakest bladder is the first one to crawl out of the sack, over his buddies and out the door to get a fire going.

"The day is devoted to individual survival skills, and ends with each student building his own individual shelter with the opportunity to use salvaged pieces of a crashed UH-1. And while you do all this, you start to realize the importance of all the little details the instructors have been emphasizing.

"Such things like the importance of drinking 4 to 6 quarts of water a day, but not drinking it until you've



Air Force TSG Allan Bobst, a survival instructor from Spokane, WA, discusses individual survival techniques including building snares and the art of opening a can of compressed corn flake bars. The students lived on survival rations during their 3 days in the field.

warmed it up to body temperature. And the constant need to keep 'nibbling' on your food.

"That night you have the opportunity to critique your own abilities as a shelter builder, and I think most of us were amazed to find out how good 12 inches of snow is as insulation. The shelters warmed up to over 30 degrees above, which is toasty compared to the outside temperature of -25 degrees.

"The last day was spent working with the signal devices in our survival equipment, and learning other methods that might help speed rescue."

Although the course is tough, it's also a lot of fun.

Mr. Bridges goes all out to see that while at the camp the students are not only well trained but well fed. Although out in the forest where the diet consists of compressed corn flake bars and other such survival rations, the meals at the beginning and end of the course are hot, delicious and best of all, all you can eat.

****

The three crewmembers watched their downed chopper for signs of sparking or fire.

The chief was cut and bleeding; his forearm broken. The pilot and copilot, though bruised and shaken, appeared to have no serious injuries.

The temperature was 5 degrees below zero.

"I think we may have lucked out," the pilot said, "I don't think she'll burn. But let's salvage what we can while we have the chance."

The injured man was in the most danger from the cold. He was the crews' first concern.

Quickly, but with caution, the two men returned to the aircraft for the survival kit. They had to get the chief warm and give him first aid.

****

Every pilot in the Army wears a survival vest while flying. The reason is obvious; if an aircraft goes down, they must escape as quickly as possible. The aircraft could explode or burn in a matter of seconds.

The aviators carry a two-way radio for voice communication and an automatic locator beacon. They have no food, only a small first aid kit, a compass, flashlight, flares and other signaling devices.

Each aircraft in the 88th ARCOM is also supplied with a winter survival kit consisting of a mountain sleeping bag, poncho/tarp, an insect headnet, water containers, flares, smoke, first aid kit, shovel, saw, candles, knife, frying pan and a limited quantity of survival rations.

Hooks, line and sinkers that one might expect to find are supplemented with a gill net which, for an injured flier or anyone in a survival situation, is less time consuming and more effective.

Air Force TSG Thomas Lutyens, survival instructor from Fairchild Air Force Base, Spokane, WA, stresses the danger of hypothermia, the major cause of death in cold weather. He emphasizes "C-O-L-D"; keep your clothing Clean, avoid Overheating, dress Loose in Layers and keep Dry.

****

After removing the cargo door from the chopper, they pulled off the soundproofing and removed the seatbelts, harnesses and tiedowns. The door would serve as a roof for their shelter or, if necessary, it could work as a sled or litter should the chief have to be moved.

After treating his injuries, they placed him in the sleeping bag, and wrapped him in the soundproofing, an excellent insulator.

The copilot prepared the signaling devices and helped the pilot gather wood for a fire.

The fire would serve as a signal, provide warmth and make drinking water.

****

Starting the fire was no problem. Their greatest fear—a highly combustible aircraft—could now work to help them.

Oil from the engine would burn in a thick black cloud for signaling.

The fuel, JP4, would simplify getting damp wood started. In addition, they could use maps and charts

to kindle the fire, or if necessary drain the alcohol from the compass or burn various plastic components.

If their matches were wet, they could pull the chopper battery and spark the JP4. And the horizontal stabilizer, made of magnesium, would burn.

After the fire, water would become their chief concern. Surprisingly, dehydration is a major danger for anyone working in an arctic environment. A northern forest in midwinter is as dry as a desert, with virtually no humidity. Dehydration occurs quickly from work, and from increased metabolism needed to keep your body warm.

Dehydration is dangerous because it occurs in cold weather as quickly as in the desert, yet it may not be noticed. A person who becomes dehydrated does not think clearly, and *clear thinking* is vital to survival.

The cold weather survival kit includes an insect headnet, not by mistake, but by design. With a fire going, and the headnet filled with snow and suspended over the fire, it serves as a superior "water machine" with the heat melting the snow rapidly, and the water caught beneath it in a container.

****

The copilot shoveled an area of snow to expose the bare ground, while the pilot sawed logs to serve as a framework for the shelter. They covered the framework with salvaged material from the chopper and balsam boughs, then covered the shelter with 12 to 15 inches of snow.

Since the earth stores a great deal of heat, exposing the bare ground releases that heat, and warms the shelter. Coupled with body heat, the shelter will quickly reach +32 degrees or warmer—far more comfortable than the subzero temperatures outside.

With the chief warm inside the shelter, a fire burning and their water machine in operation, the three were prepared to survive, and they could survive for days if necessary.

****

At present, the 88th USARCOM Aircrew Cold Weather Survival School is the only such school run by the Army. Its purpose is to provide formal training in the use of survival equipment, build confidence and train aviators in techniques needed for survival in arctic conditions.

In peacetime, as was the case during the Vietnam War, most fliers are picked up within a half-hour, either by a buddy flying on their wing or by efficient civilian or government rescue operations.

But doctrine and tactics have changed in recent years and they have increased the likelihood that a pilot will operate solo in a free-flowing combat situation. He may not have the luxury of being picked up by his buddy and must be prepared to survive for days, if necessary.

The Aircrew Cold Weather Survival School trains for that situation. The course is offered again this winter, with four classes to be conducted during January and February 1984.

The course is open to all aircrewmembers and other selected individuals may be authorized to attend. Those include people working with aviation, aerial observers or soldiers who find themselves frequent fliers in the course of their duties.

For more information contact Major Hayes, 88th U.S. Army Reserve Command Aviation Support Facility, St. Paul Downtown Airport, St. Paul, MN 55107, telephone (612) 291-0218.

Good morning! CW2 Lee Midlo of Anoka, MN, a pilot with Det 1, 185th Transportation Company, Ft. Snelling, pops his head out of his shelter after quite comfortably surviving the night in subzero temperatures.

ABOUT THE AUTHOR

Major James M. Nielsen is the public affairs officer for the 88th U.S. Army Reserve Command in St. Paul, MN. He earned a bachelor of science degree in public affairs from Bemidji State University and a master of arts in communications from the University of Minnesota. He is a graduate of the U.S. Army Command and General Staff College. On active duty he served as an infantry platoon leader and company executive officer. As a member of the Army Reserve, he commanded a public affairs detachment and served as an infantry brigade PAO. He is presently on active duty as a military technician.

"Hangar Talk" is a quiz containing questions based on publications applicable to Army Aviation. The answers are at the bottom of the page. If you did not do well, perhaps you should get out the publication and look it over.

AR-385-95

Army Aviation Accident Prevention

Major John J. Fearing
Aviation Safety Officer
Headquarters 79th ARCOM
Willow Grove NAS

1. Local crash grid maps will be provided to and maintained by each activity listed for the primary and secondary crash alarm-circuits. A mimimum of_____ miles radius from the airfield is recommended.

a. 15 SM
b. 10 NM
c. 15 NM
d. 10 SM

2. Members of the Army Aviation Safety Council at unit level and higher echelons of command will include which of the following?

a. Aviation life support equipment noncommissioned officer
b. Aviation safety officer
c. Commander
d. Flight surgeon
e. All of the above

3. Although foreign object damage prevention is a command responsibility, at the unit level the aviation safety officer will implement the program.

a. True
b. False

4. The "Guide to Aviation Resources Management for Aircraft Accident Prevention" is a publication that contains comprehensive checklists to assist commanders in conducting an aircraft accident prevention survey. As a minimum, surveys will be made:

a. Monthly
b. Every 90 days
c. Annually
d. Semiannually

5. Commanders will ensure that procedures are established to manage the operational hazard report (OHR) function, including returning completed OHRs to the aviation safety officer within _____ of the date the report was received.

a. 7 days
b. 24 hours
c. 10 days
d. 72 hours

6. The duties of the aviation safety officer and/or the flight safety technician include all of the following except:

a. Educate aircrewmembers on safety related subjects
b. Maintain organizational aircraft accident reports
c. Monitor unit aviator life support equipment related survival programs
d. Preside over aircraft accident investigation boards
e. Only a and b
f. All of the above

7. The basic element in the command line of aircraft accident prevention is the:

a. Individual aviator
b. Aviation safety officer
c. Commander
d. Safety Center

8. AR 385-95, which became effective on 15 March 1983, establishes the Army Aviation accident prevention function and prescribes policies, procedures and guidelines for implementing these functions as part of the overall Army Safety Program.

a. True
b. False

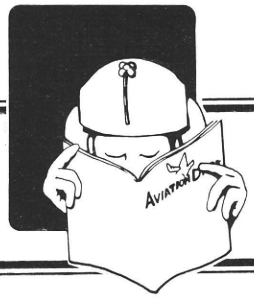
9. The responsibility for the establishment, readiness and accomplishment of the preaccident plan belongs to the:

a. Maintenance officer
b. Airfield commander
c. Operations officer
d. Aviation safety officer

ANSWERS:

1. c, pg B-5 (3) b
2. e, pg 2-2, 2-7
3. b, pg C-1, a.(1)
4. d, pg 2-1, 2-5
5. c, pg 3-2, 3-6b(5)
6. d, pg 1-2, 1-7(c)
7. a, pg 1-3, 1-7(d)
8. a, C1, 1
9. c, B-4, B-3a

VIEWS FROM READERS



Editor:

This letter is in response to the article "Army Aviation Branch Implementation" in the August 1983 issue of *Aviation Digest*. The section on Personnel Management is well written and contained a great deal of information that I am sure answered many questions for commissioned officers and enlisted personnel.

As an aviation warrant officer (AWO), I began reading the section on Personnel Management with great expectations of finding out how this new Branch might affect me and my fellow AWOs.

It should not be too hard to imagine my disappointment when I discovered that only one small paragraph dealt with Aviation Branch Implementation for AWOs.

The statement, "The Army Aviation warrant officer is a member of the Army Aviation Branch and will wear the same Branch insignia as the Army Aviation commissioned officer," has profound implications and raises many questions that are not addressed by the article. There is only a vague mention of "improved personnel management policy and procedure"; this of course, tells me absolutely nothing. Some questions which should have been addressed in the article are listed below:

1) If AWOs are now members of the Aviation Branch, does this mean we are no longer members of the Warrant Officer Branch?

2) If AWOs are no longer a part of Warrant Officer Branch, will the authorized level of CW2s, 3s and 4s be computed separately for aviation and nonaviation warrant officers?

3) What effect will this have on promotions? For example: Will AWOs and nonaviation warrant officers be considered by the same boards?

4) What effect will the Aviation Branch have on advanced schooling for AWOs? Will we attend the same senior course as non-AWOs or will one be developed which presents subjects that will help aviators perform their jobs better, i.e., tactics and operations, instead of supply and administration?

5) Will there be any changes to assignment policies for AWOs (overseas, and stateside lengths of tours or choice of assignment locations, etc.)?

A reply of any type in response to my questions regarding Army Aviation Branch Implementation in the near future would be appreciated.

CW3 John A. Harris
4th Aviation Battalion (CBT)
Ft. Carson, CO

• **The *Aviation Digest* received the following answers to CW3 Harris' questions from the Branch Implementation Office at the Aviation Center:**

1. The affiliation of AWOs with the Aviation Branch is similar to the affiliation between counterintelligence technicians and the Military Intelligence Branch. It should be understood that Warrant Officer Division is a Personnel Management Directorate of MILPERCEN and that warrant officers do not compose a separate branch of the Army. Therefore AWOs, by Army Chief of Staff decision, are members of the Aviation Branch and will continue to be managed by the Warrant Officer Division.

2. Warrant officer strength levels by grade are based on the total warrant officer force and not by MOS.

3. All warrant officers eligible for promotion are considered by the same promotion boards. Presently, warrant officer promotion boards use MOS promotion floors in an effort to provide a more equitable distribution of senior warrant officers throughout the force.

4. The implementation of the Aviation Branch will not affect the Warrant Officer Senior Course (WOSC) directly. The Warrant Officer Senior Course is presently under revision to bring the curriculum in line with the needs of the Army and the WOSC graduates. Particular interest is being placed on providing more instruction in tactics and combined arms operations. The Department of Combined Arms Tactics is responsible for tactics training at Ft. Rucker and will provide current and timely training to the WOSC.

5. Formation of the Aviation Branch is not expected to result in changes to AWO assignment policies. However, the Aviation Center as the proponent for personnel management of AWO personnel may recommend changes where needed.

Editor:

Although a nonaviator (my PMOSC is 71N4K), I find your magazine provides a wealth of information for us transportation/traffic management types. Working at a Corps Support Command Movement Control Center, having a working knowledge of Army air operations and all that goes into such gives us surface troops a better insight when it comes time to arrange for a surface-air interface in transportation matters.

Yes, I even tried my hand at CW2(P) Weiland's "Hangar Talk" quiz in the April 1983 issue. No, I'll not comment on how badly I did, but I did think that one question was worded badly (unless, of course, Army aviators talk a completely different language than Air Force aviators). The true/false question was, "Passengers will not be carried in an aircraft with chemicals onboard." Being somewhat naive, I considered this statement false since no mention at all had been made concerning hazardous materials, TM 38-250 or Title 49 CFR. Upon researching the correct answer in AR 95-1, I discovered that the cited paragraph (2-18d) talked somewhat obliquely about toxic or incapacitating chemicals. So, if one quoted chapter-

and-verse, the true/false question was indeed "true." On the other side of the coin, however, if one loaded a sack of halite onboard an Army aircraft for a cargo shipment, no passengers would be permitted to be carried since the sack of salt technically constituted a chemical (sodium chloride), and passengers can't fly with chemicals. Never mind that the rock salt wasn't identified as a hazardous material in TM 38-250....AR 95-1 prohibits passengers to accompany the stuff. Perhaps the regulation needs rewording?

Like I stated earlier, perhaps Army aviators speak a different language from the rest of us mortals, but according to Federal regulations, a hazardous material is a hazardous material is a hazardous material, and if it's not a hazardous material it's just another piece of cargo.

SFC Henry J. Statkowski
502d Trans Co., 3d SUPCOM

• **The point you make in regard to hazardous versus nonhazardous chemicals is well taken. The proponent for AR 95-1 also noticed this discrepancy. As a result, change 1 to AR 95-1, 1 July 1983, changes paragraph 2-18d to read, "Personnel who are not essential to the mission will not be carried in an aircraft with incapacitating or toxic chemicals onboard."**

Editor:

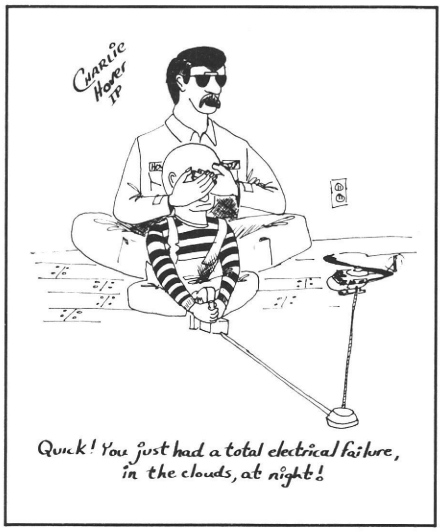
As I recall I've heard it before. The same ideas, same prejudices, the same game, just different players; with 20 years in Army Aviation I can look back and think "Why did I do it? I must be a masochist." I am referring to the latest talk around the old flying field of doing away with the flight suit. Now this really makes sense, since our aircraft don't burn anymore. As a matter of fact maybe we should do away with the bayonet since we haven't used one in 30 years, and we could eliminate the steel helmet since we haven't had a fatal head injury for so long.

Now I realize I'm overacting but I have seen the same efforts before; the ground commanders don't like the "coveralls" the aviators wear and I must admit that there have been times that the behavior of some of those aristocratic fly people in the "O" club has been less than fully acceptable and the flight suit made a lasting impression that was not complimentary to the branch. However, I've worn the cotton suit, the two piece Nomex, the one piece Nomex, and greens and kahkis to fly the various aircraft I've been qualified in and must comment that there is really a reason for the one piece suit; there is also a reason for Nomex and these reasons have been researched and re-researched over and over so I don't have to elaborate, but the main reason for the Nomex suit is the most valid—and that is fire safety.

So we say "but the aircraft don't burn" and the statement is true to a degree, but the fact remains that they can, and with more ferocity than anything else the Army has except for a gas truck; and therein lies the biggest argument in favor of the flight suit—plain and simple, the potential for thermal injury is greater in the helicopter than anywhere else, and the *potential* is the consideration.

Well, as I said, with 20 years in Army Aviation I've seen it before and probably I'll see it again, but I just had to write it down. I think it's time we stopped the petty, opinionated approach to the type of aircrewmember flight clothing that should be worn and recognize that aviation is a combat arm and a very valuable one at that. That the people in aviation have a deserved pride in what they do and work harder to attain and retain those wings than any other single qualification in the Army, and that the uniform—the flight suit—is a necessary part of that job just as the steel helmet is to the infantry, the white coat to a doctor or the silver suit to a fireman.

I recently started wearing the new battle dress uniform and aside from being a little warm for 100 degree plus weather I think it's the best thing the Army has done in along time. It fits very well (I have a perfect body) while allowing for movement and providing enough pockets (in enough locations to satisfy



nearly everyone) but it doesn't have a chart pocket in the leg, the jacket cannot be worn tucked in comfortably, the sleeve is missing the pencil pocket and it definitely is not fire resistance or even fire retardant.

In short we still don't have *the* perfect answer for everyone, anymore than we have the "all around" anything, weapon, car, aircraft or boat. We still need special designs to fit special needs. I've been on posts where the commanders wouldn't allow anyone off the flight line wearing a flight suit, which required the aviators to carry a change of clothes. Other places wouldn't allow the flight suit in the club, but fatigues were fully acceptable. As an airline pilot, I flew in a white short sleeve shirt, black slacks and black coat, took the coat off in the cockpit and was comfortable, safe and looked good to the girls. That uniform would be totally out of place of course, in an AH-64 on a gun run, but I was dressed for my job, just as an Army aviator is dressed for his in a one piece Nomex flight suit with gloves, helmet, survival vest and related equipment. Let's leave it the way it is so we don't go into the next war and find out that our helicopters still burn when hit with 12.7 mm incendiary rounds.

LTC John L. Cromwell
U.S. Army Reserve

Articles from the *Aviation Digest* requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Ft. Rucker, AL 36362

ASTS Followup

THE MAY 1983 edition of the *Aviation Digest* introduced the Aviation Standardization and Training Seminar (ASTS), a new training program developed by the Directorate of Evaluation and Standardization (DES). The ASTS is an assistance oriented program developed to improve training, safety and standardization throughout Army Aviation.

The first ASTS was conducted from 12 to 17 June at Ft. Campbell, KY. Since then, the ASTS team has conducted training visits at Ft. Lewis, WA, Ft. Riley, KS, Alaska and Ft. Carson, CO.

The composition of each ASTS team was tailored to meet the specific requests of each installation visited. During the first visits, heavy emphasis was placed on flight training. The team had a DES standardization instructor pilot (SIP) for each type aircraft assigned to the installation. A vast amount of time was scheduled by the ASTS team coordinator and local points of contact (POC) to conduct various training flights (night vision goggles (NVG), tactics, instruments, etc.). Unfortunately, the team's SIPs did not fly nearly as much as had been hoped. The SIPs found themselves spending a great deal of time conducting informal classes on subjects ranging from the loss of tail rotor effectiveness to Performance Planning Cards. This situation was caused by two significant factors.

The first factor was an extreme reluctance on the part of the aviators in the field to fly with DES SIPs. (We, at DES, realize that it is difficult for many people to accept DES SIPs as trainers rather than evaluators.) Toward the end of the team's visits, the aviators began to realize the purpose of the ASTS. Reluctance to fly with DES SIPs disappeared and the frequency of training flights increased. However, this realization came too late in the visit and many of the training flights could not be conducted.

The second factor that reduced the number of training flights was the sincere interest the unit aviators displayed in discussing aviation related subjects with the SIPs. These informal discussions led to some of the most beneficial training that occurred during the team's visits.

In addition to the DES SIPs, the team included instructors and subject matter experts from Ft. Rucker, Ft. Eustis, VA, U.S. Army Troop Support and Aviation Materiel Readiness Command, U.S. Army Development and Readiness Command and the Natick Laboratory. Each of these instructors satisfied requests of the units to present specific classes and seminars. Classes were presented on instructor pilot fundamentals, aircrew training manual program, Army Regulation (AR) 95-1, flight records and Field Manual (FM) 1-300, the standardized maintenance test flight procedures and aviation life support equipment (ALSE).

During the team's next visit, many of the lessons learned during the first trip were applied to improve the quality of the visit. The daily training schedule developed for the team provided an increased opportunity for the DES SIPs to meet with the aviators from the units and conduct those informal classes and seminars that proved so popular during the first ASTS. The team also included maintenance test flight examiners from Ft. Eustis who conducted seven flights, including two evaluations performed at the request of the unit. A safety officer was added to the team for this trip. He provided instruction for unit safety officers on specific areas that they had requested. An NVG academic instructor was also added to the team to discuss NVG operations and how the Aviation Center could better train NVG qualified aviators.

On the final ASTS trip of fiscal year (FY) 1983, the lessons learned during the previous ASTS visits were again used to improve the program. The single largest

change was the deletion of any scheduled flight training until the final day of the visit. This change was made by the ASTS coordinator, working with the POC at each post, in order to present the maximum amount of training to the maximum number of people. For the most part, a flight in an aircraft can benefit only one or two people, but a class or seminar can benefit more than a hundred. (More than 120 people attended one class on aerodynamics.) Some training flights that were specifically requested by the units were flown, but, again, the emphasis was changed from hands-on flying to academic instruction.

The most recent visit included new members on the ASTS team added at the request of the visited units. One, an aviation petroleum, oils and lubricants (POL) specialist, provided guidance toward improving the POL program at one post. Another, a supply specialist, was brought in to perform courtesy inspections of the aviation supply procedures at one of the installations. The assistance and information that he provided will help them to improve their aviation supply program and improve readiness. Plans for future ASTS visits include the addition of a flight surgeon to visit with the local flight surgeons to discuss areas of mutual interest.

Each ASTS visit has been an improvement over those preceding it. This is due to the experience gained by the team coordinators and by the increasing acceptance of the ASTS by the commanders in the field. As commanders and aviators realize that the ASTS is strictly an assistance program, not an inspection or evaluation, they become more receptive to the program. Additionally, as proponent responsibilities for Army Aviation shift to the Aviation Center, the ASTS will be used as a tool for gathering information and providing field unit input into training programs and doctrine developments

As many as 14 installations may be visited by the team during FY 1984. The visits occur about 6 months before a unit's Aviation Resource Management Survey (ARMS). This schedule was developed to provide assistance the unit may want prior to its ARMS visit to help improve safety, standardization, training and any other area that the commander may identify.

Editor's Note: **With branch implementation, the ASTS in accordance with TRADOC Circular 350-82-2 has become a Branch Training Team (BTT).**

Keys to the Successful ASTS

The ASTS, like any other program in the Army, will be successful only if the commanders want it to be. They must place the appropriate command emphasis on the planning and execution of the team's visit to gain the maximum benefit for their units.

The ASTS is the first Armywide, onsite training effort designed to improve aviation safety, standardization and training by providing the instruction a unit needs to improve in these areas. How then can a commander take maximum advantage of the team's visit? Here are some guidelines, provided by commanders who have had an ASTS visit. They should lead to beneficial ASTS visits for others:

- **Put the visit in your unit weekly training schedule. Let your people know what is going on and what you expect of them.**
- **Encourage maximum attendance at the classes and seminars. Free discussions that occur during these classes lead to self-evaluation that can be of tremendous benefit.**
- **Ask for the training you want during the planning phase of the visit. For example, if your flight records need help, let the installation's visit coordinator know that you want some 71P and FM 1-300 training.**
- **Check with your POL, supply, ALSE, safety and maintenance officers, etc., to see what they want in the way of specialized training.**
- **Coordinate laterally and vertically. At one installation, almost every unit wanted help in one particular area, but they didn't ask for help.**
- **Be prepared to talk tactics.**
- **Relax—remember, it's all "free."**
- **The individual units and the ASTS both seek to improve Army Aviation. The proper attitude—*we are all in the same Army*—must prevail.**

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

AVIATION PERSONNEL NOTES

ORB: The Army Officer's Resume

Lieutenant Colonel John C. Eberle
Information Resource Management Officer
Officer Personnel Management Directorate
U.S. Army Military Personnel Center
Alexandria, VA

OFFICER RECORD Briefs (ORBs) were found to be *extremely* important, particularly in screening, said members of a recent Department of the Army (DA) selection board. In a sense, the Officer Record Brief has become the Army officer's resume. Commanders and supervisors use the ORB to get an impression of an officer's qualifications for a duty position. DA selection boards use the ORB to establish initial impressions of an officer's potential for promotion, schooling and command. Assignment officers use the ORB to aid in finding officers qualified to fill positions and to make other important professional development decisions.

Based upon comments from every recent DA selection board, there are still many of us who need to get our "resumes" in better shape.

Over the years officers have criticized the ORB system because of the difficulty they've had in getting changes made. Though there may be a lot of us that have tried to make changes to our ORBs that did not get made, there is a significant number of officers who have succeeded based on the quality of their ORBs. If the number of letters and phone calls before the selection boards is an indicator, it appears that many officers avoid serious involvement in getting their ORBs updated until it becomes a problem. DA Pamphlet 600-8, Procedure 5-1, is the ORB correction bible. Copies of this pamphlet should be available in your unit's personnel administration center and at your local military personnel office (MILPO). You should read it. It will take you about 10 minutes.

Much like any task that you try to get someone else to do, ORB correction takes personal involvement and follow-up. HQDA sends a copy of your most recent ORB to your MILPO three times a year. The ORB received in your birth month is the audit ORB and must be audited by you. Your signature on the audit ORB attests that the data on the ORB is correct, or that you have indicated what data changes must be submitted by the local MILPO. The other two ORBs will come at 4-month intervals following the audit ORB and should be used by you to check that the changes you indicated were made.

You don't have to wait until your audit ORB arrives to make changes to your ORB. Changes may be made through your MILPO anytime during the year.

Before we address specific procedures, let's talk about where the data comes from that is printed on the ORB. When an officer comes on active duty, a record of his or her entry on active duty is made on an automated data base, called the officer master file (OMF), located at the U.S. Army Military Personnel Center (MILPERCEN) in Alexandria, VA. The data which is entered on each officer at active duty time is sketchy until the officer arrives at his or her first duty station. Here, the local MILPO sends a copy of the DA Form 2 and 2-1 to MILPERCEN where the record is completed to the extent possible. Once data is entered on the data base, it is maintained until some action either at HQDA or through a Standard Installation/Division Personnel System (SIDPERS) causes the data to change. The data that you see printed on your ORB is a copy of the data that is stored in your automated record on the OMF.

Some data displayed on the ORB is the exclusive responsibility of HQDA to update directly to the OMF. Other data can only be updated through SIDPERS transactions which are transferred to HQDA via AUTODIN (automatic digital network). If one of the data elements on the ORB listed in Table 5-1-1, DA Pam 600-8, needs updating by HQDA, have your MILPO send a letter to the appropriate agency as listed in the Correction Procedure column of the table. Provide adequate data for the MILPO to validate your requested change. Usually, sending the request for change through the MILPO to HQDA, rather than directly to HQDA, is the best way. If there is a change in the procedure, the MILPO is more likely to know about it. If there is a problem with the update procedure, the MILPO chief can bring it to the attention of HQDA to get the problem fixed.

Some officers have the impression that their assignment officer is the only one who can get changes made on the ORB. This is a myth which needs to be dispelled. The fact is, to quote DA Pam 600-8, "MILPERCEN and the Special Branches will not process changes which can be reported through SIDPERS." The reason for this is that there currently is no reliable way to decide if the SIDPERS data is more correct than the OMF data. Therefore, the decision has been made that the SIDPERS data, which comes from the field, updated by your MILPO, is most current and correct. When the OMF/SIDPERS reconciliation is done, SIDPERS data overrides OMF data thereby negating changes which may have been made by HQDA. Despite the fact that the SIDPERS file contains only a subset of the OMF data, it is essential that you submit ORB changes through your MILPO to ensure that both your OMF and your SIDPERS records are correct.

EXTRACT OF DA PAMPHLET 600-8, TABLE 5-1-1

Data Items	Data Item Explanation	Source Document	Responsibility for Correction	Correction Procedure
HEIGHT/WEIGHT	Height in inches. Weight in pounds.	SF 88. Officer.	MILPO	Use procedure 2-57, DA Pamphlet 600-8-2. Annual verification of height and weight is required. To fulfill this requirement, only the signature of officer concerned is required. An annual physical IS NOT required to accomplish the verification. (AR 640-2-1)

Each item on the ORB is important, but those items which are most often noted as not being accurate by selection boards are military education level, civilian education level, height/weight and assignment history. Specific details on how to make ORB changes are outlined in Table 5-1-1, DA Pam 600-8, but let me use the above items as examples of what to look for and how to correct the errors. The figure is a copy of what Table 5-1-1 has to say about height/weight.

Note that height is to be in inches and weight in pounds. A 6-foot 3-inch man who weighs 200 pounds may not seem too heavy. However, if his ORB is incorrect and lists him as 63/200, it raises some rather obvious questions. How can an Army officer be physically fit if he is 5 feet 3 inches tall and weighs 200 pounds? If your photo makes you appear overweight, but your ORB says you're not, the board will request verification of your height and weight data.

The assignment history block contains a maximum of 19 assignments. All entires for casual, student, patient or duties of 2 months or less are deleted. The number of months shown should be the number of months spent in the assignment. The organization and duty titles need to be concise but clear. When an officer arrives at a new location, a SIDPERS transaction is generated which extracts the organization title from the SIDPERS organization master file. This sometimes causes a significant problem because these extracted titles appear on the ORB as "0002 AR SQ 03 CV HHT." Except for the MTOE (Modification Table of Organization and Equipment) author, this coding gives no one a clear picture that the officer was in the Third Squadron, Second Armored Cavalry Regiment, normally abbreviated "3d SQDN 2d ACR."

The best source of data to correct these difficult to read duty titles is DA Form 67-8, Officer Evaluation Report. However, this will require a SIDPERS change to modify the existing procedures, which has not yet been approved. Until such a change is implemented, there is a procedure by which organization titles can be changed to satisfy your requirements.

Organization titles can be no longer than 19 characters with 4 additional characters available for the unit number. Duty titles can be no longer than 24 characters. A duty title such as "OB OFF" is too concise at six characters. OB could mean obstetrics, obstacle or order of battle. Take your pick, this example taken from a Military Intelligence officer's ORB obviously meant "Order of Battle Officer" as that was the duty description of his officer evaluation report for that period. Note that Order of Battle Officer is 23 characters long (remember a space counts as a character) and therefore fits in the allocated space. If you must use abbreviations, make sure that they comply with AR 310-50.

Military education level (MEL) data for command and staff college (MEL 4) and senior service college (MEL 1) level schooling are entered in HQDA. All other school data are entered in the field. Civilian education for master's and doctorate-level schooling is done at HQDA. Officers enrolled in resident MEL 1- and MEL 4-level schools will automatically be credited for completion of the courses. Officers who complete nonresident programs for MEL 1 and MEL 4 producing schools must forward appropriate documents through the MILPO to HQDA for update. Appropriate degrees and transcripts must be forwarded to HQDA to be credited for completed master's or doctoral work.

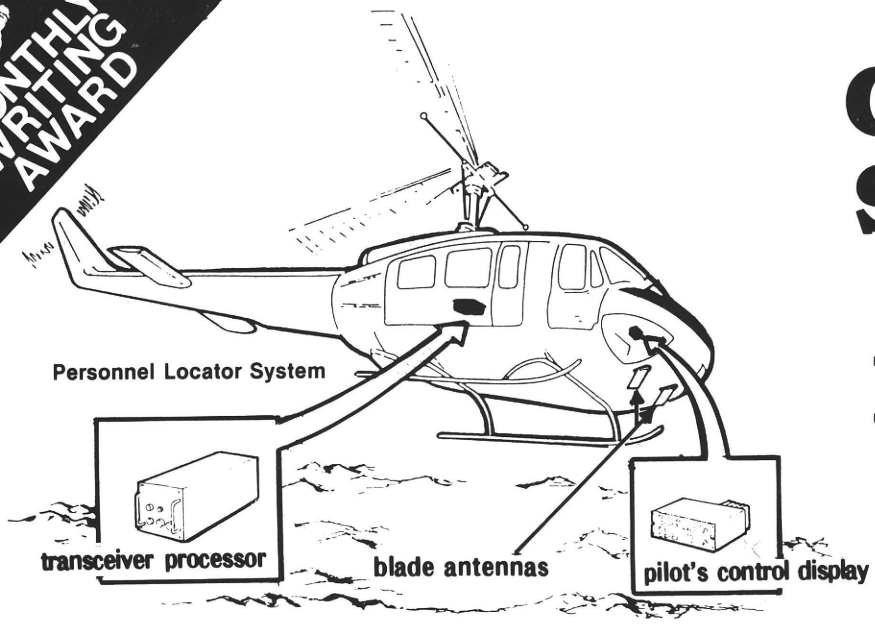
We need officers to get involved in changing their ORBs. There may be problems, and every change may not "take" on the first try. The change may have been coded incorrectly, the clerk may have forgotten to forward it or it may not have been changed the way you wanted it. If you submit a change that does not show up on the next ORB you receive, follow up on it. Force the issue. Get your commander involved if you have to. Don't accept the statement that "the system is screwed up" as the answer. Computers, for all their faults, do what people tell them to do. If you are getting close to a selection board and have not succeeded in getting changes made which you feel are important, write to your assignment officer, or call if time is short.

At the same time, go to your MILPO and submit the changes once more. The assignment officer will change those items that are HQDA changeable items, and he or she will post the ORB which goes before the selection board with the handwritten changes as you indicated in your request.

What does the future hold? Someday we hope to have a system in which both the MILPO clerk and assignment officer can sit at a terminal and update the current data on the officer master file and get an immediate update response.

In the meantime, there are procedures to get your ORB updated. Where the procedures are being followed, the system is working reasonably well. If no one is making the system work where you are, be the first link. Remember two things: First, your ORB is more important to you than to anyone else, and second, if your ORB does not represent clearly what you have done and who you are, it will not change unless you get directly involved.

MONTHLY WRITING AWARD



COMBAT SEARCH AND RESCUE

Mr. Raymond Birringer
Materiel Developments Division
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL

THE AIRLAND Battlefield will be characterized by highly mobile, firepower-intensive maneuver forces being transported and supplied rapidly over the battlefield by cargo and utility helicopters, with decisive firepower provided by large numbers of attack helicopters. The vast array of enemy ground and air weapons, to include sophisticated threat air defense weapons, could result in the loss of numerous Army aircraft. It is essential that we have a dependable operational concept together with the most advanced equipment to quickly locate, recover and return to duty our downed aircrews so they may fight again another day.

To some, the subject of combat search and rescue (CSAR) may be thought of as strictly a mission of the Air Force, or perhaps our Vietnam era pilots may envision it being accomplished by another Army aircraft such as a wingman. Our present capabilities are limited; however, there are developments ongoing which will render a significant improvement, and these will be addressed in the remainder of this article. First, let's describe what we possess in combat, search and rescue capability if we went to war today.

At present, Army aircraft do not have a direction-finding system to interface with our present survival radio—the AN/PRC-90. Our CSAR is restricted primarily to voice communications and visual sightings. However, poor weather often delays or prevents visual detection of downed aircrew personnel, and enemy electronic warfare (jamming) could disrupt all rescue voice communication frequencies. Unlike the Air Force, we do not have the resources to dedicate aircraft strictly for the CSAR mission. The Air Force may be limited in its ability to provide CSAR assistance to the Army due to the limited number of rescue helicopters in its inventory and the supposition that its CSAR capabilities will be saturated attempting to rescue its own downed aircrew personnel.

So what is required to locate and recover our downed aircrews? The answer is rapid and reliable communications *plus* a highly accurate locating system that is capable of interfacing with the equipment of our other services and allies. Next, this system must be coupled with sound operational procedures to give us a timely and dependable means of combat rescue. A CSAR program that can rapidly locate and rescue downed aircrews flying dangerous missions, such as deep strike penetrations into the enemy rear, could well provide aviators with motivation to "go that extra mile," knowing they have an excellent chance of being rescued should they be shot down.

Personnel Locator System. To answer the equipment requirement, the U.S. Army Aviation Center at Ft. Rucker, AL, has stated the need for a Personnel Locator System. The PLS is a state-of-the-art system that couples the new triservice survival radio—AN/PRC-112—with onboard direction-finding and distance-measuring equipment which will provide first pass, covert rescue capability in a high threat, day/night or adverse weather environment. The system design will incorporate lightweight modules to allow its rapid installation and removal from UH-1 Huey or UH-60 Black Hawk helicopters. This design is an important feature because Army Aviation does not have dedicated CSAR aircraft; therefore, the system is designed to

be installed in any mission-ready aircraft. PLS will be organic to combat aviation battalions, air cavalry squadrons, and air ambulance companies and detachments. PLS is envisioned to be operational in the mid to late 1980s.

CSAR and the Battlefield. The Aviation Center has published a CSAR mission concept written within the framework of the AirLand Battle doctrine. The document is currently at Headquarters, TRADOC, awaiting approval. Written by the Concepts Branch of the Directorate of Combat Developments, U.S. Army Aviation Center, the CSAR concept was developed in conjunction with current procedures of other U.S. services for CSAR and NATO STANAG, primarily STANAG 2861, "Procedures in the Event of Downed Helicopters" (RSI Report, *Aviation Digest,* December 1982). The CSAR mission concept divides the battlefield into three areas—uncontested, contested and across the forward line of own troops (FLOT) into the enemy rear areas. The scope of CSAR operations required for an aircraft forced down on the battlefield will depend on the tactical situation at the forced landing site and the organic recovery capability of the aerial force. CSAR efforts are oriented to the immediate recovery of downed aircrews. The recovery of the downed aircraft may be accomplished in conjunction with the aircrew recovery when feasible.

PRC-112
Survival Radio

Recovery Procedures. The location of an aircrew forced down on multiship missions is normally known and search operations are not required. The aircrew is recovered by an onsite aircraft if the mission and tactical situation permit immediate recovery. If the aerial force does not have recovery capability, a recovery aircraft will be requested from the controlling aviation headquarters.

When an aircraft is reported down, search operations are initiated to locate the downed aircrew. down, search operations are initiated to locate the downed aircrew. When the aircrew is located, the CSAR aircraft completes the recovery operation if the tactical situation permits.

When the tactical situation precludes their immediate recovery, downed aircrews may be required to move to preplanned pickup points or to the nearest friendly ground unit. The specific actions of the downed aircrew are covered in operation orders and briefed to all aircrews prior to the mission. Subsequent recovery efforts are conducted at times and locations specified in pre-mission briefings or when the tactical situation permits.

Army Aviation operations across the FLOT are thoroughly planned missions, to include actions to be taken in the event aircraft are forced down. The operations are coordinated with the Joint Rescue Coordination Center (JRCC) and will include provisions for immediate CSAR support. Downed crewmembers who are not immediately recovered proceed to preplanned pickup points or follow unit escape and evasion plans. Any subsequent effort to recover crews deep in enemy territory will require detailed planning and Air Force support. A mission of this magnitude will be planned and coordinated by the JRCC.

The CSAR mission concept and the introduction of the personnel locator system will increase joint service cooperation. The Army also has been invited to become a full-time member of the U.S. delegation to the NATO Search and Rescue Working party. This working party meets routinely at NATO headquarters to discuss SAR issues within the alliance. Representation of the Army on the delegation will greatly improve allied cooperation to effect smooth and timely rescue of aircrews.

The Army is well aware of the high cost in terms of money and time to train aviation personnel and is keenly aware of the limited number of available combat aircrews. Therefore, the Army is moving quickly to ensure procedures and equipment are introduced that will permit expeditious recovery of crews should they be shot down or forced down during a conflict. The Aviation Center CSAR mission concept, together with the PLS, is the first step in the process to develop procedures and equipment that will be effective and compatible with the CSAR activities of other U.S. services and NATO allies. Once these are perfected, Army aviators will conduct intense, demanding combat operations with the added confidence that the Army has effective methods of rapid recovery should that become necessary.

REPORTING FINAL

Late News From Army Aviation Activities

AH-64 Apache prototype.

photo courtesy of Hughes

FROM FORT RUCKER

Publications Division. As part of the School Model '83 reorganization, the Training Literature Division, Directorate of Training Developments, is now the Publications Division, Directorate of Training and Doctrine. Two main functions of the division will be to review nonproponent literature and to manage the USAAVNC portion of the Armywide Doctrine and Training Literature System.

Write or call this office if you have any questions or thoughts concerning the aviation literature program: Commander, U.S. Army Aviation Center, ATTN: ATZQ-TD-P-PM, Ft. Rucker, AL 36362; AUTOVON 558-3801/7120.

FROM VIRGINIA

Aviation Logistics School Established. The Army's Aviation Logistics School has been established at Ft. Eustis, VA, with 1 October having been the implementation date.

The school's inauguration is a major feature in the birth of the Army Aviation Branch which takes its place in the combat arms alongside Armor, Infantry and Artillery.

The Aviation Logistics School's commandant is MG Aaron L. Lilley Jr., also commandant of the U.S. Army Transportation School and Ft. Eustis commander. He and MG Bobby J. Maddox, Aviation Branch chief, developed plans for the school. It received the indorsement of GEN William R. Richardson, Army Training and Doctrine Command Commander, in late July.

FROM ARIZONA

An Apache Milestone. The first of a projected 515 AH-64 Apache advanced attack helicopters came off the production line at Hughes Helicopters Inc. Apache Assembly and Flight Test Center in Mesa on 30 September.

The Apache, whose primary mission is to destroy enemy armor, made its debut in a ceremony jointly sponsored by the Army and Hughes Helicopters. It is scheduled to begin ground acceptance testing immediately after making its first flight in December.

A total of 59 production Apaches are under contract, and Congress recently authorized another 112 for fiscal year 1984. The Army plans to purchase a total of 515 AH-64s.

FROM FLORIDA

HELLFIRE Missile Contract. Martin Marietta Orlando Aerospace has been awarded the second increment of a contract for HELLFIRE laser-guided missile production by U.S. Army Missile Command. The production contract, which totals $96.6 million, covers 947 missiles and more than 2,000 laser-seeker sections, plus 18 training missiles.

Orlando has been producing HELLFIRE seekers for several years, while Rockwell International has been prime contractor for the missile. This new contract makes Orlando a second source for production of a percentage of the missiles under the Army's "dual-source" concept.

HELLFIRE was developed as an air-to-surface missile and the primary antitank weapon for the AH-64 Apache helicopter.

photo by Yvonne Lugo

Safety Award. MAJ William R. Fesler, left, commander of Combat Skills Branch I, Lowe Division, Ft. Rucker, AL, receives the Daedalian Army Aviation Flight Safety Award 17 September from Air Force COL Richard E. O'Grady, a member of the Order of Daedalians and also the commander of the Squadron Officers School, Maxwell Air Force Base, Montgomery, AL. The branch won the award for attaining the record of 31,420 training flight hours during fiscal year 1982 with a Class "A" and "B" mishap rate of "O" and a Class "C" mishap rate of 3.2 per 100,000 flying hours. The C rate was the result of one mishap costing $690. This is the third year since 1970 the unit has won this award.

Staff Sergeant Janet Garofalo
Headquarters and Headquarters Company
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Controlled Substances That Can Kill You

THE SOVIET UNION is better prepared than any other nation to engage in nuclear, biological and chemical (NBC) warfare. They have developed *and are using* a wide range of detection, protection, decontamination and delivery equipment. Soviet training concentrates on realistic field exercises using live chemical and radiological agents. The Soviet soldier is required to wear protective masks and clothing for several days at a time. Soviet decontamination techniques are practiced in actual contaminated situations. Repetitive training enables the Soviet soldier to achieve overall preparedness for combat operations in a contaminated environment. A well-trained soldier can survive and use an NBC environment to his advantage. Following Soviet principle, an initial massive nuclear and/or toxic chemical strike in great depth is viewed as a means of gaining surprise—achieving a major breakthrough into enemy defenses.

The Soviets have an extensive *capability* for NBC operations. There are about 80,000 to 100,000 full-time NBC defense personnel in their ground forces, with an estimated 700,000 tons of chemical warfare (CW) agents, and an undetermined large amount of nuclear warheads. Along with these capabilities, they also are well *organized* to conduct operations in NBC environments.

Chemical defense units are organic at each level from *front* to regiment.

- Chemical defense brigade at *front* level.
- Chemical defense battalion at Army level.
- Chemical defense battalion at division level.
- Chemical defense company at regiment level.

Chemical defense troop duties include NBC reconnaissance, detection, location and marking of contaminated areas; conducting full-scale personnel,equipment and terrain decontamination; and assisting subordinate units in training troops in NBC defensive measures.

Soviet chemical defense troops are an important part of combat operations. To keep the fast pace on the battlefield both in offense and defense, the Soviets have an extensive inventory of NBC equipment. Generally, the equipment is of simple design, rugged and effective (figure 1).

The Soviets are aware of NBC equipment limitations. They are attempting to develop collective protection systems which can protect beyond these limitations. Several of these systems are noted as carrying

EQUIPMENT	CHARACTERISTICS AND CAPABILITIES
Truck-mounted, mobile decontamination system, TMS-65	Can decontaminate vehicles in the field by spraying decontaminating agents through jet exhaust mounted on a swivel base on a truck chassis. It can treat a tank in about 3 minutes.
Truck-mounted decontamination system, ARS-124	Consists of a large tank on a truck chassis, with hoses, brushes, and special-purpose nozzles. One filling of the 680-gallon tank can decontaminate about 12 tanks. The ARS-124 is the basic equipment for chemical defense battalions in motorized rifle and tank divisions. The newer ARS-14, with a larger tank on a heavier truck, is replacing the ARS-124.
Truck-mounted, steam cleaning system, DDA-53	Used for decontamination of clothing, small areas and light equipment.
CBR detector set, VPKLR	Has a shoulder strap and is operated while worn. It can detect conventional chemical agents as well as nerve agents. It is the standard Soviet portable CBR system.
Protective mask, ShM-1	The standard Soviet protective mask. It consists of a separate facepiece, hose and canister. The strapless facepiece covers the entire head. It is uncomfortable in hot weather and lacks voice transmission, corrective lenses, and eating/drinking openings. The ShM-1 does allow the wearer to change canisters rapidly, and the hose attachment contains a double-outlet valve to reduce back breathing.

FIGURE 1: Chemical, biological and radiological equipment.

overpressurized capabilities linked with known air filter systems. Such examples are in their tanks, combat vehicles and combat support vehicles. Both the T-64 and T-72 tanks are equipped with the PAZ system, an automatic system which detects radiation and, at a predetermined level, automatically closes selected openings (not hatches). Also, a centrifugal particulate filter expels solid particulate matter from the air before it enters the tank. This same centrifugal filter also pressurizes the vehicle to provide a chemical and biological protection system. Considerable eivdence indicates these tanks have been equipped with a collective system. Along with the pressurization, each crewmember has his own individual mask and protection suit. The soldiers practice donning these while inside a buttoned-up tank.

The Soviets rely on systems with multiple capabilities to employ nuclear, chemical and conventional munitions. When tactical nuclear weapons are employed, chemical weapons may be used as follow-up weapons. Principle bulk dissemination is from aircraft and simple design munitions. Aircraft, to include helicopters, would be used to spray or disperse agents at any designated battlefield position.

Examples of systems capable of delivering chemical munitions on the battlefield include: 240 mm mortar with ranges of 800 to 9,700 meters; 122 mm, 152 mm and 203 mm howitzers with ranges of 15,000 to 24,000 meters; 122 mm, 140 mm and 240 mm multiple rocket launches with ranges of 400 to 40,000 meters, dispersing anywhere from 306 to 720 rounds within 1 minute or less and requiring a reload time of 3 minutes. The larger tactical rockets such as the FROG-7 deliver munitions 70 kilometers and SCUDs deliver up to 300 kilometers with their follow-ons expected to have improved ranges.

All of these systems are capable of delivering the Soviet inventory of CW agents. The agents believed to be in the Soviet inventory are listed in figure 2 to include nerve, blood, choking and blistering agents in vapor, aerosol and liquid forms.

Nerve agents are the fastest acting chemical agents. Small doses can put personnel out of action for periods lasting from days to weeks. Fatal doses consist of only 2 to 10 milligrams. V-series agents are quicker acting and more persistent than the G-series nerve agents.

Blister agents disable or kill by contact with skin and eyes, resulting in extensive and painful blistering. If these agents are inhaled, they are especially lethal. Mustard is primarily a blister agent and is sometimes used in combination with lewisite to produce long-term contamination. If mustard is inhaled, it can affect the throat and lungs or cause damage to the eyes.

Blood agents cause general poisoning of the bloodstream through lung absorption and delayed poisoning through skin absorption. Blood agents are not as toxic as nerve agents, and high concentrations are needed to produce fatalities. The Soviets can produce these high concentrations through multiple rocket launcher systems. Blood agents have the advantage of clearing the target area rapidly to allow occupation by enemy troops.

Choking agents attack the respiratory organs. Death from this type of agent can be caused by asphyxia.

Type of Agent	Symbol	Persistence	Rate of Action	Symptoms
Irritant	CN CS DM/Adamsite CA	Minutes	Rapid	Tears, irritates skin and respiratory tract. Incapacitates, nonlethal.
Incapacitating	BZ	Some minutes	Delayed acting 1 to 4 hours	Dizziness, vomitting, blurred vision, stupor, temporarily incapacitates.
Nerve	G-series GS/Tabun GB/Sarin GD/Soman V-series VX VR-55	 Some days Hours Hours Hours Hours	Very rapid inhaled, slow through skin Delayed through skin, more rapid through eyes	Difficult breathing, vomiting, convulsions, asphyxia, death. Incapacitates, kills if high concentration inhaled, skin not decontaminated—kills.
Choking	CG DP	Hours	Immediate to 3 hours	Coughing, choking. Damages and floods lungs.
Blood	AC CK	Clears area rapidly	Rapid	Convulsions and coma, incapacitates; kills if high concentration is inhaled.
Blister	Hd/mustard L/Lewisite HL/mustard Lewisite	Hours/days	Blister delayed hours to days; eye effects more rapid HL very rapid	Blisters on skin; destructive to respiratory tract HL highly toxic if inhaled.

FIGURE 2

Irritants are primarily used for riot control. These agents produce a strong burning sensation in the eyes, mouth and respiratory tract. Tear gas is the best known irritant. The effects of all irritants are temporary.

Chemical agents are also classified by the Soviets according to their persistence. *Persistency* can be affected by many environmental conditions:

Mountain operations must take into consideration wind, mountain wind and inversion; these all enhance downwind coverage. Generally, cool daytime temperatures without winds slow evaporation and allow contamination to remain. Snow deposits on top of a contaminated area increase hazard duration. At high altitudes, however, the sun, which destroys agents, reduces contamination.

In desert terrain, the relative flatness and lack of vegetation create a fairly even agent effect in all directions. The cool desert evenings are generally suited for NBC operations—the air is more stable at this time. During the hot afternoons, some agents are killed by extreme temperatures. Distribution patterns during the afternoon winds are also affected. Hot temperatures cause more perspiration which, in turn, increases the effects of some agents on body exposure. Use of protective equipment and clothing is also limited to short periods for fear of heat illness and dehydration.

Persistency of an agent can also be enhanced by adding a plasticizer, called agent thickening. Thickening changes the agent from a waterlike substance to one similar to molasses. This process reduces evaporation, makes decontamination difficult and possibly prolongs storage time of the thickened agent.

The Soviets possess and have developed antidotes for North Atlantic Treaty Organization (NATO) agents as well as their own agents. One in particular is an antidote for soman, an agent they possess but which is not in the U.S. inventory.

Increasing evidence shows Soviet use of chemical agents in Afghanistan and Southeast Asia. "For the period from the summer of 1979 until the summer of 1981, the United States Government received reports of 47 separate toxic agent attacks with a death toll of more than 3,000. More recent evidence indicates that the Soviets have continued the selective use of toxic agents in Afghanistan. A variety of agents and delivery systems has been used. Fixed wing aircraft and helicopters usually are employed to disseminate agents in rockets, bombs and sprays. Land mines containing toxic agents also have been reported. The toxic agent clouds are most commonly described as gray or blue-black, but clouds of yellow or a combination of colors also are reported."

The Soviets are taking NBC warfare seriously. Although not much is known on exact production levels or stock NBC equipment and munitions, the evidence points to an extensive program. Stockpiles of chemical agents exceed those available to NATO and are sufficient to sustain large-scale use.

NUCLEAR
BIOLOGICAL
CHEMICAL

Aviation Performance Assessment in a CHemical Environment

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APACHE

Consistent with reassessment of U.S. NBC capabilities, the 1978 U.S. Army Aviation Program Review initiated tasking to determine "where we are and where we need to go." It was recognized that NBC protective equipment designed for use by aircrews and aviation ground support personnel has not been adequately evaluated to determine its acceptability, compatability with aircraft and ground support systems, and effects on overall systems operations and personnel performance.

THE STATUS OF existing doctrine, tactics, force structure, training of aircrews and current equipment that is being developed relevant to Army Aviation's ability to function effectively in a chemical environment is questionable. As a result of the 1978 Army Aviation Program Review, an Independent Evaluation Plan for Aviation Performance Assessment in a Chemical Environment (APACHE) was drafted. The test issues are consistent with the U.S. Army Forces Command's and the U.S. Army Training and Doctrine Command's goal that "all soldiers should train and be able to effectively operate in a chemical protective ensemble for 6 continuous hours." This minimum standard must be met if we are to survive on a dirty battlefield.

During the fall of 1982, the U.S. Army Combat Developments Experimentation Command (USACDEC), at the request of the U.S. Army Aviation Center, conducted APACHE at Ft.

Hunter Liggett, CA. The test produced data to assess the degree of degradation, if any, in attack helicopter team performance attributed to the conduct of extended combat operations while wearing the chemical/biological protective ensemble (see photo at left).

The results of this force development test and experimentation will be used by the Army Aviation Center, Army Chemical School, Army Human Engineering Laboratory and Army Materiel Systems Analysis Agency to support assessment of aviation chemical operations, to assist in development of doctrine and to make force development recommendations.

The APACHE test consisted of Phase I—Training, Familiarization, and Exploratory Trials; and Phase II—Attack Helicopter Test (AHT) Tactical Operations.

During Phase I each AHT player-set (made up of two AH-1 Cobra pilots and one OH-58 Kiowa pilot) received 1 week of initial training and equipment familiarization at their parent unit, D Company, 7th Combat Aviation Battalion, where they performed typical combat tasks wearing mission oriented protective posture (MOPP) level 4 equipment. The training, accomplished while wearing the complete MOPP 4 ensemble, is listed in figure 1.

FIGURE 1: MOPP level 4 training.

Plan terrain flight mission

Perform preflight inspection and before takeoff checks

Perform takeoff

Perform NOE flight and navigation

Perform target acquisition and engagement

Perform approach and landing

Perform tactical communications

Perform weapons cockpit procedures

Perform post flight

The players conducted a minimum of three separate flights in which each task was performed at least once. Each player had at least 6 hours of flight time conducting these tasks. They received an additional week of training and equipment familiarization with the test directorate at Ft. Hunter Liggett, 85 miles south of Ft. Ord, CA. During this week they received instruction on conduct of the APACHE test by test directorate personnel; they also had additional flight training in MOPP 4 through three training flights consisting of 3 hours, 5 hours and 6 hours successively. These times include mission planning and preflight time; therefore, time in the cockpit wearing MOPP 4 was about 2, 4 and 5 hours, respectively. During this phase of training they also conducted tactical and mission tasks as shown in figure 1.

Phase II involved 15 record trial days, each covering a 6-hour sequence which started when the player pilots donned their masks just prior to receiving an operations briefing from a test controller who was also attired in MOPP 4. The trials broke out to 60 percent in MOPP and 40 percent in standard flight gear, the baseline configuration. The AHT was made up of two AH-1S Cobras and one Kiowa. Each crew consisted of a player pilot and an instructor pilot (IP). The Aviation Center supplied the instructor pilots who flew in the back seat of the Cobras and the left seat of the Kiowa. The IPs functioned as crewmembers, safety pilots, controllers and data collectors; they did not wear MOPP.

After the briefing, the players conducted their terrain flight mission planning, then moved out to the flight line to conduct their aircraft preflight inspections. Most of them described this as the most uncomfortable part of the test because of heat build-up inside the suit.

The rubber gloves also posed a handicap to making a proper inspection because of their bulkiness. Following run-up and instrumentation checks they began the battlefield movement sequence, navigating low level, contour and nap-of-the-earth routes to the battle area.

In the battle area the AHT went to work, with the scout acquiring and handing off threat armor targets to both attack helicopters. After acquisition by the Cobras, the targets were engaged using a low power laser to simulate tube-launched, optically-tracked, wire-guided (TOW) missile firing. The targets were equipped with laser sensors to give hit indications. The attack sequence consisted of from 8 to 12 target engagements by each Cobra.

When the sequence was complete the AHT returned to the forward arming and refueling point (FARP). This involved about a 25-minute stop for hot refueling, completion of data questions, instrumentation check and latrine stop if necessary. The AHT then returned to the battle area on a modified navigation course to begin a second engagement sequence of from 8 to 12 targets. After a second stop at the FARP, a third engagement sequence was begun. The 6-hour time limit was usually achieved toward the end of this sequence when the players unmasked and the AHT returned to the heliport.

The threat force consisted of 12 armored vehicles, 8 tanks (M60Al's simulating T72s), and 4 APCs (simulating BMPs and a ZSU-23-4). Each player pilot was allowed 30 seconds to detect targets located from 1,000 to 3,000 meters from the 12 designated firing positions.

Each firing position and target was sited so that only one target could be seen from a particular firing position, and target locations were changed between engagement sequences. If a particular target could not be detected within 30 seconds, that fact was noted and the targets were cued (using gun

simualtors) so the players could detect them. This was done because data had to be gathered from the TOW engagement event.

Throughout the test, a sophisticated instrumentation system monitored and recorded events as they occurred. The CDEC range measurement system (RMS), continuously monitored each player's location and movement and provided a second-by-second record of significant activities during each trial.

Controllers monitored print-outs and observed test progress via the visual information display system which converts computer inputs to a full-color, video game-type display with tank and helicopter symbols and digitized contour lines. Real-time casualty assessment was accomplished by using lasers to simulate gun or missile fire and laser sensors on target vehicles to detect hits and position data from the RMS. Videotape machines in the helicopters recorded gunner's sight pictures, cockpit conversations and radio communications for post trial playback and analysis. During all phases of the test, qualified data collectors recorded the AHT performance in the conduct of combat missions with and without MOPP 4 equipment.

The questions below were asked of the pilots and IPs who participated in the APACHE experiment. The responses to these questions should be of interest to field commanders concerning their MOPP 4 training programs.

Question 1: How many hours wearing MOPP 4 do you feel it took to become proficient conducting mission tasks in the aircraft and normal tasks out of the aircraft, i.e. preflight, mission planning?

Response: One player indicated that after 2 hours in the aircraft and 2 hours performing other tasks, he felt proficient; another player indicated that he did not feel comfortable until achieving 10 hours in the aircraft and 6 hours performing other tasks. The mean for all players was 11.8 hours performing tasks both in and out of the aircraft before they felt proficient.

Question 2: How many hours wearing MOPP 4 did it take before you felt comfortable in the suit and mask?

Response: One player indicated that 3 hours were sufficient for him while another stated that it took him 20 hours to feel comfortable. The mean for all players was 10.7 hours wearing MOPP 4 before they felt comfortable.

Question 3: What is your recommendation for required training of aviators who have not previously worn and trained in MOPP 4?

Response: One player indicated that 8 hours performing tasks in the aircraft and 4 hours performing other tasks for a total of 12 hours in MOPP 4 over a 12-month training period would be sufficient, while another player stated that 34 hours in aircraft and 10 hours performing other tasks for a total of 44 hours in MOPP 4 over a 12-month training period should be required. The mean for all players was 18.0 hours performing tasks in the aircraft, 6.3 hours performing other tasks for a total of 24.3 hours of MOPP 4 training within a 12-month period.

Question 4: What were your training hours in MOPP 4 prior to beginning record trials?

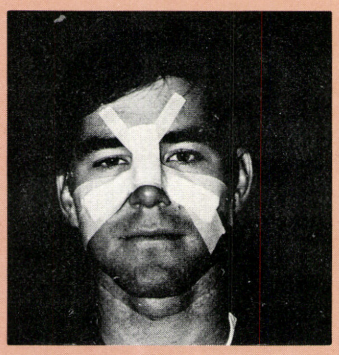
Response: One player had 21 hours of MOPP 4 training while another had 50 hours of MOPP 4 training with the mean for all players being 32.4 hours of MOPP 4 training (22.4 hours in aircraft and 10 hours performing other tasks) before beginning record trials.

The time, wearing MOPP 4 for all players, Phase I and Phase II is shown in figure 2.

Some of the recommendations made by the player pilots and instructor pilots on developing training programs that will allow aviators to wear MOPP 4 for 6 consecutive hours follow:

- Proper fitting and comfort of the mask is of most importance. What may be an irritation after 30 minutes will feel like a spike in the skull after 3 hours; therefore, begin with wearing the mask and helmet for a minimum of 3 consecutive hours so that hot spots can be identified and adjustments made to the mask and/or helmet.
- Care and maintenance of the MOPP 4 ensemble becomes extremely important with increased use. Pilots must be thoroughly trained to perform inspections and to care for their MOPP equipment. We cannot afford to lose aircrews because they are improperly trained with regard to inspection and maintenance of their MOPP 4 equipment.
- To achieve proficiency and confidence in performing mission tasks both in and out of the aircraft, MOPP 4 training must be concentrated over a short period, i.e. 10 to 14 hours over a 10- to 14-day period. Then, to maintain proficiency, MOPP 4 training must be conducted at regular intervals. It will be virtually impossible to feel comfortable and maintain proficiency without conducting training at regular intervals.
- Aviators should be given an introduction to MOPP 4 flight during intial entry flight training while in the tactics phase. This early exposure to MOPP 4 training should lessen the anxiety about wearing it for extended periods.

The Aviation Center at Ft. Rucker, AL, began analyzing the data from the test during the 4th quarter fiscal year 1983 and will formally publish the final results. It is not the intent of this article to suggest what the data analysis and final report will indicate. Rather, it is a composite of subjective appraisals from those aviators who participated in the test and from the test directorate, who closely monitored every aspect of the test. The intent is to provide an overview of test activity in a very key area of aviation operations.

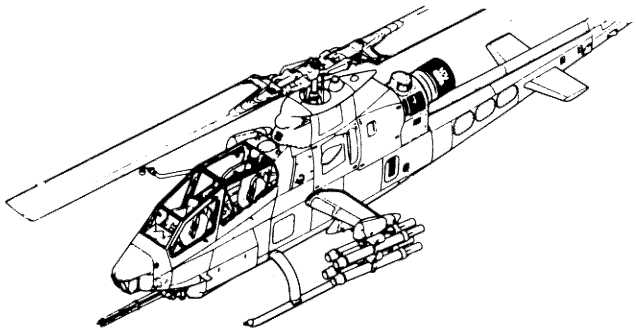


TOP LEFT: Pilot performing preflight on AH-1S. Preflight activities proved to be most stressful because of the increase in body motion. MIDDLE LEFT: Copilot/gunner sighting through the TSU. With increased use the face lens of the mask became distorted and scratched. The TSU flags cannot be seen requiring the use of the pilot's attack flags. BOTTOM LEFT: With MOPP equipment, survival vest and body armor on, entering and exiting the aircraft was a difficult task. Equipment tended to snag on switches and knobs. TOP RIGHT: LT Sullivan, one of the scout pilots during the APACHE test, demonstrates the padding that was used on the face of some pilots to ease the pressure from the mask. Comfort is of most importance when wearing the mask for 6 consecutive hours. About half the pilots had to use gauze to pad face and head to eliminate hot spots created by the mask. MIDDLE RIGHT: Padding was also used under the strap buckles to eliminate hot spots and to ensure comfort. BOTTOM RIGHT: APACHE AH-1S instructor pilot CW3 John Harris demonstrates the Microclimatic Vest. Originally designed for tank crewmembers, this version was used during a 4-hour period on the APACHE test. The pump/cooling unit circulates cool water through the vest. The temperature can be regulated by the pilot.

FIGURE 2

	MIN	MAX	MEAN
Time in aircraft:	25	64	39.0
Time performing other tasks:	8	22	14.0

AH-1S (MC) Integrated Troubleshooting Manual



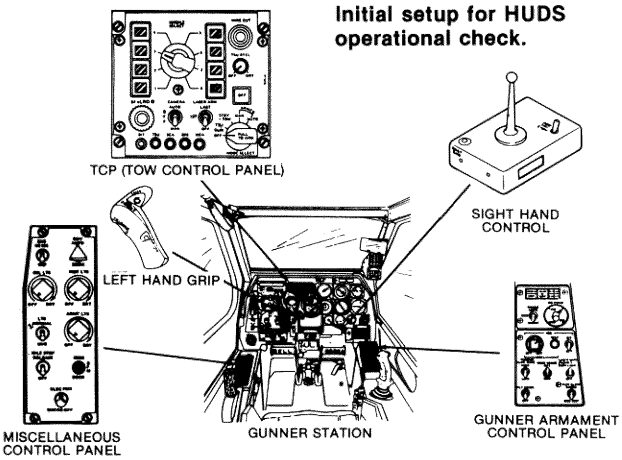
Mr. William Sparacino and Mr. Carroll G. McCosh

THE LONG AWAITED Modernized Cobra (MC) Weapons System Integrated Troubleshooting Manual (ITM) has been distributed to Army attack helicopter units. It is a 4-volume, 1,800-page document consisting of 10 chapters:

- Introduction
- Rocket Management System
- Tube-Launched, Optically-Tracked, Wire-Guided (TOW) Missile System
- Universal Turret
- Heads Up Display
- Air Data Subsystem
- Fire Control Computer
- Jettison System
- Power Distribution
- Helmet Sight Subsystem

The manual features operational checklists, failure symptoms, decision tree logic, schematics and illustrations that enable armament repair people to isolate and make necessary repairs to the armament and fire control systems of the AH-1S (MC) Cobra.

Prior to the development of the ITM, the weapons subsystems that were linked together throughout the helicopter with wires, connectors, terminal boards, avionics and airframe components had separate troubleshooting procedures in each supporting maintenance manual. Missile, rocket, cannon or fire control problems induced by other systems could not be readily detected and repairs could not be made using the separate publications.



Initial setup for HUDS operational check.

The Project Manager, Cobra contracted with Bell Helicopter Textron, Inc., to develop a simple but technically accurate document that would tie together the operation and interrelationship of airframe wiring, avionics and weapons subsystems. A team of more than 35 persons including representatives from Bell, General Electric, Hughes Aircraft and the Army worked together for about 18 months to develop the ITM.

Each chapter required the formulation of probable faults, drawing reviews, format, language development, illustration, contractor validation and complete verification by Army armament and missile repair people from Ft. Eustis, VA.

The resultant ITM provides a capability to troubleshoot interface problems between each of the weapons subsystems and helicopter wiring. Using the manual, maintenance crewmembers perform an operations check until a fault is encountered. The list of faults—called Maintenance Action Precise Symptoms (MAPS)—guides the crew to the appropriate decision logic tree where the fault can be isolated and repairs made.

The ITM is the backbone of Modernized Cobra troubleshooting. It will eliminate much of the guesswork in locating the problems within the weapons subsystem, reduce downtime and controlled substitution and eliminate unnecessary return of serviceable line replaceable units.

The ITM is an Army first for a complex airborne integrated weapons platform. Troop acceptance and initial success indicate that supply pipeline costs should be reduced and Modernized Cobra fleet readiness will improve.

ABOUT THE AUTHORS

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U.S. Army Communications Command
ATC ACTION LINE

Controllers' Phraseology Is The Key

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THE USE OF excessive, improper or incomplete phraseology can place you in a compromising position by directly involving you in an operational hazard report (OHR). Beyond that however, it represents a very real and direct threat to the safety of the people using the air traffic system. Improper phraseology by controllers also encourages pilots to adopt a similar pattern of communication which further increases the potential for misunderstanding. The following are examples in which improper or incomplete phraseology could be a definite factor contributing to an OHR or worse.

Improper phraseology during intra/interfacility coordination could be the cause of an incident. For example, approach control calls the tower and advises there are two aircraft on approach. These aircraft are different types with the same last three numbers in the call sign. A short time later, a departure aircraft requests clearance for takeoff. Weather conditions prevent visual sighting of arriving aircraft, and the tower does not have radar. Before releasing the departure, the controller in the tower requests the position of 438 from approach control. The first 438 is on short final. The approach controller thinks the tower controller means the second 438, and states the aircraft is still outside the marker. The departure is cleared for takeoff and a situation develops whereby a controller's career could be ruined by an OHR. You can imagine what else could happen.

Similar sounding numbers continue to be a problem. When controlling aircraft under these circumstances, the importance of using proper phraseology cannot be overstated. Don't let the pilot's improper/incomplete phraseology lead you into a trap.

Clearing an aircraft to taxi for departure has been a potential for generating an OHR. Envision an aircraft taxiing to the departure runway. Suddenly the pilot indicates the aircraft must return to the terminal and requests clearance "around the horn." If cleared around the horn this pilot would probably accept this as a clearance back to the starting point, across active runways where aircraft are preparing for departure or landing. Around the horn could mean one thing to the pilot and something else to the ground controller. This message is clear: *Do not use or encourage homespun phraseology or slang expressions.* Eliminate terms which may lead to misunderstanding or confusion. If there is a possibility of your phraseology being misunderstood by the pilot, clarify—don't *hope* the pilot understood. Pilots should also request clarification when there is doubt of what the instruction is. The use of clear taxi instructions is a must to get the pilot off on a good flight.

What can you do to improve your performance? Phraseology/communication improvement should be a regular agenda item at air traffic control/facility chiefs' meetings. A group discussion on the subject led by the chief after listening to tapes provides an avenue for constructive criticism. Controllers monitoring each other on the job also helps. Poor phraseology has been the end for numerous pilots and controllers. As a controller, would you want someone's end on your conscience? As a pilot, would you want to risk your own neck? Good phraseology helps to ensure your life and the lives of others!

Readers are encouraged to address matters concerning air traffic control to:
Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22314

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RAM/LOG Documents Black Hawk Improvement

Mr. Don Hubler

Mr. Don Hubler started to work for the government in 1976 as an AMEDA Intern. He is a general engineer in the Product Assurance Branch, Systems Assessment Division, TSARCOM. He is involved with the SDC reliability, availability, maintainability and logistics programs on the Black Hawk and other systems.

THE RELIABILITY, availability, maintainability and logistics (RAM/LOG) is a sample data collection system that is comprehensive and fully controlled. This means RAM/LOG uses knowledgeable, dedicated data collectors to collect the aviation maintenance and mission data. By computer, this data is edited for accuracy, and output as reports. These reports allow trend analysis, and one such analysis indicated a UH-60 Black Hawk mission problem.

The Black Hawk was not meeting its mission reliability requirement as specified in its Materiel Need (MN) document. The RAM/LOG data collection system documented the fact that there were too many Black Hawk mission aborts.

The Black Hawk has a long history of RAM/LOG data collection starting in 1976 and ending in April 1983. It was the first aircraft system developed by the Army under a full-scale RAM development program.

At the time that the Black Hawk mission reliability problem surfaced, RAM/LOG was on the spot. At the 2/17 Cav at Ft. Campbell, KY, the RAM/LOG team chief noticed while analyzing the RAM/LOG data, that many mission aborts were generated by equipment failures discovered during the preflight inspection. As a result, he recommended a change in maintenance procedure to catch these equipment failures before they caused mission aborts. This, of course, would improve the Black Hawk mission reliability. Specifically, the RAM/LOG team chief recommended that after the crewchief made his routine inspection of the aircraft every 10 flight hours or 7 calendar days (10-hour/7-day inspection), he should then start up the engines and run them for 15 minutes, observing the operation for irregularities. This additional operational check, the RAM/LOG team chief reasoned, would catch many of the equipment problems before a scheduled flight, allowing repairs and thereby preventing mission aborts.

The Black Hawk Project Manager authorized a limited trial of the change in the maintenance procedure. On five fourth-year production Black Hawks, the additional runup inspection was performed from 15 June 1982 through 28 February 1983, and RAM/LOG captured the data.

The resulting data on these five aircraft was compared to data on the same aircraft taken over a similar length of time during which the runup inspection was not made. The comparison showed a 50 percent reduction in mission aborts caused by equipment failures discovered during preflight inspections. This results in only a slight growth in mission reliability since this represents only one of several mission abort categories. Although this improvement alone does not completely resolve meeting the MN reliability requirement, it does show positive progress. However, RAM/LOG data indicated that during the trial period, the scheduled maintenance man-hour per flight hour requirement stipulated in the MN was exceeded.

What does RAM/LOG performance in this situation tell us about the systems' capabilities? As in this case, RAM/LOG data can identify adverse trends and, combined with team leader experience, can suggest solutions to problems. The controls on the data collection allow computations with considerable accuracy and also provide timely response. These computations help RAM/LOG to evaluate the suggested solution during trial implementation.