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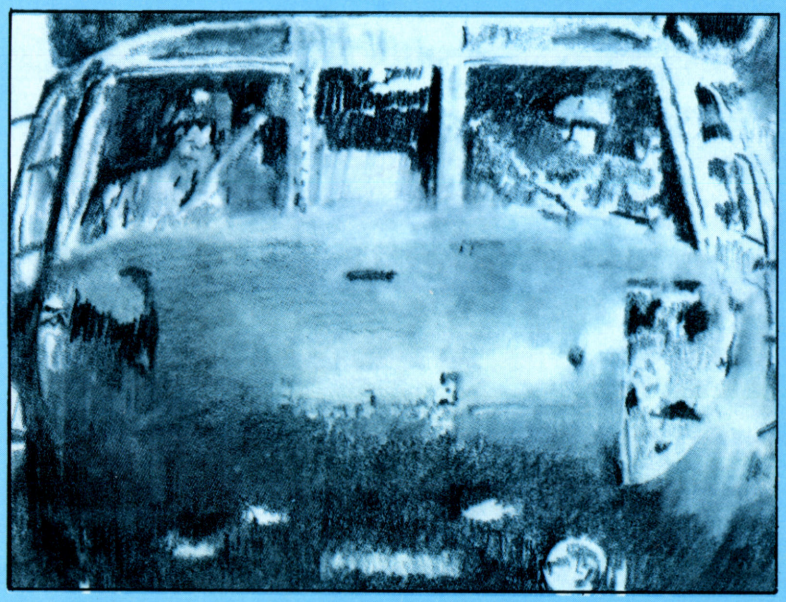
FEBRUARY 1986

# AVIATION DIGEST

CPT BRUNE

# FLIGHT SAFETY PARTS PROGRAM



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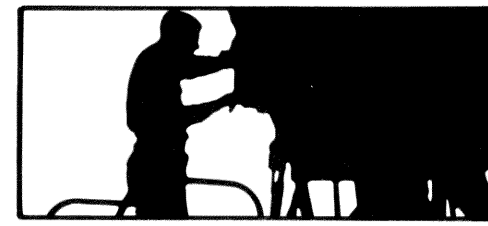
*Cover:* **This endeavor, initiated by Army Vice Chief of Staff, General Maxwell R. Thurman, promises to eventually embrace all Army aircraft. The purpose is to control to higher quality standards than ever before those aircraft parts critical for flight safety. The article begins on page 2.**



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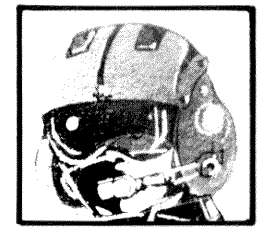

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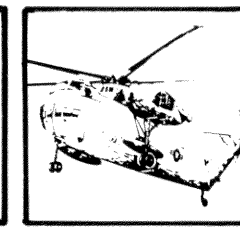

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The mission of the *U.S. Army Aviation Digest* (USPS 415-350) is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, Aviation medicine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

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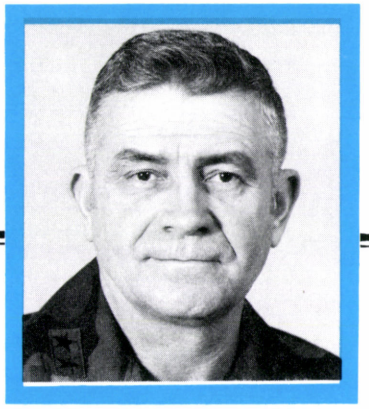
**Major General Ellis D. Parker**
Chief, Army Aviation Branch



## DYNAMICS OF AIRCREW COMMUNICATION

"To err is human, to forgive is divine."

Modern technology is producing aircraft for Army Aviation that are as close to divine as is mechanically possible. Technology cannot, however, surmount inherent human frailties such as pride, prejudice, inattention and poor judgment. Because of these human traits, we still manage to commit errors which our sophisticated aircraft aren't divine enough to forgive.

In 1984, human error accounted for 75 percent of Class A aviation accidents. In 1985, human error was responsible for 78 percent of all aviation accidents, 31 percent of which involved willful violations of established procedures by aircrews.

Since human error caused these accidents, it is logical to conclude that the most effective cure also must be human in origin. History consistently shows the major human breakdown causing accidents to be poor communication and coordination between aircrewmembers. If we are to eliminate human error accidents, we must preclude these failures. Dynamics of Aircrew Communication and Coordination (DACC), a class newly instituted at Ft. Rucker, AL, is designed to increase the students' awareness of the factors of human error and to offer insights into potential means of resolution.

Teamwork is the objective. Teamwork is the basis for all mission accomplishments throughout the Army and involves all aspects of aviation. The essential elements of teamwork can be wrapped up in one word—synergy. Synergy is defined as the combination of two or more items providing an end element stronger than the individual items taken separately. In the case of aviation, the sum of crew effort provides higher assurance of safe mission accomplishment than is possible with a single pilot or a nonsynergistic crew. Experience continues to demonstrate that through proper communications and coordination, aircrews can function at a more effective level to ensure mission accomplishment and reduction in human error related accidents.

Teamwork does not challenge command authority in the cockpit. There is still a pilot in command (PIC) responsible for the accomplishment of the mission and the safety of the aircraft and crew. Synergistic teamwork simply provides the information necessary for the PIC to make timely and effective decisions. In nearly all situations, 100 percent of the information needed to make the proper decision is available. The amount and quality of information reaching the PIC depends on the communication flow that he has established among all his crewmembers. This teamwork can be positively influenced by those who are not formally in charge, through an understanding of basic leader and follower traits.

Currently, DACC is being taught in a seminar format to all students in Initial Entry Rotary Wing, Instructor Pilot Courses, Aviation Advanced Officer Courses, Warrant Officer Advanced Courses and Pre-Command Courses at Ft. Rucker. Additionally, an exportable package recently has been provided to all Active, Reserve and National Guard aviation units worldwide. The exportable package is a stand-alone product that can be used for training in the aviation unit with no additional outside support.

Effective teamwork is essential in reducing the number of human error related accidents. The Aviation Branch will continue to be a leader in recognizing and promoting this effort throughout the combined arms team. Remember, you are part of the problem and you can be part of the fix. Reduction of human error accidents will require a commitment by the entire aviation chain of command and every individual aviator, crewmember and maintenance person. I need *your* involvement today.

Though safety always has been an issue of great concern for the military community, the Army and industry are now working together in this endeavor. This new safety and quality control program, established to select critical aircraft parts and ensure life cycle control of these parts for the helicopter and aerospace industry, is a joint effort to enhance all existing procedures and include all Army aircraft.

# FLIGHT SAFETY

**George R. Karas** is the UH-60 Black Hawk Deputy Program Manager for Safety and Technical Management at Sikorsky Aircraft. He has more than 25 years of engineering experience in the helicopter field.

**James A. Ray** is the Acting Deputy Director of Engineering at the U. S. Army Aviation Systems Command. He has been directly involved with Army Aviation for more than 16 years.

# PARTS PROGRAM

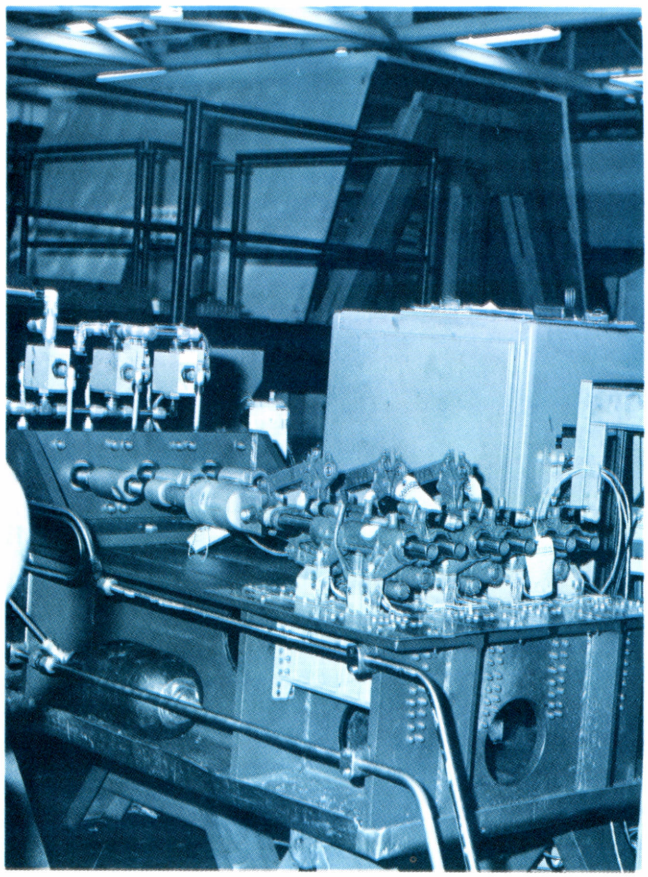
"WE CAN'T WAIT for an aircraft to crash and kill a lot of people to find out a part did not achieve its calculated service life."

With the above words, the U. S. Army's Vice Chief of Staff, General Maxwell R. Thurman, initiated what may well become a hallmark safety and quality control program for the helicopter and aerospace industry. Entitled the "Flight Safety Parts Program," it is an effort to enhance all existing procedures. A key feature of this program is that it is a *cooperative* Army-industry effort to provide *life cycle management* of aircraft parts whose integrity is essential to flight safety. The UH-60 Black Hawk is one of the Army's newest aircraft, and it was chosen to be the fleet leader to establish this program. All Army aircraft are being included, whether old or new, but the Black Hawk story will provide the background for all Army Aviation.

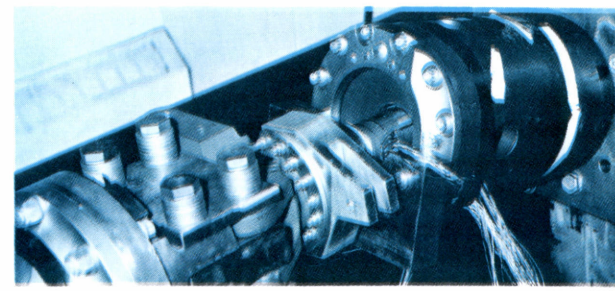
**Background.**

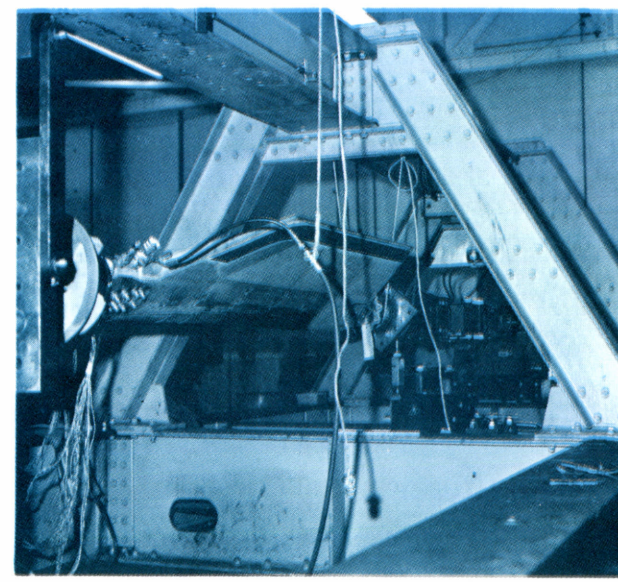
A Critical Parts Program, in existence since the early 1970s, has increased the quality control procedures for selected critical parts. Although a high level of quality control procedures has been and is continued for aviation parts, these selected *critical* parts were controlled to even higher standards. For these parts, specific critical characteristics were defined that were essential for part integrity and subsequently flight safety. These could be any feature, such as a dimension, finish, material, process, inspection, etc. which, if nonconforming, could cause failure of the part. The Black Hawk has

## UH-60 Black Hawk test equipment:



Main rotor servo actuator bridge fitting.





TOP: Main rotor spindle.
BOTTOM: Inboard section main rotor blade.

had such a program, but it was recognized that this procedure only ensured the quality integrity of the part during manufacturing.

An aircraft part is designed to meet requirements expected during operation. Detailed calculations are performed initially in the design, followed by testing the item as a part, a part of a system, and in aircraft operation; design and test efforts consider extremes of usage and environmental conditions to ensure verification for all known and expected operation. These procedures lead to the basis of airworthiness qualification of individual parts and the system.

The Black Hawk was subjected to the most extensive design analysis and test effort that both the Army and industry had ever conducted. However, actual usage of the Black Hawk could still vary from the actual design, and subsequent part integrity may be impacted by a degraded condition resulting from that use or environment.

Problems identified from the field through overhaul records, quality deficiency reports (QDRs), equipment improvement reports (EIRs), preliminary report of aircraft mishaps (PRAMs), test incident reports (TIRs), etc., still provide a valuable input to address product improvement and flight safety. However, no formal procedure has been in place to ensure that those critical characteristics verified during manufacturing, and those conditions used to provide the basis for design, are absolutely valid for everyday use. The need for a life cycle management procedure with continuous surveillance monitoring was thus determined as an improvement that would enhance overall safety and product improvement.

**Flight Safety Parts Definitions.**

To establish a program, definitions are essential to provide a common baseline. The definition for a flight safety part and its associated critical characteristics was adopted from the prior Critical Parts Program. These revised definitions are as follows:

• *A flight safety part* is any part, assembly or installation whose failure, malfunction or absence could cause loss or serious damage to the aircraft and/or serious injury or death to the occupants.

• *A critical characteristic* is any feature throughout the life cycle of a flight safety part which if non conforming, missing or degraded, could cause failure or malfunction of the flight safety parts. Critical characteristics include dimension, tolerance, finish, material or assembly, manufacturing and inspection processes. Life cycle covers manufacturing, operations, field maintenance and overhaul.

These definitions have been coordinated with industry as well as selection criteria guidelines—which consider redundancy, strength margins and sensitivities to manufacturing process variabilities—to ensure consistency in approach.

An important aspect of the subsequent identification of flight safety parts is that it is not a one time or static effort. The nature of the life cycle management approach will cause revision of the listing any time new information warrants a change. For the Black Hawk, the initial identification of flight safety parts amounts to 195 individual parts. This number will continue to vary as Black Hawk experience indicates any need for changes.

**Flight Safety Parts Program Implementation.**

Following identification of the flight safety parts a structured program is put into place to provide specific identification, inspections, monitoring, feedback, surveillance, etc., to ensure life cycle control of the parts. Revisions to drawings, manufacturing procedures, quality procedures, field manuals and overhaul manuals are required, as well as defined policy/regulations updated to cover the program. Additionally, overall management support is required for the Army and industry to cross all disciplines and to provide proper closed-loop feedback of information from all sources as it affects flight safety parts.

At Sikorsky Aircraft, a new position, Deputy Program Manager for Safety, has been established to provide this overall management of the Flight Safety Parts Program and other safety related functions that pertain to the Black Hawk. In-house reporting systems also are being expanded at Sikorsky to supplement the framework provided by the Flight Safety Parts Program. Sikorsky document revisions have been completed and Sikorsky has initiated a pilot program to verify and permit evaluation of the controls and procedures instituted for this program.

For this implementation at Sikorsky, there are several key elements that provide the controls for these parts. A summary of these follows:

• Critical characteristics are identified by the designers and annotated on the drawings.

• The planning documents, by which the parts are manufactured and quality inspected, are approved at a high level interdisciplinary board to ensure proper controls are in place to maintain the critical characteristics. Once approved, the procedures are "frozen" and cannot be changed, varied or waived. Only a formal change, again approved by the board, can constitute any change in procedure.

• All critical characteristics of the flight safety parts are to be inspected 100 percent by qualified inspectors for every part manufactured.

• No deviations from the drawing specification for critical characteristics are permitted. Any change of the critical characteristic would require resubstantiation of the part before a change could be considered.

• Manuals, including depot maintenance work requirements (DMWRs), are revised to properly annotate the critical characteristics. No repair or overhaul shall be permitted to deviate from the drawing specification for critical characteristics.

• Flight safety parts will be tracked for their entire life cycles. All records regarding initial fabrication and inspection are retained.

These internal Sikorsky elements apply to both in-house manufactured parts and those supplied by vendors. Alternate source supplies will be required to meet equivalent qualification requirements as well as all aspects of the Flight Safety Parts Program. For Army breakout for competition, alternate sources will be reviewed against the same criteria. Breakout sources will be maintained as controlled sources in lieu of full and open competition, except for simple cases where part manufacturing is not the critical characteristic and the controlling flight safety parts procedures in place will ensure that essential flight safety is maintained.

**Flight Safety Parts Surveillance Program.**

With a flight safety parts program implemented, a method to ensure that the parts are performing adequately in the real world aircraft environment must be in place. Waiting for an input from an EIR or PRAM may jeopardize flight safety because the information is after-the-fact. As such, a Flight Safety Parts Surveillance Program has been initiated to provide a proactive approach to identify any potential concern before it adversely impacts safety.

One aspect of surveillance is to provide better feedback from information

**Figure 1: Sample Flight Safety Parts Surveillance Program (UH-60A Rotor System Parts).**

| Nomenclature | No. Parts Configs | Qty A/C | Retirement Life Or Overhaul Interval (Hours) | Freq Removal (Hours) | | Sample Qty/Yr | Surveillance Program |
|---|---|---|---|---|---|---|---|
| | | | | Initial | Subq | | |
| M.R. Spindle Assy (with tie rod) | 4 | 4 | 1,400 (Life) (Interim) | 500 | 500 | 4 | Visual Teardown |
| | | | | 1,000 | N/A | 6 | Fatigue |
| | | | | N/A | New Prod Heat Lot | 4 | Fatigue |
| M.R. Spindle Tie Rod | 1 | 4 | 1,400 (Life) (Interim) | N/A | New Prod Heat Lot | 6 | Fatigue |
| M.R. Control Rod Assy | 2 | 4 | On Condition | 1,000 | 1,000 | 4 | Visual Teardown Fatigue |
| M.R. Swashplate Assy | 3 | 1 | On Condition | 1,500 | 1,500 | 2 | Visual Teardown Fatigue |
| M.R. Hub Assy | 1 | 1 | 1,400 (Life) (Interim) | 500 | 500 | 2 | Visual Teardown Fatigue |
| M.R. Blade Expandable Pin | 1 | 8 | 8,100 (Life) | 2,000 | 2,000 | 4 | Visual Teardown Fatigue |

systems already in place. A problem with relying on a single information entry, such as an EIR, is that trending information is not apparent. In this respect, a customer support integrated data base is being established with the Flight Safety Parts Surveillance Program so that all data relating to a flight safety part is at a single source. This is being established at the U. S. Army Aviation Systems Command (AVSCOM) and at Sikorsky. An alert system has been developed so that if information comes in concerning a flight safety part it is immediately "flagged" for special attention. Additionally, a Safety Analysis System is being developed by Sikorsky to analyze long-term tranding of the removal of flight safety parts. Based upon this analysis, the issues would be scrutinized if trending is adverse.

Also, the Army has now begun a more positive surveillance program. The lead effort was initiated by an AVSCOM contract awarded 18 December 1985 to Sikorsky for the Black Hawk program followed closely by a companion contract on 28 December with Boeing Vertol for the CH-47 Chinook aircraft system. Similar programs are in the process of being initiated for all other prime manufacturers/aircraft, which will provide a recurring review of new and fielded parts. The purpose of this program is to:

- Confirm the validity of requirements used during initial design and qualification of flight safety parts.
- Monitor the effects of usage on parts to demonstrate that replacement and overhaul intervals are adequate and safe relative to actual use.
- Continually assess new components to ensure that minor design and manufacturing changes do not affect flight safety parts in a detrimental manner.
- Confirm degraded mode limits or affects due to wear, corrosion, fretting, damage, etc.
- Ensure that repair procedures do not degrade the critical characteristics.
- Determine any previously unknown or known degraded condition impact on flight safety parts.

The surveillance program for the Black Hawk that has been initiated will provide for sampling all flight safety parts as an annual recurring effort. The recurring effort, along with the continual involvement of the part designer, will ensure that anomalies shown in operation can be directly assessed by the engineers most familiar with the part's capability.

**Figure 2: Sample Flight Safety Parts Surveillance Program (UH-60A Flight Controls System Parts).**

| Nomenclature | No. Parts Configs | Qty A/C | Retirement Life Or Overhaul Interval (Hours) | Freq Removal (Hours) | | Sample Qty/Yr | |
|---|---|---|---|---|---|---|---|
| | | | | Initial | Subq | | |
| Aft Support Assy | 2 | 1 | 12,000 (Life) | 2,500 | 1,000 | 3 | Teardown Analysis, Fatigue |
| Lateral Bellcrank Assy | 2 | 1 | 10,000 (Life) | 2,500 | 1,000 | 3 | Visual, Fatigue |
| Lateral Link Assy | 3 | 1 | 14,000 (Life) | 2,500 | 1,000 | 3 | Visual, Fatigue |
| Lateral M/R Servo Rod Assy | 2 | 1 | On Condition | 2,500 | 1,000 | 3 | Teardown Analysis, Fatigue |
| Aft Longitudinal Rod Assy | 2 | 1 | On Condition | 2,500 | 1,000 | 3 | Teardown Analysis, Fatigue |
| Aft M/R Servo Rod Assy | 2 | 1 | On Condition | 2,500 | 1,000 | 3 | Teardown Analysis, Fatigue |
| Fwd M/R Servo Rod Assy | 2 | 1 | On Condition | 2,500 | 1,000 | 3 | Teardown Analysis, Fatigue |
| Aft Tie Rod | 1 | 1 | 20,000 (Life) | 2,500 | 1,000 | 3 | Visual, Fatigue |

Figures 1 and 2 provide examples of the fiscal year 1986 program for some of the flight safety parts in the rotor system and the flight controls system. Numbers of samples are determined by prior history, concerns (such as low indicated life), and potential sensitivity to usage or environmental effects. Selection of samples is based on obtaining candidates for high time, those with degraded condition (such as, corroded or fretted condition); and some new parts where new source, new process, and/or low life is present. Sources for the used parts may come directly from a given fielded aircraft or chosen from parts returned for repair/overhaul. A specific surveillance program effort is identified for each of these chosen parts. Surveillance efforts include:

- Nondestructive inspection to include visual and measurement to determine condition, dimensions and material properties. Condition changes could include fretting, spalling, corrosion, handling/usage damage, cracks, etc.
- Acceptance test procedures would include procedures used for new or overhauled parts to verify the functional operating condition of used parts.
- Analytical teardown or detailed analysis to assess changes in critical characteristics, destructive cut-up for inspection or material properties tests, and detailed nondestructive inspection techniques such as radiographic, ultrasonic, eddy current, dye penetrant and magnetic particle.
- Static strength test to include burst pressure, overspeed, and ultimate load/transmission overload.
- Fatigue testing to verify proper residual life for known failure modes and potential new failure modes if the part has degraded.

The procedures and test fixtures used for these efforts are the same as those used for airworthiness qualification, thereby providing insight into changes from original or current qualification. Figures 3 and 4 (page 8) show two examples of test rigs being used for the Black Hawk in the component-level airworthiness qualification. These efforts will document changes from the original design and test of the Black Hawk for the flight safety parts so that any changes can be introduced to ensure and enhance overall safety.

Following the FY 86 effort, the sampling plan and surveillance program will be determined based on results of the prior tests in an attempt to identify those parts which indicate usage has had adverse effects. New

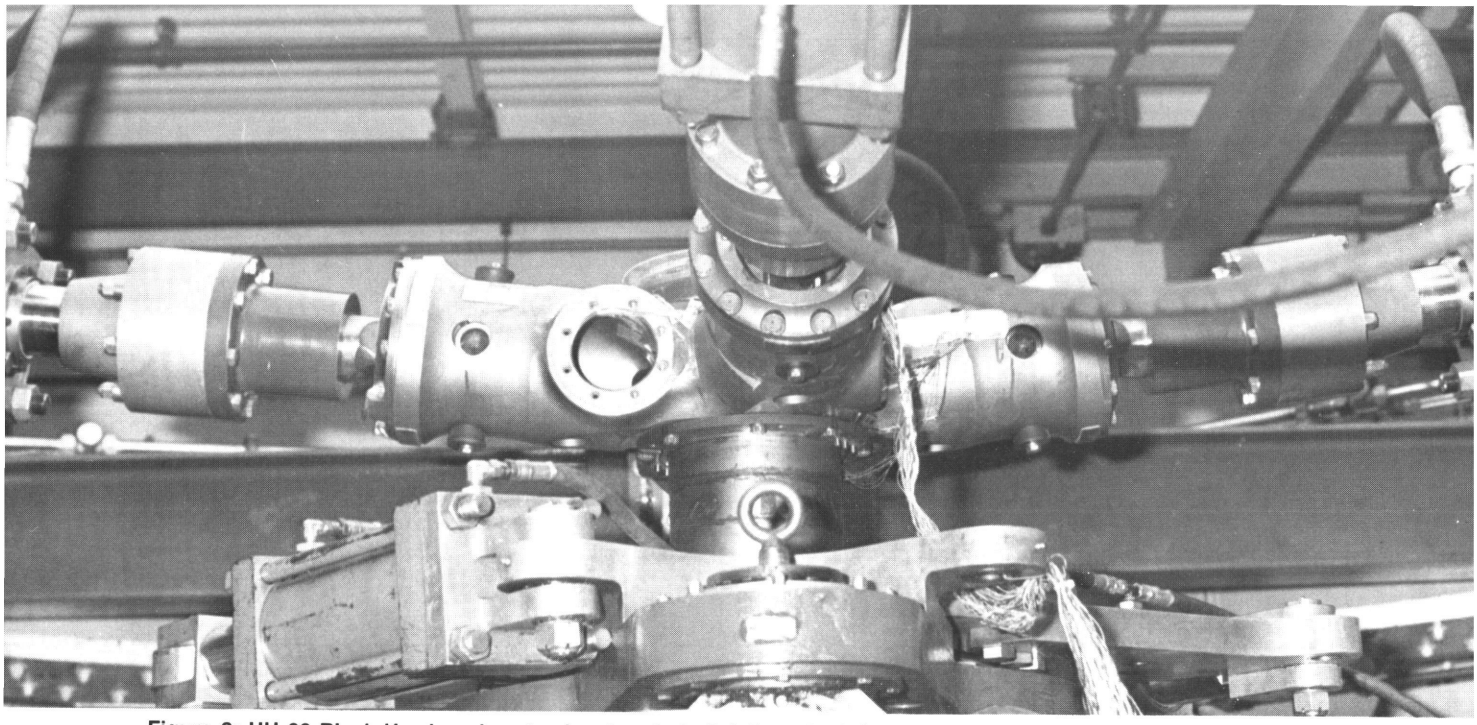


Figure 3: UH-60 Black Hawk main rotor head and shaft fatigue test rig.

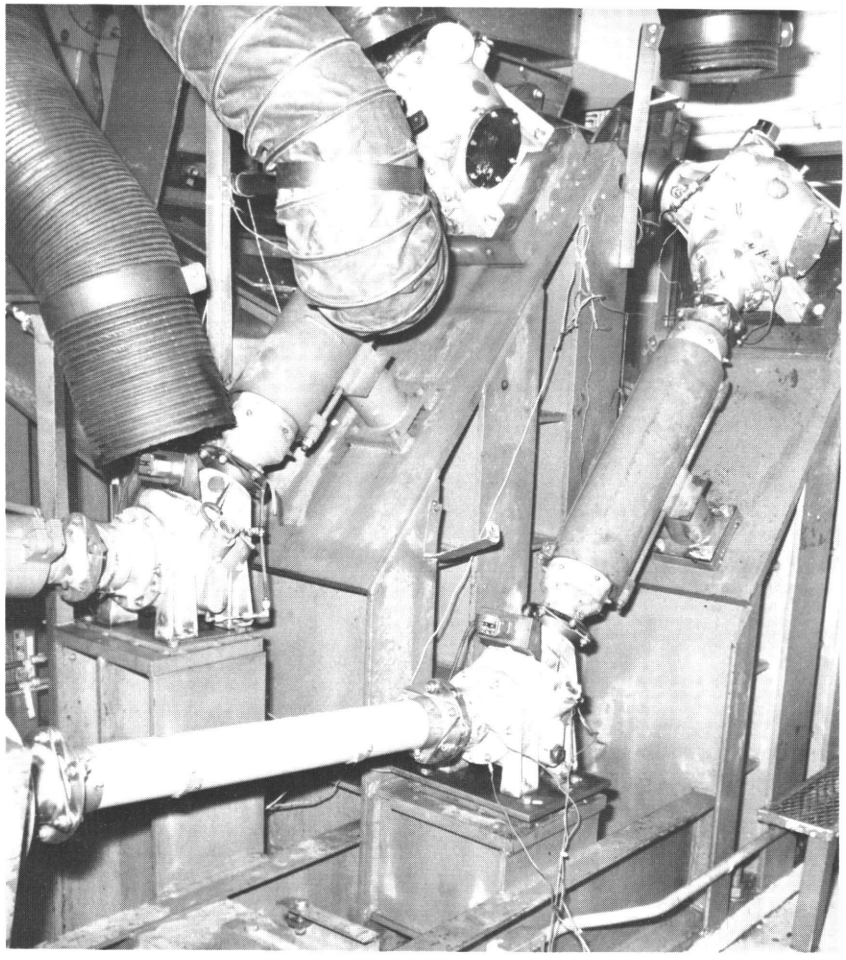
parts also will be continually sampled to ensure that no change in the manufacturing and quality process has inadvertently occurred.

The surveillance effort will be similar to the flight safety parts list in that it will change anytime new information indicates a need, such as: a newly identified flight safety part; a new degraded mode is identified and it would require a different test; field/overhaul data indicates a high usage/reject rate, etc. Also, any premature failure or adverse safety condition discovered during this effort will be treated in the same manner as any other urgent safety indicator warranting safety of flight messages, urgent manual changes, aircraft grounding actions, etc. to be initiated.

**Supplemental Surveillance.**
***A Good Idea Gets Better.***

A surveillance program limited to identified flight safety parts and present known information still would not ensure overall flight safety without some additional supplemental surveillance. To ensure that other aircraft parts could not potentially lead to a

Figure 4: UH-60 Black Hawk tail rotor and intermediate gear box test rig.



problem, procedures established for feedback/trending will also allow information from other parts to be addressed in the same manner. In this regard, some directed efforts are being identified to evaluate the overall aircraft and its usage.

For the Black Hawk, a high time/hard usage aircraft will be selected in FY 87 for a total, detailed teardown and analysis. This documentation will verify the condition of both flight safety parts and all other parts. Results from this effort and follow-on efforts will continually provide data for incorporation into the Flight Safety Parts Program. Programs for other Army aircraft will introduce this type of surveillance as the older aircraft are introduced to the depot for modification.

The usage of an aircraft is also critical to its safety because the life limited parts have calculated lives based on a given usage spectrum. This usage spectrum considers both a given flight condition and its frequency/duration over a given time. Thus, for each flight condition a part will be subjected to a different load which in combination with magnitude and duration will impact the life of a part subject to fatigue. If increased loads or increased duration of high load conditions occurs, the fatigue life (retirement life) of the part would be adversely affected. Variations due to actual usage must therefore be assessed to ensure the proper life values are in place.

Some impact is gained from the part fatigue test conducted under the flight safety part surveillance effort, but additional information is needed. For the Black Hawk, field surveys have been conducted with pilots to assess how the aircraft is being used; but, this still only addresses a general usage system. Specific details of the aircraft usage can be obtained by instrumented aircraft with recorders. Although this is done during the aircraft airworthiness qualification effort, variances in use of an aircraft due to mission requirement changes may adversely impact these efforts.

For the Black Hawk, a flight data recorder effort has been established to allow actual measurement of pertinent usage parameters. In FY 86, one effort will entail 30 single data channel recorders to measure the occurrence of droop stop pounding at various fielded locations, as well as with training aircraft. Droop stop pounding frequency has been shown to adversely affect the life of several components in the rotor system.

Actual usage level determination will allow accurate life calculations in lieu of current conservative values required to ensure safety. Also in FY 86, a multiple channel data recorder is being flown in development—the intent being to start providing an overall actual usage spectrum.

**Conclusion.**

The Flight Safety Parts Program underway at Sikorsky will provide further enhancement of safety of the Black Hawk. As an additional benefit it also is expected to improve quality and reliability with a resultant decrease in operating and support costs. The Black Hawk, however, is only the first system in Army Aviation; FY 86 programs also are being put into place for the OH-58 Kiowa, CH-47, AH-1 Cobra, UH-1 Huey, OV-1 Mohawk and AH-64 Apache series aircraft. The Army's Flight Safety Parts Program is a shared program with industry to provide a better and safer product for the user.

illustration by Paul Fretts

# Remembering the Forgotten Mechanic

Through the history of world aviation many names have come to the fore,
Great deeds of the past on our memory will last as they're joined by more and more—

When man first started to labor in his quest to conquer the sky,
He was designer, mechanic and pilot, and he built a machine that would fly—

The pilot was everyone's hero, he was brave, he was bold, he was grand,
As he stood by his battered biplane, with his goggles and helmet in hand—

But for each of these flying heroes there were thousands little renowned,
And these were the men who worked on the planes but kept their feet on the ground—

We all know the name of Lindbergh and we've read of his flight to fame,
But think, if you can, of his maintenance man; can you remember his name?

And think of our wartime heroes, Gabreski, Jabara, and Scott,
Can you tell me the names of their crewchiefs? A thousand to one you cannot—

So when you see mighty jet aircraft, as they mark their way through the air,
Remember the grease-stained man with the wrench in his hand, he's the man who put them there—

Anonymous

The *Aviation Digest* thanks the Second Army for sending the above tribute to the maintenance people who make it possible for Army Aviation's aircraft to be flown in the safest and most effective manner.

## VIEWS FROM READERS

Editor:

Thanks very much for mentioning our Bird Dog [old designation L-19; new designation O-1] promotion in the May 1985 *Aviation Digest.*

The INTERNATIONAL BIRD DOG ASSOCIATION is no longer just an idea. It is a reality. The missions of the association include preserving the heritage of the Bird Dog; keeping as many of them flying as possible; and, reuniting as many Army, Air Force and Marine Bird Dog jockeys as we can.

Robert Sloane's painting of the Bird Dog on the back cover of the April 1985 issue of *Aviation Digest* is most inspiring. It is good to know that the tough little Bird Dog has not been forgotten as a real "warbird."

We invite all Army aviators and observers who are interested in the Bird Dog to get in touch with our association. Furthermore, we would really appreciate hearing from anyone who knows the whereabouts of active duty, retired, reserve, and civilian Korea and Vietnam era Bird Dog jockeys.

Thanks again for the support from *U.S. Army Aviation Digest.*

Phil Phillips
INTERNATIONAL BIRD DOG ASSOCIATION
3939 C-8 San Pedro NE
Albuquerque, NM 87110

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## CALL FOR PAPERS

### Aviation Pathology

THE FIFTEENTH BIENNIAL scientific session of the Joint Committee on Aviation Pathology will meet 7 to 9 October 1986 at the RAF Institute of Pathology and Tropical Medicine, Halton, England.

Papers are solicited for presentation. Participation by nonmilitary individuals and organizations is invited. The sessions will be oriented toward progress in the various areas of aviation pathology. Specific topics will include but not be limited to:

- Environmental Hazards.
- Advances in Toxicology.
- Accident Investigation Techniques.
- Preexisting Disease.

For more information about attending or submitting a paper call commercial (202) 576-3232, or AUTOVON 291-3232.

### Mobilization Conference

THE FIFTH ANNUAL Industrial College of the Armed Forces (ICAF) Mobilization Conference will be held 22 and 23 May, 1986, at the National Defense University, Industrial College of the Armed Forces, Ft. McNair, Washington, DC. This year's theme, "The Future Role of Mobilization in National Security," will focus on National Security and Mobilization; Manpower Resources Management; and Industrial Resources Management.

The Joint Chiefs of Staff have recognized that "the capability to mobilize the reserves, expand the forces to the degree necessary, and expand and expedite industrial production, are critical elements of the overall U. S. defense and warfighting posture." The inference of this statement acknowledges that mobilization constitutes an integral component of U. S. military strategy. This acknowledgement provides a mandate for pursuit of mobilization studies and conduct of the mobilization conference.

The Industrial College and the National Defense University provide a yearly forum in which relevant mobilization issues confronting the U. S. and its allies are addressed. The conference reviews capabilities and plans, and exchanges information and examines new concepts for improved mobilization planning and execution. Attendees will include senior executives from labor and industry, professors and scholars from leading universities and research organizations, senior level managers from the Department of Defense and other government agencies, and faculty and students from senior service colleges.

The 2-day conference will feature presentations of papers and reports by highly qualified authors whose perspectives are based on intense research and/or years of experience. Additional highlights of the conference will include prominent speakers to help focus on and provide key insight into the complex question of mobilization. Anyone desiring more information or interested in attending should write to: Industrial College of the Armed Forces, ATTN: Mobilization Conference Committee, (COL William Barber), Ft. McNair, Washington, DC 20319-6000. Or call Commercial (202) 475-1794, or AUTOVON 335-1795.

# AVIATION PERSONNEL NOTES

**Aviation Branch — "Hot Line"**

Aviation Branch invites you to use its new "Hot Line" Voice Information Processing System (VIPS). The system allows you to get the latest information concerning assignments, changes in policy or to leave a message for your assignment officer. All you need is a Touch-Tone telephone to take full advantage of this new system. You cannot receive the Touch-Tone information with a rotary dial phone, but you can leave a message for your assignment officer.

The VIPS service is valuable to officers serving in various time zones because the system is available around-the-clock. It also will be available when the regular phone lines are busy.

We at Military Personnel Center (MILPERCEN) firmly believe that for every Army assignment requirement there is someone who wants it, and we hope that the VIPS system of announcing vacancies will better match requirements with individual desires.

**Touch-Tone Instructions**

1. To use this new system, start by calling one of the following phone numbers:
   Commercial: (202) 325-7150
   Credit Card: (202) 325-7150 + 7513
   AUTOVON: 221-7150
2. You will hear a recording asking you to enter the seven digit code of the appropriate assignment desk given below:

| Assignment Desk | Seven Digit Code Number |
|---|---|
| Aviation Branch Chief | 243-2861 (CHF-AVN1) |
| Lieutenant Colonels | 582-2861 (LTC-AVN1) |
| Majors | 625-2861 (MAJ-AVN1) |
| Captains | 278-2861 (CPT-AVN1) |
| Lieutenants | 587-2861 (LTS-AVN1) |
| Flight School Info | 358-7241 (FLT-SCH1) |

3. The recording will identify the desk you have reached and ask you to push the pound key (#) on your phone to start the taped assignment information. When the information tape ends you will have an opportunity to leave a message if you wish.

**Rotary Dial Phone Instructions**

Use the same commercial, credit card or AUTOVON phone numbers, but you won't be able to use the Touch-Tone codes. You will, however, be able to leave messages for the appropriate assignment officer.

**Official Photographs** (From the Branch Chief—LTC Crews)

Many aviators in the field still have official photographs in their file reflecting the wrong branch on their lapels. If your photo is not current, has the wrong branch insignia or simply does not present you at your best, then you should have another one made and forwarded to MILPERCEN. AR 640-30 provides guidelines as to the proper wear of the uniform. On the day you have your photo taken, take a fellow officer along to assist in the photo session.

After sitting through many school selection/promotion board out-briefs, it's my personal opinion that mustaches send a negative signal to some board members—I have never heard one positive comment about a mustache! If you want a mustache, ensure that it is within regulation.

**Branch Trip: United States Army, Europe (USAREUR)**

The Aviation Branch will have a team in USAREUR tentatively scheduled for the spring of 1986 with a stopover at the Army Aviation Association of America conference in Garmisch. If you need an interview or want to meet with branch members, phone or drop a note to Major Fred Schattaeur, Aviation Management Officer, 1st Personnel Command, USAREUR. Officers who have a DEROS after September 1986 are welcome to meet with branch members; however, because Army requirements will not have been validated, specific assignment information will not be available.

Watch your local bulletin for additional information about this visit.

**Planning on Retiring as an Officer?**

If you plan on retiring at 20 years of Active Federal Service as a Reserve officer, you must have at least 10 years of commissioned service. This is called the "10/20" rule of AR 635-100. This rule affects officers with prior enlisted or warrant officer service. This rule does not affect Regular Army officers.

There are several programs which allow for the Reserve commissioning of officers who cannot meet the 10/20 rule. These officers will be retired in enlisted status at the end of their 20th year of Active Duty. After 10 years on the retired rolls, they are eligible for an upgrade to officer retired status.

The Secretary of the Army permits some officers, who are constrained by the 10/20 rule, to remain on Active Duty to complete 10 years commissioned service.

If you have questions about your potential retired status, contact Major Paul Trahan, AUTOVON 221-0611/12, commercial (202) 325-0611/12.

## ATTENTION PLEASE!

*Proper Distribution of DA Form 759s—ATTENTION COMMANDERS AND OPERATIONS PERSONNEL*

The DA Form 759 (Individual Flight Record and Flight Certificate-Army) is an extremely important document to the individual aviator. The Aviation Center is currently planning to automate the DA Form 759; in the meantime, however, the personnel managers here at MILPERCEN would like to ensure that each aviator's career management file contains the most current copy of this important record. A recurring problem associated with this task is the forwarding of these documents to improper agencies. AR 95-1, table 1-1 with changes prescribes the distribution of the copies of the DA Form 759.

Despite the change to the regulation indicating the proper routing of the second copy of the DA Form 759, flight operations personnel are still sending these copies to improper addresses. Therefore, here are the addresses which should receive the second copy of the DA Form 759:

**Aviation Branched Commissioned Officers (SC 15)**

Commander
USAMILPERCEN
ATTN: DAPC-OPE-V
200 Stovall Street
Alexandria, VA 22332-0400

**Aviation Branched Warrant Officers (100 series)**

Commander
USAMILPERCEN
ATTN: DAPC-OPW-A
200 Stovall Street
Alexandria, VA 22332-0400

**Medical Service Corps Commissioned Officers (SSI 67J and Flight Surgeons)**

HQDA
ATTN: DASG-HCO-A
Washington, DC 20310-2300

Please ensure that your flight records personnel receive these addresses.

## FY 86 Officer Selection Board Schedule

The following are the proposed dates for various Department of the Army selection boards:

| | |
|---|---|
| LTC CA CMD | 14 Jan — 14 Feb |
| LTC CSA CMD | 21 Jan — 7 Feb |
| LTC CSS CMD | 11 Feb — 28 Feb |
| PROD MGR (LTC) | 3 Mar — 7 Mar |
| MAJ ADL | 4 Mar — 25 Apr |
| COL ADL | 29 Apr — 23 May |
| RA INT | 13 May — 15 May |
| BG | 2 Jun — 28 Jun |
| CW 2/3/4 RA | 10 Jun — 25 Jun |
| SSC/AWCCSC | 9 Jul — 15 Aug |
| CPT ADL | 14 Jul — 25 Jul |
| LTC ADL | 15 Jul — 29 Aug |
| WO RA INT | 29 Jul — 8 Aug |
| COL CA CMD | 8 Sep — 19 Sep |
| COL CSS/DISCOM | 23 Sep — 8 Oct |

## Army Astronaut Candidate Nominees

The Army has nominated 31 soldiers to the National Aeronautics and Space Administration (NASA) for possible selection as astronaut candidates. NASA now selects astronaut candidates on an annual basis as a function of need and anticipated personnel attrition.

NASA is looking for candidates who have a demonstrated ability working as team members in a stressful environment, who have an adventurous nature and who have good operational experience in a technical field. Although it is not required, they also prefer the mission specialist to have some type of flight experience.

The Army nominees represent an impressive array of scholastic, military and scientific talent. Their academic disciplines include: life science; earth science; space science; general engineering; and flight test engineering. Their military schools include: Airborne, Jumpmaster, Ranger, Special Forces, Special Forces Scuba, Jungle and Flight schools. Eleven are graduates of the Naval Test Pilot School. Three are combat veterans. Some of the nominees' hobbies are skiing, running, scuba diving, mountain climbing and flying. Seventeen of the nominees are graduates of the U. S. Military Academy.

Impressive as the nominees' credentials are, there is no guarantee that any of them will be among the new astronauts NASA selects in 1986. To apply, you need at least an undergraduate degree from an accredited college in engineering, physical science, biological science or mathematics. Mission specialist applicants need 3 years of experience in their qualifying discipline. Those who apply for pilot must have at least 1,000 hours pilot in command time in jet aircraft.

Superb physical conditioning is a must. Applicants must be able to pass a NASA space physical. NASA allows no waivers of the prerequisites, medical or otherwise.

Based on a review of the individual applications and supporting documents, including medical and personnel records, the board selected 31 of 85 applicants as "best qualified" to represent the Army in the NASA selection process. Applications were received from all components: Active Army, Army National Guard and the Army Reserves. The 31 nominees include two females and one reservist. The final selections for astronaut candidates will be announced by NASA in May 1986.

**The Army nominees are:**

MAJ Joseph L. Bergantz
MAJ Michael R. Clifford
MAJ Robert D. Fox
1LT John C. Jarrell
CPT Mary A. Kaura
CPT John R. Martin
MAJ William S. McArthur Jr.
MAJ Randall G. Oliver
MAJ Terrance L. Reininger
CPT Kevin G. Scherrer
CPT Nancy J. Sherlock
MAJ Houng Y. Soo
MAJ Richard L. Vincent
MAJ Eric A. Vonderscheer
CPT Norman J. White
MAJ Douglas H. Wise
MAJ Waldo F. Carmona
CPT David B. Cripps
CPT Craig B. Hanford
LTC Christopher B. Johnson
LTC Thomas H. Mader
MAJ Edward W. Mayer
CPT Glenn A. Monrad
MAJ William M. Pekny
MAJ Richard T. Savage
MAJ Gary A. Sharon
MAJ Rickey C. Simmons
MAJ Frederick W. Stellar
LTC Thomas L. Vollrath
MAJ James S. Voss
CPT Jeffrey N. Williams

Congratulations to all those selected and best of luck during the NASA screening.

**Just The Facts**

MILPERCEN's Casualty and Memorial Affairs Operations Center operates the Army's casualty system and supervises worldwide care and disposition of the remains of deceased soldiers.

Survivor assistance information may not be readily available to soldiers, so the center put together answers to the most-asked questions in this area. They should help clarify some misconceptions and concerns.

***What monetary benefits are available for my survivors?***

The monetary benefits paid to your survivors upon your death are:

- Unpaid pay and allowances.
- Death gratuity (not to exceed $3,000).
- If you participate, SGLI up to $35,000.
- Family members may also receive Veterans Administration (VA) and/or Social Security benefits depending on family composition and eligibility as determined by those offices.
- If you have more than 20 years service, are still on Active Duty, and have not declined participation, your family members are automatically enrolled in the Survivor Benefit Plan (SBP). If you have retired, then you must have made an election to participate in the plan.

***Can I designate anyone to receive my unpaid pay and allowances?***

Yes.

***Can I designate anyone to receive my Servicemen's Group Life Insurance (SGLI)?***

Yes. However, if you do not elect your primary next-of-kin (NOK), your supervisor has to counsel you about the unusual designation and annotate your election form. A beneficiary designation is considered unusual when the soldier makes a designation that does not follow the order of precedence in which payment is made when the designation is "by-law." That order of precedence is:

- Your surviving spouse.
- Your child or children in equal shares.
- Your parents in equal shares or the entire amount to the surviving parent.
- The duly-appointed executor or administrator of your estate.
- Your NOK under the laws of your state of domicile at the time of your death.

***Can I designate anyone to receive my death gratuity?***

No. Only the people highest on the following list may be designated, in accordance with Title 10, United States Code.

(1) Surviving spouse.

(2) If not survived by spouse, children (includes legitimate, illegitimate, step and adopted children) in equal shares.

(3) If designated by you, any one or more of the following: parents, parents in loco parentis, brothers or sisters.

(4) If not designated and not survived by spouse or children: parents or loco parentis in equal shares.

(5) If not designated and not survived by spouse, children, parents, or loco parentis: brothers and sisters in equal shares.

***Can I designate anyone to receive my SBP?***

No. Only spouse and children under 18 years of age may receive SBP.

***If I die while on Active Duty, will the Army relocate my family?***

Yes. The Army will move your spouse and dependent children to a location of their choice up to one year after your date of death. Only one move is authorized and certain limitations apply.

***What kind of assistance will my spouse get if I die on Active Duty?***

Once your NOK have been notified of your death, the Army will appoint a survivor assistance officer to help your spouse arrange for the funeral and apply for military benefits (e.g. ID card, death gratuity) and for other benefits from the VA and/or Social Security. The officer will assist your spouse until all claims are settled and/or benefits received.

***Must I designate beneficiaries by name in all cases or is a "by-law" designation good enough?***

By-law designations are permitted; however, to prevent any possible delays in settling your estate, by-name designations are the best since they eliminate any and all questions, especially from your survivors.

***Does a will override the election of beneficiaries designated on the Servicemen's Group Life Insurance Election (VA Form 29-8288) to receive a soldier's SGLI payment, or designated on the DD Form 93 to receive unpaid pay and allowances?***

No, wills cannot change designated beneficiaries.

***Who administers SGLI?***

SGLI is a plan purchased from a commercial life insurance company by the VA. The Army certifies the soldier's insurance coverage to the Office of Servicemen's Group Life Insurance (OSGLI) in Newark, New Jersey, after the soldier's death. OSGLI pays the beneficiary as designated by the soldier.

***What is the Army's Certificate of Death?***

The Report of Casualty, DD Form 1300, is the official certificate of death issued by the Department of the Army, and may be used wherever proof of death is required.

***Does the Army make line-of-duty determinations in death cases?***

The Army does not make line-of-duty determinations in death cases, since benefits payable by the Army do not depend on line-of-duty status. The Army may conduct an investigation to gather the facts and circumstances of a death and reviews the report for administrative correctness and adequacy, then passes the report to the VA. The VA makes the determination as to whether the death was service-connected or in the line of duty.

***Does the SBP provide an annuity for the surviving spouse of an Active Duty soldier?***

Yes. An annuity for the surviving spouse of an active duty soldier is provided if the soldier was eligible for retirement at the time of death. The spouse will receive an annuity equal to the difference between any Dependency and Indemnity Compensation payable by the VA and 55 percent of the amount of any retired pay. There are times when the SBP annuity will be reduced, or offset, by Social Security benefits. These issues should be discussed with a veterans service counselor of the VA and Social Security Administration when applying to those agencies for benefits.

***If the U.S. Army Criminal Investigation Command conducts an independent investigation of a death, where can the NOK obtain a copy of the report?***

The Report of Investigation compiled by the U.S. Army Criminal Investigation Command may be obtained by writing to the Commander, U. S. Army Crime Records Center (CRC), ATTN: CICR-FP, 2301 Chesapeake Ave., Baltimore, MD 21222-4099. Allow at least 60 days before filing for a copy, as CID reporting can be a lengthy process.

***If I am ill or injured and hospitalized while assigned overseas, will the Army provide travel and lodging for my NOK to visit me?***

The Department of the Army may issue an Invitational Travel Order (ITO) for your primary next-of-kin (PNOK) and one other member of your family to visit you if:

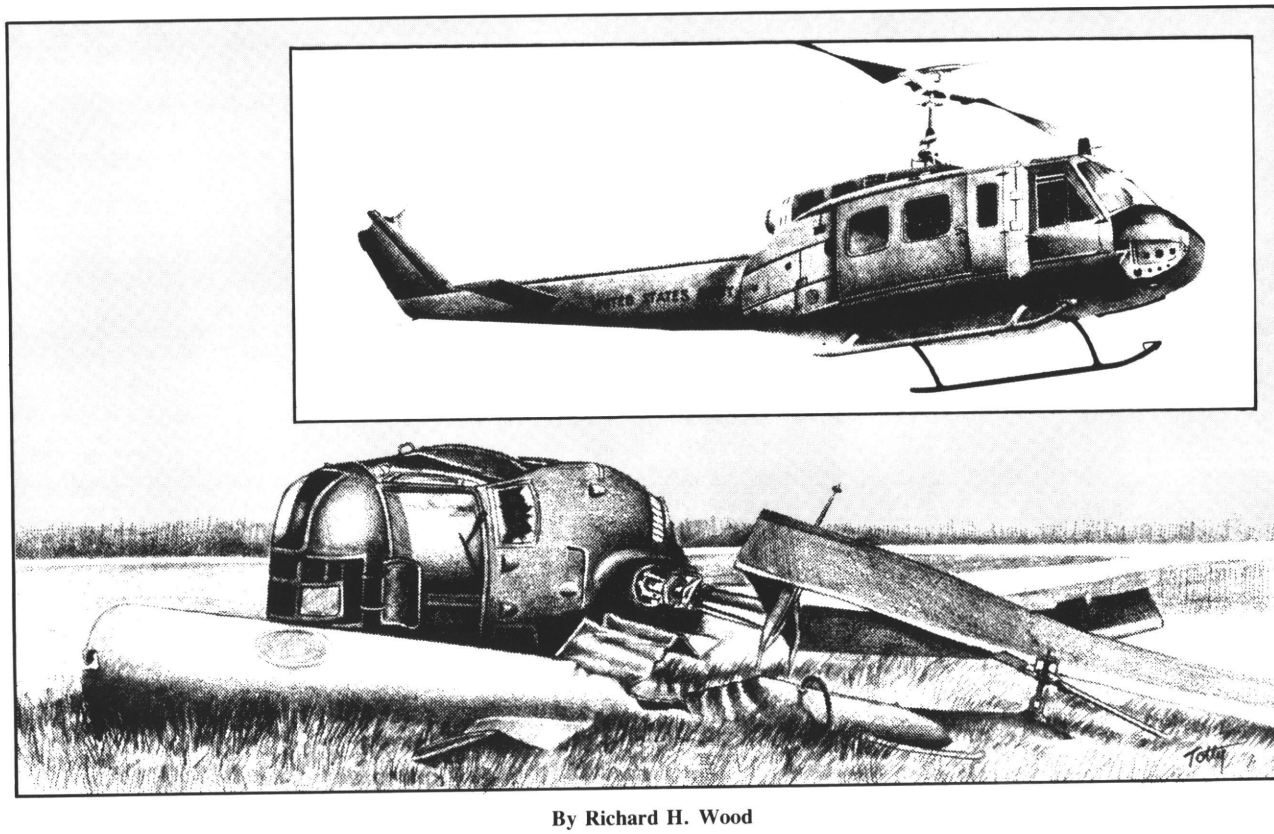
- You are on Active Duty or are a Department of Defense civilian employee hospitalized in a very seriously ill or injured condition.
- Your attending physician and the commander of the medical treatment facility consider the presence of your NOK necessary for your recovery.
- You are serving an unaccompanied tour.
- You are hospitalized overseas and your PNOK is in continental United States (CONUS), or vice versa. Travel to a hostile fire zone is not authorized. The ITO authorizes government-provided air travel from CONUS to the overseas command and return to CONUS, or vice versa if you are hospitalized in CONUS and your PNOK resides outside of CONUS. The ITO does not authorize NOK travel to and from aerial ports of embarkation/debarkation, nor are meal and lodging included; your NOK must pay those costs.

## U.S. Army Class A Aviation Flight Mishaps

| | Number | Flying Hours (estimated) | Rate | Fatalities | Total Cost (in millions) |
|---|---|---|---|---|---|
| FY 85 (to January 31) | 17 | 445,399 | 3.82 | 8 | $15.8 |
| FY 86 (to January 31) | 12 | 408,470 | 2.94 | 6 | $26.3 |

# It Takes Carnage To Get Safety Action

## After-the-Fact Approach Does Little to Prevent Disasters



By Richard H. Wood

The United States Army has been collecting Army-wide aircraft accident data since 1958. We can point with some pride to the fact that the major aircraft accident rate per 100,000 flying hours has dropped from 54.3 in 1958 to 3.00 in fiscal year 1985—and the rate was lower in fiscal years 1983-84.

We cannot point with pride, however, to the fact that, with the possible exception of some materiel factors, the causes of Army Aviation accidents today bear a dismaying similarity to the causes of accidents in 1958.

The author of the following article suggests that unless we look long and hard at the causes of "little" accidents and near-accidents and answer some basic questions about accountability, we can expect to see the same things continuing to cause accidents year after year.

Richard H. Wood, an assistant professor of safety science at the University of Southern California, specializes in aviation safety and aircraft accident investigation. His article appeared in the September 1, 1985, edition of the ***Los Angeles Times.***

Mr. Wood is writing about commercial aviation, but the questions he asks following an air disaster apply equally to Army Aviation.

- How often has this happened before?
- Who knew about it?
- What was done about it?
- Why?

Army aircraft accident investigation reports all too often contain witness statements that verify someone knew the problem existed before the accident occurred. Whether it was aviators violating procedures, superiors requiring missions be flown when the pilots knew they shouldn't fly, crews not getting enough rest during FTXs, or a multitude of other factors, ***someone knew but nothing was done until an accident happened.***

Let us suggest that, whether you are a commander, an aircrewmember, an operations officer, a safety officer, or whatever your role in Army Aviation, you look at accidents and ask yourself these questions.

- How often has it happened before?
- Did you know about it?
- What did you do about it?
- Why?

IT'S BEEN a bad summer for commercial airlines. More than 1,000 fatalities since June. More than 1,400 so far this year. Have we finally lost control of our air transportation system? Will the number of accidents continue to increase? I don't believe so, and I can offer several reasons.

First, there doesn't seem to be any relationship among recent accidents. There was a landing accident at Dallas-Fort Worth involving weather; a takeoff accident in Manchester, England, involving an engine failure; an in-flight structural failure in Japan; and the disappearance of an Air India aircraft off the Irish coast for presently unknown reasons. Individually, these appear to be random events.

Second, we are dealing with a comparatively small number of occurrences. If we had a large number of commercial air carrier accidents per year (say 100 or more), then we would expect them to be distributed fairly evenly throughout the calendar. Small numbers won't do that. By picking a short period of time (a month or a year, for example) we can fool ourselves into thinking things are either very good or very bad. If we look at the record over a longer period of time, we see that the accident rate for commercial air carriers is low and that the accident-rate curve is fairly flat. It hasn't changed much in the last several years. My guess is that the accident rate will remain low in spite of recent air disasters.

Finally, we tend to keep score in terms of people killed. If you happen to be one of those people, of course, that's all that matters. From a pure safety point-of-view, though, that's a meaningless statistic. What counts is the number of individual accidents. The number of people on board is random and it could have been any number from the basic three-man-flight crew to the maximum capacity of the aircraft.

This leads to an important concept about safety that is sometimes overlooked. If a particular event occurs, it may or may not produce damage or injury. The damage is related to the situation in which the event occurs, and the injuries are related to both the situation and the number of people involved. Thus, measuring safety in terms of results (damage or injury) is not a particularly good way to determine if things are really safe or unsafe.

Unfortunately, we tend to let those results (damage and injury) determine the depth of our investigations and, therefore, our prevention efforts. The problem of midair collisions provides a good example. The last disastrous midair collision in this country was in 1978 when an airliner and a light aircraft collided near Lindbergh field in San Diego. That resulted in a huge investigation and a lot of corrective actions. Those solved some, but by no means all, of the problems. Midair collisions and near-midair collisions continue to occur, but they generate very few actions and probably won't until we have another big one.

Logically, almost all midair collisions in the U.S. involve some aspect of the management and control of our airspace. If we accept that as true, then we don't have to wait for another big one. It doesn't make any difference what type of aircraft is involved or how many people are on board. We can act now.

It does make a difference, though, because the more people involved, the bigger the investigation and the more action taken to correct the situation. This is the classic "Blood Priority" problem familiar to all safety professionals. It is a lot easier to get the cause of an accident corrected if the accident report has a lot of blood on it.

As long as the depth and strength of our investigations are keyed to the resulting damage and injury, we are likely to miss opportunities to identify and correct problems before they cause damage or injury. To their credit, the National Transportation Safety Board realizes this and attempts to expend some of their investigative resources on events which do no harm, but obviously could. They need to do more of that.

Let me make the following unpleasant prediction: when the causes of this year's air tragedies are finally resolved, we will discover nothing new or unique. Each causal event will have occurred at some previous time. That means that the opportunity to prevent those events also occurred at some previous time. Following any air disaster, there are some important questions that always need to be asked.

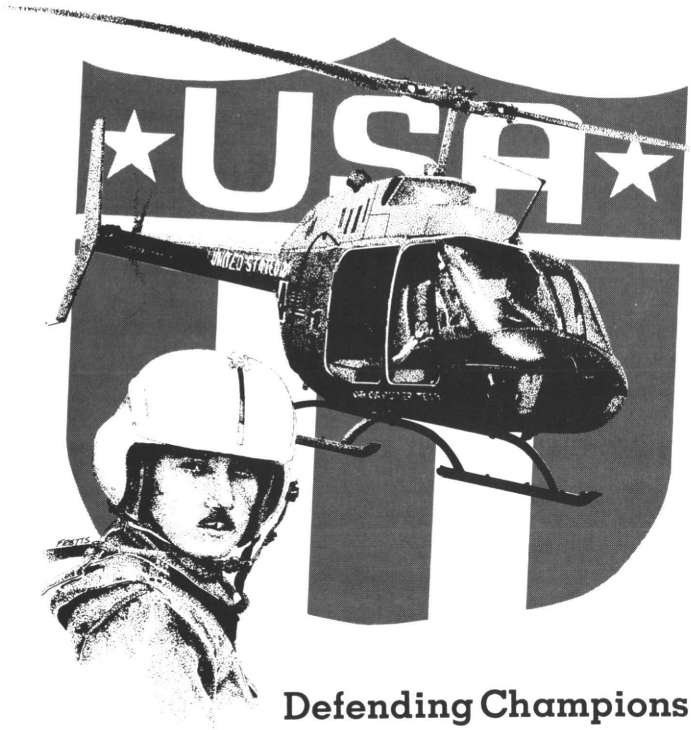
**How often has this happened before?**

**Who knew about it?**

**What was done about it?**

**Why?**

***Editor's note:*** *Since this article was written, more accidents have happened, making 1985 the worst year ever for commercial aviation fatalities. The number of lives lost is indeed tragic, but Mr. Wood's premise remains valid. In safety, we must examine the causes behind all accidents, and near-accidents, if we are ever to learn how to prevent such disasters from happening again.*




Defending Champions

# WORLD HELICOPTER CHAMPIONSHIP

**Mr. William Hayes**
Public Affairs Office
U.S. Army Aviation Center
Fort Rucker, AL

THE U.S. ARMY Aviation Center, Ft. Rucker, AL, this February has been the host for national competition that leads to the World Helicopter Championship, scheduled for 16 through 20 June in England.

Aviation Center local competition was scheduled from the 3d through the 7th at Ft. Rucker and areas of Southeast Alabama. The competition to determine the U.S. Precision Helicopter Team was set for the 10th through the 14th with 26 teams contending.

The aviators selected to represent the United States will be defending the title won by U.S. pilots in the most recent world competition at Piotrkow Trybunalski, Poland, in August 1981.

That was the year two Army aviators won the individual competition and the U.S. team won overall. Chief Warrant Officer, CW2, George D. Chrest and CPT Stephen G. Kee won individual honors as first-place pilot and copilot respectively.

It was the first team victory for the United States, following a come-from-behind win by two points over a team from the Federal Republic of Germany.*

The World Helicopter Championship is conducted under the auspices of the Federation Aeronautique Internationale, which sanctions international aviation sporting events.

The competition includes four events, with each military or civilian team consisting of a pilot and copilot flying either an observation or utility helicopter. All aircraft are equipped with standard instruments and radios. Special equipment (such as high-tech navigation devices) is not permitted.

Scoring is based on a system of penalty points for each event, to be deducted from a starting score of 200 points. The teams with the most points after all four events will be the winners.

The events scheduled at Ft. Rucker are based on the events at the world championship.

The first event, timed arrival and rescue, involves takeoff from a site 70 kilometers from the destination and observation area. Each crew will make a flight over a prescribed route at prescribed airspeeds to a pinpoint destination. At the destination, each crew will lower a weight suspended from a rope through a small opening in a rooftop mock-up.

The second event is precision hovering. Each aircraft will be fitted with two weighted ropes of different lengths. Each team will then be timed as they hover through a prescribed course about the size of a football field. While performing various maneuvers at hover, the crews must keep a fixed point on the aircraft within a lane 1 meter wide. At the same time, they must keep the aircraft between 2 and 3 meters off the ground.

*For information about the 1981 Helicopter Championship see *Aviation Digests:* April 1981, page 49, "U.S. Army Helicopter Team"; September 1981, page 22, "World Helicopter Championship, The World's Best"; and January 1982, page 2, "World Helicopter Champions," by Major Bronislaw R. Maca.

The third event is navigation. It involves a timed flight of about 120 kilometers over a prescribed course at a prescribed airspeed from a distant point to a destination and observation area. The course includes five "legs," four that are straight and one that is "curvilinear" or serpentine. Competitors must overfly checkpoints along the route, executing one landing and two sandbag drops along the way.

The fourth and final event is the helicopter slalom. Crews will fly a winding course through a competition field, negotiating 12 "gates" with a water-filled bucket suspended from their aircraft. After completing the slalom, the crew must set the water bucket on a small table in the competition field. The crews will not only be competing against a time standard, but also must avoid spilling water from the bucket. Points are deducted for elapsed time and spilled water.

Details and the point scoring system for each event are provided to all competitors in advance, except for some details of the timed arrival and rescue and navigation events. Each team will receive necessary information and instructions for those events shortly before they take off to begin their competition.

Point standings will be announced at the end of each day's competition. The winners of the first week's Ft. Rucker competition will vie for spots on the U.S. team.

The eight top teams of the event at the Aviation Center will represent the United States at the World Helicopter Championship from 16 to 20 June at Castle Ashbey, about 60 miles northwest of London.

Each team includes one pilot and one copilot, flying either an observation or utility helicopter.

Though the U.S. event is open to all military and civilian helicopter pilots, the field of competitors at the Aviation Center will include just one civilian team: Hynes Aviation Industries, Inc., of Frederick, OK, will send a team and a Hynes H-2 piston-powered two-seat aircraft.

The 25 other teams come from 14 Army commands and installations. No entries were received from other military services.

Following is a list of Army commands and installations that entered the competition before the 27 January 1986 deadline. Numbers in parentheses indicate multiple entries from the same installation or command.

Ft. Belvoir, VA
Ft. Benning, GA
Ft. Bragg, NC (2)
Ft. Campbell, KY (2)
Ft. Carson, CO (2)
Ft. Greely, AK
Ft. Hood, TX (3)
Ft. Polk, LA (2)
Ft. Rucker, AL (6)
Ft. Sill, OK
U.S. Southern Command
U.S. Army, Europe
Texas Army National Guard
U.S. Readiness Command
McDill AFB, FL

**Precision and teamwork are evident as aviators from the U.S. Army Aviation Center, Ft. Rucker, AL, practice the "helicopter slalom" event for the upcoming World Helicopter Championship.**

photo by SP4 Kelly Longbine

illustrations by Dave Deitrick

# AVIATION SAFETY:

## Pilot Error Research and Training

The year of 1985 saw a dramatic and sad increase in major commercial aviation accidents and Class A Army Aviation mishaps. Both in civilian aviation and in Army Aviation two common features emerge: the high percentage of mishaps attributed to pilot or human error, and the fact that this percentage has been almost the same for years. This article will look both at what is being done to address and remedy pilot/human error and indicate some issues for Army Aviation to consider in relation to safety.

**Dr. Ronald John Lofaro**

THE OCTOBER 1985 issue of the *Aviation Digest* printed a U. S. Army Safety Center (USASC) article entitled "Pilot Judgment." The article, while accurate and informative, needs to be updated to include and address the current efforts and some broader issues involved; especially as these impact on Army Aviation.

In February 1985, the Vice Chief of Staff of the Army (VCSA), General Maxwell R. Thurman, recognizing the need for a research process leading to products which could effectively modify and/or enhance the safety attitudes, motivations and behaviors of Army aviators, tasked the Army Research Institute (ARI) for the Behavioral and Social Sciences to develop a proposed research and action plan.

The ARI Aviation Research and Development Activity at the Army Aviation Center, Ft. Rucker, AL, briefed the VCSA in late February on just such a proposed research/action effort, which received his approval. To date, the ARI project has not formally begun. However, the basic issues and problems which prompted General Thurman's concern have not really changed. The Army Aviation Branch still faces a situation that calls for action: The situation is the steady number of yearly Class A accidents (and resultant fatalities) coupled with pilot or human error as a causal factor in these accidents.

While it may be true that "accidents will happen," it is also true that there are corporate, civilian, commercial, governmental, not to mention Navy and Air Force, efforts now in full swing, designed to deal with the pilot error and human factor aspects of aircraft accidents. Indeed, these efforts are not limited to the United States—Canada, Australia, France and the United Kingdom are engaged in ongoing analyses and research into pilot-error accidents along with the concomitant development of pilot decisionmaking programs. These are initiatives already begun within the Army, which should impact on safety in general and aviation safety in particular. These include SAFE ARMY 1990, the Aviation Behavioral Characteristic Identification and Tracking System and others.

Since 1977, the aviation community in general has been hard at work trying to develop techniques to deal with pilot error. The most effective of these techniques focuses on the pilot's judgment or decisionmaking processes, pilot stress recognition and management, and crew communication and coordination. The thrust of the research and development in these areas has been the attempt to provide *all* aviators with the motivations and attitudes, coupled with skills, which lead to reduced human/pilot error and to safer flight. The work already done and currently being done has opened a window of opportunity for aviation safety.

**Current Developments**

There is a growing belief that the reason about 70 percent of all aviation accidents continue to be attributed each year to human error is, in the words of Jim Burnett, chairman of the National Transportation Safety Board, that "existing accident and incident data do not show *why* pilots make errors." Human factors accident research has been, and is, a priority for the Federal Aviation Administration (FAA), U. S. Air Force, U. S. Navy and several foreign nations. The Air Force, in January 1985, adopted a new set of accident investigation procedures calling for increased emphasis on human factors and the inclusion of a human factors expert on each accident investigation team.

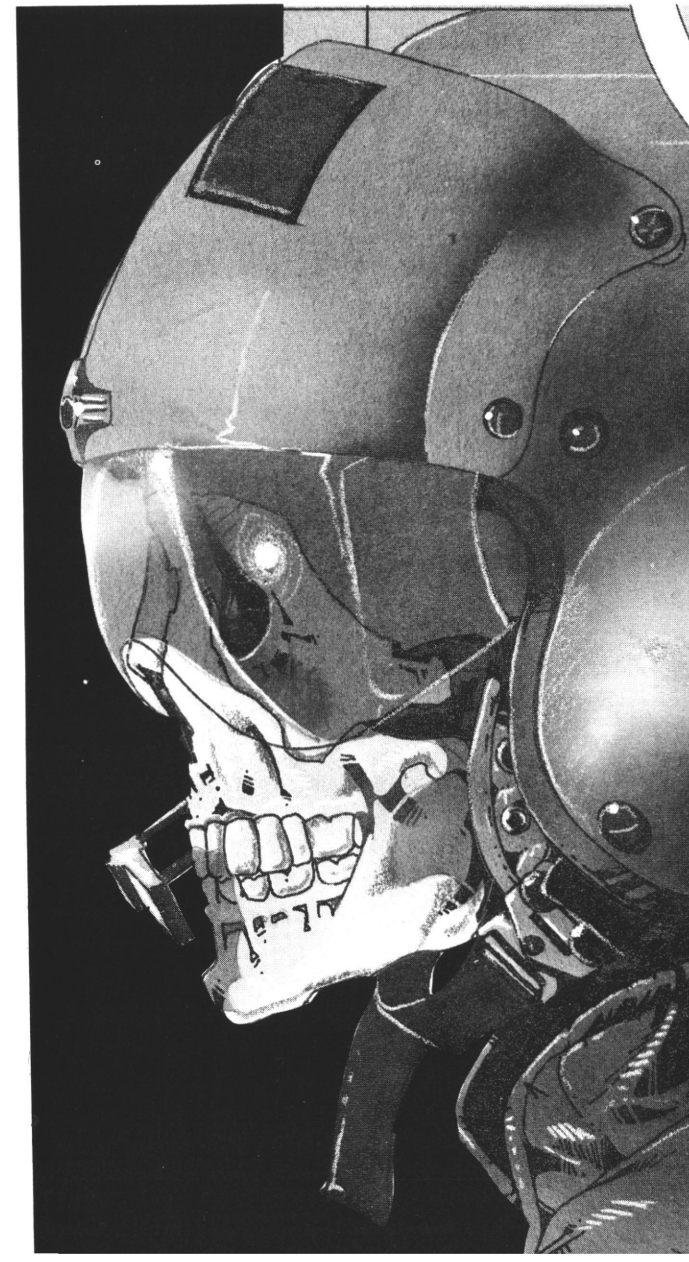
The United Kingdom Army Air Corps had implemented a similar model in 1982. In 1985, the Army Air Corps further specified that the human factors expert was to conduct an independent investigation for each accident.

A 1984 Swedish Army Aviation reanalysis of its 1975 to 1979 helicopter incidents showed that wrong decisions and faulty judgments comprised 60 percent of all the mishaps which had human factor/human error as a causal factor. Further, 215 of the 729 incidents analyzed in the Swedish report showed some type of human error problems. A follow-up of Swedish study which included previously unreported incidents showed that "human factor of the crew" was a cause 68 percent of the time.

In view of such work, it seems logical that the area of pilot error/human factors is one that is both vital to accident prevention and safety and one that needs close reexamination and analyses. Let us now look at what is actually online, or coming online, in aviation training related to "pilot error."

**Pilot Decisionmaking Training (PDMT)**

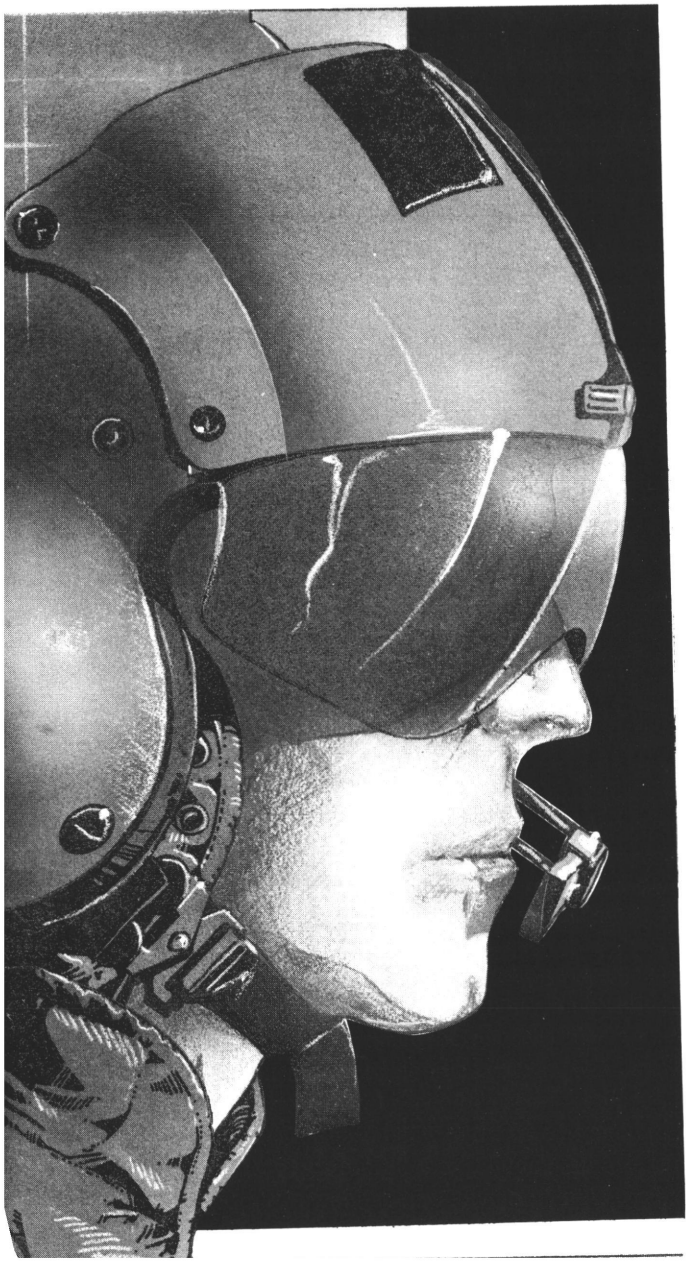
This was begun by the FAA in 1977, under contract to Embry-Riddle Aeronautical University. The original research and development work dealt with generic PDMT. It has since been validated, modified, revalidated and continues to be expanded. These ongoing efforts have come



to include Air Transport Canada, the French and Australian Ministries of Aviation and Ohio State University (as of the writing of this article).

Currently undergoing development are materials and procedures that now deal with specific aspects or portions of a flight, such as an instrument flight, takeoff and landings, *et al.* PDMT is online, or coming online, for civilian, corporate and commercial aviation in Australia, Canada, France and the United States.

As an example, the September 30, 1985, issue of *Aviation Week and Space Technology* has an article, "Pilot Training Systems Stress Decision-Making, Command Skills," on pilot training programs developed by FlightSafety International and SimuFlite Training International. These PDMT programs place emphasis on ". . . decision-making, crew interactions related to the flight, stress, fatigue and distractions related to the flight . . . ." The programs use simulator scenarios patterned after actual aircraft accidents and incidents.



The FlightSafety company is developing a pattern recognition mode designed to help the pilot both recognize and break the decisional chains that lead to pilot error. Both of these PDMT programs aim at developing the pilot's "situational awareness"—the accurate perception of all factors and conditions that affect the aircraft and the crew during specific timeframes. The use of simulation adds to the pilot's "experience file" by presenting the pilot with scenarios that would be dangerous if they occurred in a plane—but allowing for controlled, supervised responses and learning in the simulator. Certainly we all know there is *no substitute* for experience. However, we now have and can develop experiences which are carefully planned, come from validated research and development and aim at increasing pilot safety awareness and skills. The alternate to using this approach would seem to be the hope that the pilot can see, recognize and handle the dangerous situation if and when it happens.

The Air Force is testing what it calls "aeronautical decisionmaking" for its undergraduate jet pilot training. If the implementation and validation is successful, the Air Force's manuals state that ". . . similar advanced training materials may be developed for both simulator and inflight use."

Article space and the number of programs and players preclude going into further detail on PDMT. A fair summary would be that there now is available a set of broad-based ground and air (and/or simulator) training procedures. These include written situations and scenarios designed to make the pilot aware of his or her flight decisional and judgmental processes (including hazardous thoughts and decisions); stress recognition and management; inflight and simulator situations designed to test, modify and reinforce the aviator's decisional processes and stress management skills. PDMT exists; it has been researched and validated; it is being bought-into by all sectors of aviation—and it works! Let us now proceed to another aspect of safer flight.

**Cockpit Resource Management**

United Airlines, during 1980, responded to the flight recorder data available on a series of major accidents such as Air Florida Flight 90 that crashed into the Potomac River after striking the Fourteenth Street Bridge in Washington, DC. These data showed lack of crew coordination; poor crew communication; and, poor or avoided decisions by aircraft crews. United Airlines contracted with a company owned by Doctors Bob Mouton and Jane

Blake (of the management-styles "Grid" fame) to develop training dealing with these problems. The result was a program called Cockpit Resource Management (CRM) which came online in 1982. The program recognizes the human side of flying as the most important frontier and factor in aviation safety; CRM provides the learning and behavioral skills essential to optimum crew cockpit performance. It is a 3½- to 4-day program, involving group work, written scenarios, lectures and one/two simulator checkrides. It has been so well-received that:

- The other airlines send their crews through United Airlines' training, at $1,250 per person.
- The FAA has certified CRM as meeting its requirements for recurrent annual training.
- The Navy has recently entered into contract negotiations for United Airlines to train, in CRM, its DC-9 crews—as has Japan Airlines.
- The Air Force has incorporated CRM into its C-130 and C-141 training programs and is now putting it into its C-5A training.

I have only given small glimpses of a large and expanding process. It involves:

- Attempts to use accident data to build training scenarios which increase pilot and crew levels of performance and safety.
- Research and development of training in pilot decisionmaking skills.
- Research and development of training in pilot stress recognition and management.
- Research and development of training in crew coordination, communication and decisional processes.

The aviation community, at large, is of the opinion that *now* is the time to examine, research, analyze and deal with as much of the varied human factors/pilot error problem as is possible. The various efforts at this time have shown, and continue to show, that both reanalysis and new emphasis are needed in accident investigation and research. These efforts have also developed quality training in pilot decisional, awareness, stress and communication skills—all of which lead to a better, safer pilot and crew.

**Army Aviation: Where Do We Go From Here?**

The Army Aviation Branch must consider stepping from infancy to adulthood, in a series of bold moves. The primary goal of the Army Aviation effort should be to impact on aviators' safety awareness, motivations and attitudes. A primary method to do this is through new and effective training. A primary outcome would be increased aviator safety awareness and skills. The effort would begin with an open, objective evaluation of flight selection and training, with no areas sacred or off limits: An evaluation which begins by first listening to all concerned parties, from the initial entry rotary wing (IERW) student and his instructor pilot to the field commander and to the commander, U. S. Army Aviation Center, then proceed to link the data gathered from these personnel with research aimed at answering the issues and problems raised. The Department of Gunnery and Flight Systems at the Aviation Center has begun study on a program of instruction (POI) for IERW students. This POI will increase their tactical and technical proficiency and impact on field unit requirements as to qualifying aviators in additional aircraft. This program is to be called Army of Excellence Aviator Training.

This initial evaluation would be aware of and use what the rest of the flying community has done and is doing. The evaluation would be the basis for a program which would lead to the changes necessary to make Army aviators more professional, safer and more effective. While the above may sound like a task without end (and, in some ways, it is), it certainly is a task that needs to be begun now—before Army Aviation falls victim to trying to select and train for the ultrasophisticated AH-64 Apache, the Light Helicopter Family and the joint services advanced vertical lift aircraft, while incorporating programs and methods originally designed for the UH-1 Huey.

Among the issues to be raised and responded to might be these:

- What is the purpose of the current selection criteria?
- Is it a numbers game only?
- Does it weed out too many people with the qualities that a combat aviator needs—or does it do the reverse?
- Does it let in too many people with the qualities that Army Aviation should not want; people who will become the cowboys, the accident statistics?

What of IERW? Why are parts of it considered sacrosanct by many people? Does it produce a pilot with good flight control skills but who is unable to function well in a unit or mission setting? If IERW is the first and key step in any aviator's career, why, as is indicated in some studies, are time and money constraints considered *first,* before the quality and goals of the training? Does IERW function as any sort of screening device—i.e., can poor aviators get through it via many setbacks? *Should* IERW function as a screening device and, if so, how?

The same questions apply to aircraft qualification courses (AQCs)—perhaps more so. Is it realistic to expect an aviator to actually become, *in any way,* proficient in the UH-60 Black Hawk or the AH-64 given the length of time currently allowed/projected? What is the *real* pur-

pose of AQC—i.e., what do we expect/demand it do? We can certainly go on through unit and continuation training, the precommand and command courses and so on. Instead, let's shift gears slightly and look again at aviation safety.

The Army shares pilot error/judgment problems and concerns with all aviation, including the Air Force, FAA, United Kingdom, Swedish Air Force and others who have begun efforts to develop better human factors research and accident investigations (encompassing pilot error). their common view was that they did *not* have all the answers, and that this work was of primary importance. They based their work, in part, on reanalyses which showed the need to deal more completely with human factors and to deal with them in a new (better) way. Certainly, army work in this area can result in such benefits as effective improvements in training and accident analyses and classification; the development of systematic accident/emergency simulator training based on human factors data—and more.

Similarly, the flying community has not only recognized the benefits of PDMT, CRM and similar approaches to safety, but also has developed them and put them online. It is clear that the U. S. Army needs to take these types of training and modify them for rotorcraft, validate them, and make the training available to its aviators. In fact, Army Aviation should take the lead in rotorcraft safety awareness training and skills.

The Army cannot view punitive efforts as a major way to deal with aviators involved with aviation accidents. While there may be some (2 to 5 percent) of those in the Army flight force who are "bad actors," the most productive approach is to provide training/awareness/skills that are aimed at 100 percent of the flight force. Let Army Aviation work out programs to focus on and modify the safety awareness attitudes/motivations of all its aviators. If the 2 to 5 percent or so of the poor aviators don't buy it and don't change their ways, then they are really no secret and the mechanisms exist (or are being implemented) to deal with them.

But, let's not throw out the dishes with the dishwater—let's keep our focus on positive actions which impact 100 percent of the Army's aviators. The time is right for a quantum leap; the window of opportunity is open. Let's not hear the closing and padlocking of that window. The cost of that padlock may well be paid for by people, materiel and morale. Instead let us feel the cleansing wind of open evaluation and needed change leading to increased aviator effectiveness and safety—**now!**

While there is no absolute solution to the pilot error/human factors problem, it is realistic to expect improvement both in flight operations and in a clarification and demarcation of the problems. The problem clarification can result in further aggressive, effective study and resultant positive change. Can Army Aviation afford to do less?

## ABOUT THE AUTHOR

Dr. Ronald John Lofaro is a research psychologist who came to ARI in 1984 from the FAA. He also served as a commissioned officer in the U. S. Air Force. He has had some 14 articles and monographs previously printed.

# PEARL'S

*Personal Equipment And Rescue/survival Lowdown*

This month's PEARL, Dawna Salazar, shows us a well-organized Army Aviation life support equipment (ALSE) shop. Jim Cully, an ALSE technician with Sikorsky Support Services, Aviation Developmental Test Activity at Cairns Army Airfield, Ft. Rucker, AL, established the shop. To PEARL's left are boards on the wall displaying the general purpose first aid kit and the SRU-21/P individual survival kit.

In future issues, PEARL will demonstrate a variety of ALSE equipment. Photographs are by Benjamin Martel.

**Technical/Field Manuals (TM/FM) Data**

We have identified some 150 odd Army technical manuals that deal with aviation life support equipment (ALSE). We orchestrated action to the U.S. Army Aviation Logistics School, Ft. Eustis, VA, to develop ALSE guidance via field manuals. This will eventually cut down on the number of TMs on this critical equipment and make it easier for ALSE specialists/technicians to maintain a working library of data. We're happy to report that the ALSE Training School at Eustis is following this action. Take a look at the *Aviation Digest* dated July 1985, pages 24 to 25. The FMs are scheduled for publication fourth quarter FY 86; FM 1-508-1, the initial FM — "Maintaining Aviation Life Support Equipment (ALSE): Maintenance Program," was approved by DA, 24 May 1985, and FM 1-508-2 (FC 1-508-2), "Field Circular for Maintaining Aviation Life Support Equipment (ALSE): Personal Equipment," was sent out for staffing in June 1985. Other projected FMs are: FM 1-508-3, "Flotation Equipment"; FM 1-508-4, "Survival Equipment"; FM 1-508-5, "Medical Equipment"; and FM 1-508-6, "Oxygen Systems and Related Equipment": These are nearly ready for staffing. Upon print they will be distributed automatically via pinpoint distribution. They will not be available from the U. S. Army Adjutant General Publications Center, Baltimore, MD, until they are indexed in DA Pamphlet 310-1.

**Total Two-Way Radio Failure!**

If you experience total two-way radio failure, all is not lost. Just break out your PRC-90 survival radio, attach the earphone assembly, place the earphone into your ear and start talking into the survival radio microphone. While this will be somewhat awkward, it will allow you to talk to someone. When not transmitting, the survival radio can be kept in the vest radio pocket (vertical survival radio pocket) or some other handy place. If you have other aircrewmember personnel onboard, let them handle the survival radio.

**Cold Weather Flying and Survival**

If true winter weather hasn't already hit your neck of the woods, then its arrival is sure to come. The time to prepare for it is now, while you're in the cozy warmth of the aircrew personnel lounge, not after you find yourself in the thick of the cold weather that you are sure to encounter. Preparation for any flight begins long before you ever step into your aircraft. During the winter months it is extra important that you keep physically fit, rested and ready to fly. Remember, it's easier to catch cold during the wintry season, but balanced meals and adequate sleep will go a long way toward maintaining your health. Start your flight planning early. Plan your missions thoroughly: You probably won't be able to accomplish as much as you are used to because of increasing marginal weather. Consider the terrain you'll be flying over and please, please, make sure you wear the appropriate clothing and have the survival equipment needed to give you a chance for survival and/or rescue. Again, please prepare for the worst and you will surely be ahead of the game.

**Good Ideas for Gifts in the New Year**

How about a fire extinguisher? Look for one labeled with ABC. "A" means it's good for wood, cloth or paper fire; "B" fights gas and grease fires; and "C" is for electrical fires. Or, a smoke detector? Don't discount someone who has one—one isn't enough. A smoke detector is needed on each level of a home or at both ends of a single story house. Thanks to the Air Force Office of Safety for these timely tips; but don't just acquire the items, install them where they will do the most good.

**ALSE Training and Survival Training/Schools**

We need your help in compiling an up-to-date listing on ALSE training and survival training/schools that can be used by our Army personnel to ensure they have a better opportunity to undergo training in these critical areas. If you or your activity sponsors a school filling one of the requirements listed below, please contact PEARL on AUTOVON 693-3215/3818 or Commercial (314) 263-3215/3818. You can also write to PEARL, c/o AMCPM-ALSE, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798.

*School/Training Requirements:*

1. Ongoing school/classroom training — not just a one-time thing.
2. Open to all Active Army, Army Reserve and Army National Guard personnel.
3. Billeting and mess facilities (i.e., quarters, hotels, motels, available eating facilities nearby for personnel attending the course (s)).
4. Program of instruction (copy furnished to AMCPM-ALSE) for inclusion in a catalog of ALSE Training and Survival Training Schools.

We hope this will provide the Army and the ALSE personnel with information to help you become better trained in these critical areas.

**AR 95-17 Waivers**

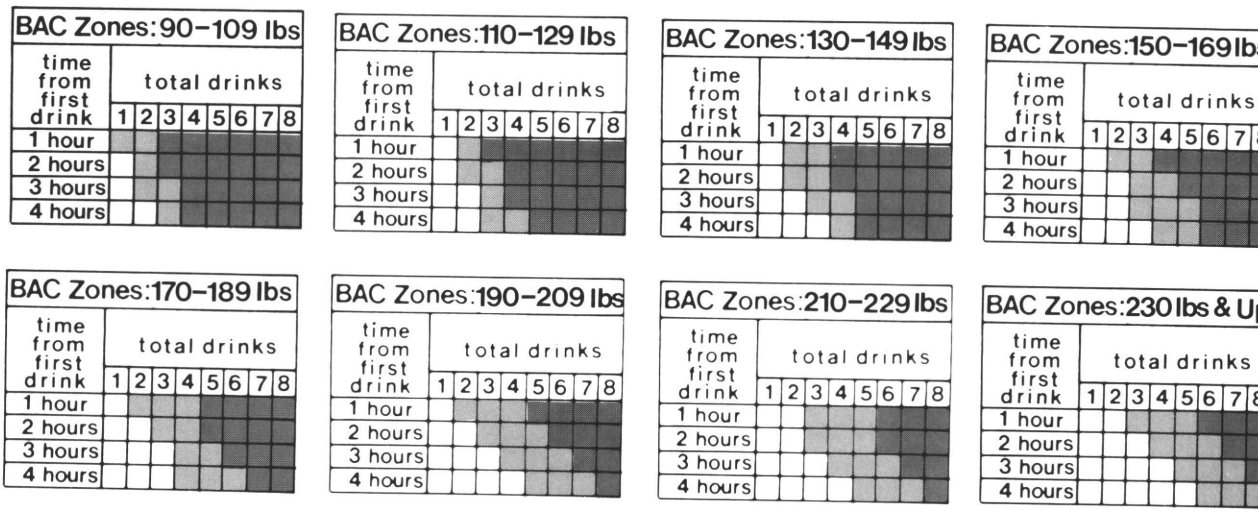
AR 95-17 was published 15 April 1984 with an effective date of 15 May 1984. This proliferated a rush of re-

quests for waivers for the requirement for each crewmember to carry a survival radio. Prior to this, the survival radio shortage had surfaced at the Worldwide Aviation Logistics Conference. A working group consisting of individuals from the concerned commands was formed to attempt to rectify this problem. In the meantime, a blanket waiver was issued for 6 months to allow for an interim period of noncompliance and to ensure a minimum of one survival radio per aircraft. This waiver has since been renewed for another 6 months and will continue on a 6 month cycle until the radio shortage problem can be rectified. Other requests to give the major commanders the authority to grant waivers to AR 95-17 have been sent to the Department of the Army and have been denied. The reasoning behind this is that both DA and the Army Materiel Command Project Office are highly concerned for the safety and survivability of the Army aircrews. We realize there are logistical problems obtaining equipment and replacement parts and feel these problems should be surfaced and dealt with at the highest level to reduce the likelihood of this occurring again.

Again I reiterate that our biggest concern is the safety and survivability of Army aircrews and the enhancement of mission accomplishment. We realize that the present equipment is heavy, bulky and cumbersome, and we are taking steps to reduce the stresses and discomforts experienced by the aircrews. The research, development and acquisition processes are tedious and time-consuming and we ask that you please bear with us through this transition period. Thank you for the support you provide to us through your letters and telephone calls and for your continued support of the Army aircrews.

### If You Drink, Don't Fly Or Drive

As you can see from the charts below, there is no safe way to fly or drive after drinking. Information comes from the Office of Traffic Safety, the Department of Alcohol and Drug Programs, and the Department of Justice. Take a look at the chart that includes your weight and go to the total number of drinks. One drink is a 12-ounce beer, a 4-ounce glass of wine, a 1¼-ounce shot of 80-proof liquor, mixed or unmixed. And the impact of alcohol on the body is different if you drink on an empty stomach, you're tired, or you are sick or taking medication; so add a few more to the actual count. Now, follow the drink column down to an amount of time. If you stay in the white, you may be OK. If you're in the gray, you could be illegal, and your chances of having an accident are five times higher than if you had no drinks. If you're in the black, *you are* illegal; your chances of having an accident are 25 times higher. Coffee doesn't lower your blood alcohol concentration (BAC), only time does.




SELDOM ILLEGAL .01%–.04%

MAY BE ILLEGAL .05%–.09%

DEFINITELY ILLEGAL .10% & UP

*If you have a question about personal equipment or rescue/survival gear, write PEARL, AMC Project Officer, ATTN: AMCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-1218/9 or Commercial 314-263-1218/9.*

# Flight/ATM Records Checklist

**Sergeant First Class Jeffery R. Buedel**
External Evaluation Branch
Evaluation Division
Directorate of Evaluation and Standardization
Fort Rucker, AL

SINCE THE LAST Aviation Standardization and Training Seminar (ASTS) "DES Report to the Field" article published in the May 1985 issue, many efforts have been made to improve our assistance-oriented training program. One such improvement has been the development of a checklist to assist the field to correctly maintain flight and aircrew training manual records in anticipation of courtesy inspections during ASTS visits.

This checklist was designed as a guide to help ensure that all areas in flight and aircrew training manual records are being maintained in accordance with AR 95-1, AR 600-105, AR 600-106, AR 310-10, AR 37-104-3, FM 1-300, DA Pam 738-751, FC 1-210 and the DOD Pay Manual. ASTS and DA evaluation visits are using this checklist. A copy also was sent to Forces Command (FORSCOM) recommending that the checklist be considered for use during future Aviation Resource Management Survey (ARMS) inspections, thus ensuring standardization between DES and FORSCOM.

There are six different areas that make up the checklist. All areas are inspected, but not necessarily in the following order:

1. Publications—AR 95-1 gives required publications.
2. Individual Flight Records Folder (IFRF)—AR 95-1 and FM 1-300 give instructions on how to construct and maintain the IFRF.
3. Crewmember/Noncrewmember Flight Status—AR 600-106 gives instructions on flight status.
4. DA Form 2408-12—FM 1-300 and DA Pam 738-751 give instructions on filling out the 2408-12.
5. Monthly Exception Certificate—AR 37-104-3 gives instructions on filling out and submitting the Monthly Exception Certificate and the DOD Pay Manual gives an example of how to track flight time.
6. Aircrew Training Manual (ATM) Records—FC 1-210 gives instructions on how to construct and maintain the ATM folder.

Some of the most common errors found during an ASTS courtesy flight and ATM records inspection are:

- The date that the operations officer reviews DA Form 759 and 759-1 is not being annotated in block 8 of DA Form 759, IAW FM 1-300.
- Senior and Master Aircrewmember Badges have not been annotated in section II, block 17 of DA Form 759, IAW FM 1-300.
- Aviators and nonaviators not having an extension for annual flight physical, if physical was not completed by end of birth month, IAW AR 40-501.
- DA Form 4186, "Up" and "Down" slips are not being annotated in section II, block 17 of DA Form 759, IAW FM 1-300.
- DA Form 4186 is not being completely filled out by the flight surgeon.
- DA Form 2408-12 is not being filled out IAW DA Pam 738-751.
- Aviators are not being integrated into the unit's Aircrew Training Program within 14 calendar days after reporting for duty or when authorized IAW 95-1.
- Aviators are not progressing to ARL 1 status within 90 days of being designated ARL 2, IAW FC 1-210.

Our goal is to provide your unit the best assistance program possible. This checklist can be used as a guide to help your unit prepare for an ASTS courtesy or DA Evaluation Flight/ATM Records inspection.

Any questions or requests for the checklist should be made by writing DES, ATTN: ATZQ-ES-E, Ft. Rucker, AL 36362-5000, or by calling AUTOVON 558-4691/6571, FTS 533 (205) 255-4691/6571.

***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 36362-5000; or call us at AUTOVON 558-3504, FTS 533-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or 205-255-6487 and leave a message.***

# SEMA SURVIVABILITY:

## The Story Continues

**Captain Thomas R. Biang**
Aviation Test Officer
United States Army Intelligence and Security Board
Fort Huachuca, AZ

IF YOU RECEIVED the June 1985 issue of *Aviation Digest*, you most likely have read "Mohawk Evasive Maneuvers: The Rest of the Story" by CW4 Terry Clark. It was a very informative article and a testimony to the increasing interest by the Army Aviation community in aircraft survivability and what we, as special electronic mission aircraft (SEMA) aviators, can do to survive.

Actually, the rest of the story has yet to be written. Project managers, engineers and test officers are working closely together, developing the future world of aircraft survivability—for you see, the story continues.

The idea to evade the airborne threat began the moment aircraft were used to either support or fight in combat. Advancing aircraft technology and efficient airborne threat systems have caused the evaluation of what we now conceive as the evasive maneuver and the use of electronic countermeasures. Today, we are rapidly approaching technologies that will electronically counter the most sophisticated threat systems, experiencing better than 99.9 percent effectiveness. If technology allows us such an efficient percentage, will there be a need to maneuver in the future when the threat is rendered useless, or will we always be subjected to the dumb bullet?

The U. S. Navy and U. S. Air Force have been studying and developing evasive maneuver strategies and electronic countermeasure devices to defend against the airborne threat and to effectively train aircrews in proper techniques of employment. Over the years, these two services have compiled volumes of studies that examine every segment of a particular situation in order to gather data critical for increasing the margin of survivability.

Many of these studies and their conclusions were put to the test in the Republic of Vietnam and on various test facilities throughout the United States. Army testers have at their fingertips the conclusions and proven recommendations of these studies. But do these results meet the needs of the SEMA aviators and their specialized mission?

The U. S. Army Intelligence Center and School (USAICS), Ft. Huachuca, AZ, recognized the need to provide answers for the SEMA aviator concerning aircraft survivability, and in 1981, initiated the Force Development Testing and Experimentation (FDTE), phase I, to define that answer. The test was limited, using only one aircraft—the OV-1D Mohawk, severely void of aircraft survivability equipment (ASE) systems. The final test report concluded that further testing was needed.

In April 1983, FDTE phast II was conducted. It included the evaluation of the AN/APR-39, AN/APR-44, and M-130 chaff and flare dispenser (see information below), which were mounted on the OV-1D, RU-21H Ute and UH-60 Black Hawk aircraft, and encompassed how these should be used to increase the margin of survivability. The test was a great success and lay the foundation for SEMA survivability in the form of USAICS Pamphlet 95-1. As CW4 Clark wrote in his article, we now had something that told us what an "appropriate evasive maneuver" was and its purpose—not letting a missile fly up your exhaust stack.

**Radar Warning Receivers**
AN/APR-39
AN/APR-39 (V)2
AN/APR-44

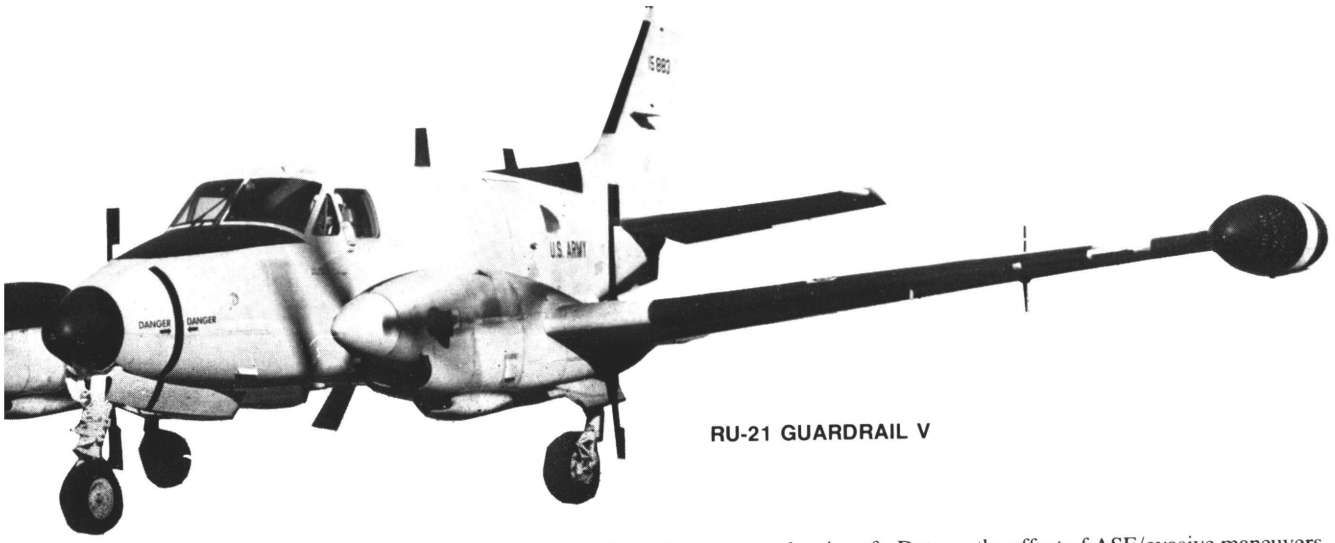
**Radar Jammers**
AN/ALQ-136
AN/ALQ-162

**Infrared Jammers**
AN/ALQ-144
AN/ALQ-147

**Missile Detector, Chaff Flare Dispenser**
AN/ALQ-156
M-130

Before the beginning of the FDTE phase I test, the Army established the Project Manager for Aircraft Survivability Equipment (PM-ASE) office at the Aviation Systems Command, St. Louis, MO, to manage the development of future electronic aircraft survivability countermeasure devices and to provide these "black boxes" to the user. The efforts of the PM-ASE office, in the form of years of study and development, will provide the SEMA aviator with alphanumeric radar warning receivers, pulse and continuous wave radar jammers, and automatic chaff and flare dispensers. Some of the systems are available now, but most will be in production or available at the end of 1986.

So now the question comes back to training and how aviators are going to use these new systems when they become available. Efforts are currently underway to answer these questions dur-




RU-21 GUARDRAIL V

ing the conduct of the FDTE, phase III (a continuing effort of phases I and II). Phase III is designed to collect data to determine what doctrine and tactics can be used that will provide the greatest margin of survivability. The test will include a complete ASE suite mounted on each of the six SEMA aircraft. Included are: the AN/APR-39 (V)2, AN/ALQ-136, AN/ALQ-156, M-130, AN/ALQ-162, and a combination of infrared suppressors and paint.

Prior to actual flight, an analysis of the capabilities of each SEMA/ASE suite will be conducted. Simultaneously, optimal mixes of evasive maneuvers and countermeasures will be developed through computer modeling. This model will have the capacity to put the "pilot" in the simulation loop in the form of an analytical comparison of approaching situation blocks. Computer programers will insert the SEMA mission profile, the employment concept, add the threat's aerodynamic characteristics, and then run a typical mission.

This program will allow the test officer to examine thousands of one-on-one engagement possibilities, observing every detail of each event from threat acquisition to the end of the evasive maneuver. The program also will provide a means of putting each aircraft in situations and positions that are not testable on any range.

The results of this study, combined with two additional studies, will help the test directorate to determine the best evasive maneuver to be used. Two of the studies are similar computer simulations with the third complementing the results of the models focusing on when, or should, a pilot initiate a maneuver. This study is a mixture of simulation and analysis of existing studies. The results will be flown in an operational environment, using aircraft representative of those found in the Aerial Exploitation Battalion, Military Intelligence Combat Electronic Warfare Intelligence Group (Corps). Using maneuvers and countermeasures developed with the data collected during the simulation, aircraft will fly doctrinal and designated mission profiles with standard mission equipment and ASE against simulated surface-to-air missiles, airborne intercept and antiaircraft artillery threats.

Consistent with recognized threat employment concepts, the FDTE will pit individual aircraft against each threat air defense array and, as appropriate, against combined air defense arrays consisting of one of each threat system that might simultaneously engage the aircraft. Data on the effect of ASE/evasive maneuvers on the threat system, along with military judgment, will be used as a basis for assessment.

But what if the studies reveal that evasive maneuvers are not required? One of the critical issues to be addressed during the test is the effectiveness of the ASE suite and how it will affect the collection of intelligence. If the ASE suite does its job, warning the pilot and clearing the air of the threat, will there be a need to maneuver? If the need to maneuver does exist, when does the pilot initiate action, given the new ASE suite?

Another new set of evasive maneuvers to learn? Possibly, but what if that "set" of maneuvers becomes "one" maneuver for all situations; one maneuver to get your assets out of trouble? Obviously the workload on the pilot during the critical phase would be reduced. No more asking yourself during a highspeed dive, "Should I have used an othagaral break or was that a jinking maneuver?"

Considerable forethought and planning have gone into the first suite of aircraft survivability equipment for SEMA aircraft. System development testing, operational testing and initial configuration design are already ongoing or, in some cases, completed. Being the most important event scheduled for the SEMA pilot, the FDTE phase III test is the only vehicle scheduled that combines the efforts of developers, manufacturers, project managers and state-of-the-art simulation into one coordinated effort designed to help define future tactics of survivability. The success of each component that makes up the ASE suite, and its ability to work in harmony and provide the aviator the decisive edge, will be determined during the phase III test.

The final goal will be to produce the first revision to USAICS Pamphlet 95-1, addressing not only the maneuver but also the use of the ASE as it is configured on each aircraft. Hopefully, when aviators report to their new units, they will not be burdened with the task of memorizing all the maneuvers, but rather only the maneuver associated with the type of aircraft they will be flying.

Engineers across the United States have designed and developed the best surveillance equipment in the world. If we cannot use these systems in times of conflict and survive, we might as well leave them on the shelf. When completed, FDTE phase III will bring the aviator closer to SEMA survivability: ***the story continues!***

GOAL —
$2,500,000

February 1986—
$1,925,000
Cash and pledges

# Army Aviation MUSEUM

*This is a series about the Army Aviation Museum Foundation fund drive. Currently, plans call for building a modern complex to house your Army Aviation Museum. Since last month additional donations have been received. However, we still have a ways to go, as the barometer above shows. If you would like to help "build" the Army Aviation Museum's new home, you are invited to send a tax deductible contribution to: The Army Aviation Museum Foundation, Box 610, Ft. Rucker, AL 36362-5000. If you desire additional information call Mr. Ed Brown at (205) 598-2508.*

## A Look At What's In Your Museum

Originally the H-37 was designed to meet the Navy/Marine assault transportation requirement, and was first flown on 18 December 1953. In 1954, the Army tested a YH-37 and received its first delivery in 1956. The H-37A was trial tested at Ft. Rucker, AL, and subsequently used to equip transportation companies, the first being the 4th Medium Transportation Company at Ft. Benning, GA, on 1 February 1958. This was also the first unit to deploy the H-37 overseas when it moved to Germany in 1959. For 10 years, the H-37 was the largest transportation helicopter in the free world and the Army's first twin-engine helicopter. With the addition of automatic stabilization equipment and modern avionics gear, the H-37A models were upgraded to H-37Bs. The mission prefix "C" was added to the designation in 1962. Normal accommodations were for either 23 passengers, 36 equipped troops, two jeeps, or a 10,000-pound externally slung cargo. Of the 148 H-37s built, the Army received more than half including the last aircraft of the series, delivered in May 1960. The H-37A was placed on display at the U. S. Army Aviation Museum in 1970.

H-37 Mojave

THREAT

**Captain Scott A. McManus**
Threat Branch
Directorate of Combat Developments
U. S. Army Aviation Center
Fort Rucker, AL

# THE CATALYTIC KILLER

This article serves to make you, the aviator, aware of the potentially deadly effects smoke has on air defense operations when strategically employed in a blinding, camouflage or decoy mode of attack under favorable weather conditions.

IT IS THE THIRD day since the Soviets crossed the German border.

Last night, North Atlantic Treaty Organization (NATO) forces had finally stalled the initial Soviet offensive thrust, but intelligence reports indicate a Soviet buildup to reinitiate offensive operations beginning tomorrow morning.

In an effort to preempt the Soviet thrust, NATO forces planned and issued orders for a series of deep air assault attacks. The plans are made down at unit level. The routes, using nap-of-the-earth (NOE) flight, should provide excellent cover and concealment from enemy air defense artillery (ADA) systems. Weather conditions are good: Ceiling 4,000 feet; visibility 2,000 meters, light fog; wind 090/05; altimeter 29.82 . . . .

All crews are properly briefed, night vision goggles are checked, and pitch-pull is right on schedule, 2130 hours. Two minutes from the forward line of own troops (FLOT), prep artillery is initiated while escort gunships establish overwatch positions.

At this time, the Soviets initiate a barrage of counterartillery fire across the forward edge of the battle area (FEBA).

Visibility appears to be decreasing and you start swearing at the weather people. Almost instantly, you punch in the "soup"—inadvertent instrument meteorological conditions (IMC) while NOE. How can this be? You

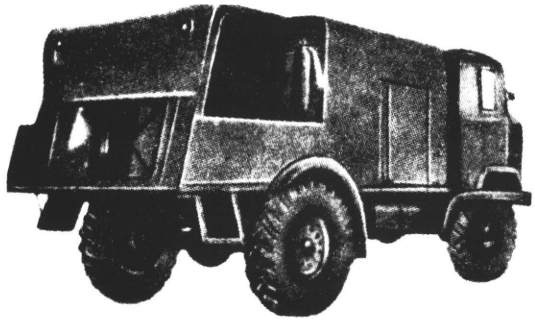
pull power in an effort to execute IMC recovery procedures. All of a sudden you hear a rapid signal from your APR-39. What evasive maneuver do you take? Dive? But you cannot see anything! Do you climb and hope you are not within the maximum effective range of the enemy's ADA system? What ADA system is it? What would you do? How did you get into this position?

One of the least addressed prospects in an air operations order is the use of smoke, and Warsaw forces plan to use this capability to the utmost. Isolated, smoke is a passive, nonlethal weapon but when employed on the modern battlefield, it can place aviators in fatal positions. A smoke screen can be produced and maintained up to 400 feet above ground level. Without adequate visibility at low altitudes, the aviator is deprived of NOE and contour flight—the aviator's primary ADA defensive measures.

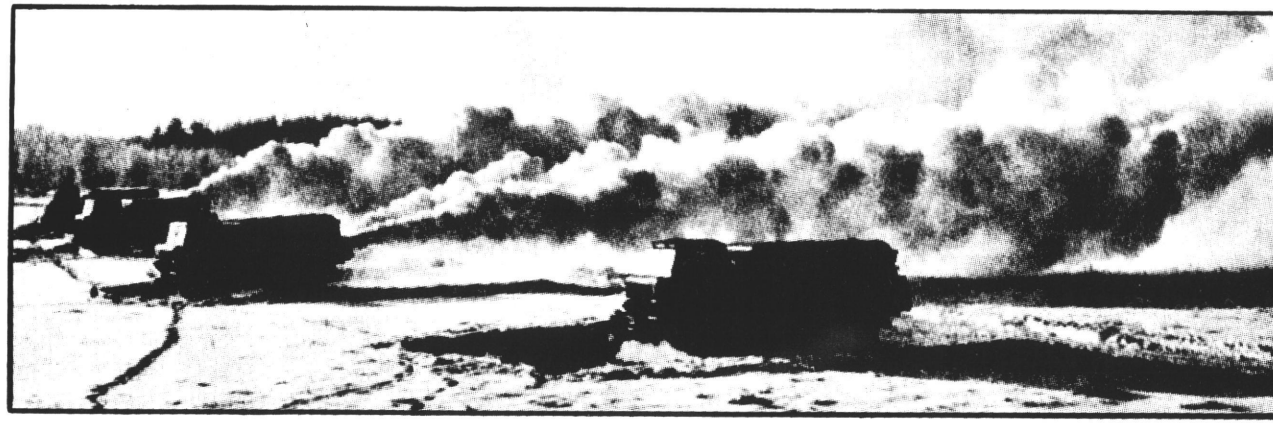
The Soviets realize the adverse effects smoke can have on helicopters. Consequently, they produced an extensive arsenal of smoke delivery systems to include smoke grenades, smoke generators, combat vehicle exhaust systems, artillery and aviation. Each battalion has two vehicles capable of producing a smoke screen five times the width of a battalion sector. The Soviets employ three types of smoke screens—blinding, camouflage and decoy—all of which affect aviation operations.

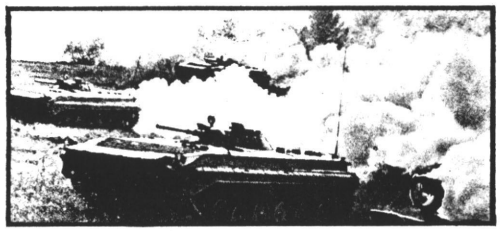
The *blinding smoke screen* is placed on the enemy's position, which hampers or impairs the firer's target acquisition and tracking capabilities. It also attenuates microwave and infrared waves and will diffract laser beams. This screen could drastically decrease the overwatch element's ability to provide adequate fire support. A blinding smoke screen also diminishes the effectiveness of the attack helicopter's antitank guided missile's standoff range. In fact, the Soviets believe that blinding smoke can reduce a firer's effectiveness by a factor of 10.

This screen also causes aeroscout missions and cross-FLOT airlift missions to be ineffective unless observations are made above the smoke layer and sorties are flown higher than contour flight, respectively. However, these situations would create optimum targets for Soviet ADA systems. Therefore, a blinding screen could be detrimental to aviation operations along the FEBA by reducing standoff range, de-



**The smoke trucks, a variant of the GAZ-66 4x4 2,000-kg truck fitted with a smoke-generating device, dispense a large-scale smokescreen during a chemical reconnaissance exercise.**





**Many armored vehicles have smoke generating systems incorporated into their design, including tanks such as the PT-76, T-10M, T-55, T-62 (above left) and T-72, as well as the BMP infantry combat vehicle (above right). These vehicles can create smokescreens by injecting raw diesel fuel directly into the engine exhaust manifold, causing vaporization of the fuel. The vaporized fuel is forced through the exhaust outlet, resulting in the release of thick smoke.**

nying intelligence observations and by creating a potentially hazardous ADA environment.

The Soviets employ a *camouflage screen* that enables Soviet bloc forces to maneuver without being seen. The screen is placed between the opposing forces, and Soviet doctrine states attacking forces should follow as closely as possible behind the advancing screen. This screen hampers the defending force's ability to detect and track enemy combat vehicles. Remember, "What you can see, you can hit." Conversely, "What you cannot see, you cannot hit." The Soviets believe that target acquisition through a camouflage screen is reduced four times and offensive casualties are reduced by 25 percent. This combat "divider" would effectively reduce NATO standoff ranges in the defensive posture.

The Soviets also employ a *decoy screen* using vehicle silhouettes and noise simulators to produce a false picture of their forces' disposition. Outnumbered by the Soviets, NATO forces must maximize economy of force without exception. A decoy screen could produce a viable yet feasible target for Army Aviation causing misuse of a vital and key asset of the combined arms team. Not only would the aircraft be diverted from the real threat, but ammunition and fuel would be consumed with zero results.

The Soviets primarily employ S-4, white phosphorus, and plastic white phosphorus, producing an extensive smoke screen yielding a reduction in visibility. These screens can be produced in a matter of seconds. The primary factor affecting the use of smoke is the weather. Factors conducive to the use of smoke are:

- Winds 3 to 5 meters per second in the direction of the enemy.
- Air and ground temperatures the same.
- Overcast skies.
- Relatively high humidity.
- No precipitation.

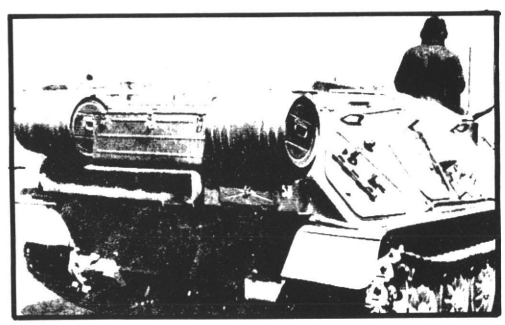
High winds and precipitation will cause the smoke to dissipate rapidly.

Although smoke alone is not detrimental to the aviator, its effects can be lethal. If weather conditions are favorable for the use of smoke, effectiveness of aviation can be reduced drastically. Overwatch fires will be hampered along with a reduction in standoff range. The ability of scout aircraft to effectively observe enemy activities would be reduced unless observations were made at less survivable altitudes. Helicopters operating in cross-FLOT would be deprived of NOE and contour flight, producing easy ADA targets. Vital aviation assets could be needlessly committed to targets no longer viable or existent. If we are not cognizant of the potential use of smoke in the weather portion of our operations orders, the enemy has the advantage of surprise. Although only a catalyst, smoke can cause death to the aviator.

References

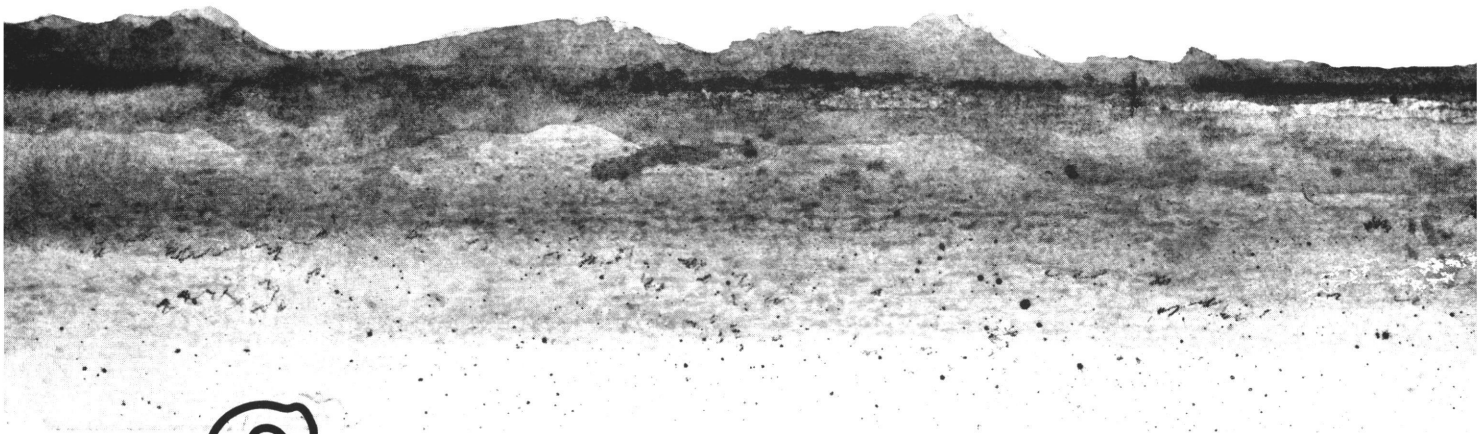

1. "Tactical Smoke Increases Survivability," Dr. Gerald C. Holst, *Armor,* May-June 1984, pp., 20-25.
2. FM 100-2-1, "The Soviet Army: Operations and Tactics," Chapter 13.


**A few combat vehicles, such as the T-54 tank and the ASU-85 assault gun (below), may carry externally mounted smoke barrels.**



# Not Just Another

**When members of D Company, 229th Attack Helicopter Battalion, were deployed to the National Training Center, Ft. Irwin, CA, a lesson well learned was that standards governing aircraft maintenance in a desert environment must be strictly adhered to. This article discusses the standing operating procedures for UH-1H Huey, AH-1S Cobra and OH-58C Kiowa helicopter maintenance in a pre-desert, desert and post-desert environment.**



SO YOU ARE going to the National Training Center (NTC), Ft. Irwin, CA! You've probably heard rumors about what goes on "out there" on the high desert floor, and you've probably sought information from NTC veterans. (You can tell NTC veterans by that special gleam in their eyes and the fact that they keep shaking sand and dust out of their socks.)

D Company, 229th Attack Helicopter Battalion's deployments in August 1984, and again in May 1985, to the National Training Center have lead to a realistic pre-desert, desert and post-desert standing operating procedure (SOP) for the UH-1H Huey, AH-1S Cobra and OH-58C Kiowa helicopters. It is important to note that such an SOP assists highly motivated and dedicated crewchiefs to keep their aircraft clean and serviced in a desert environment. As you read this article, you may say to yourself:

- We already know (or do) that!
- Why do we have to do that?

Both of the above thoughts can be placed under the heading "Experience Through Lessons Learned." Let's look at a few examples selected from our pre-desert SOP:

- External surface of oil cooler radiators cleaned with soap and water, followed by compressed air to blow out any build-up of sand and gunk between the radiator fins.
- Variable inlet guide vane (VIGV) actuator "begin to open" check by maintenance test pilot (MTP).
- Bleed band closure check by MTP.

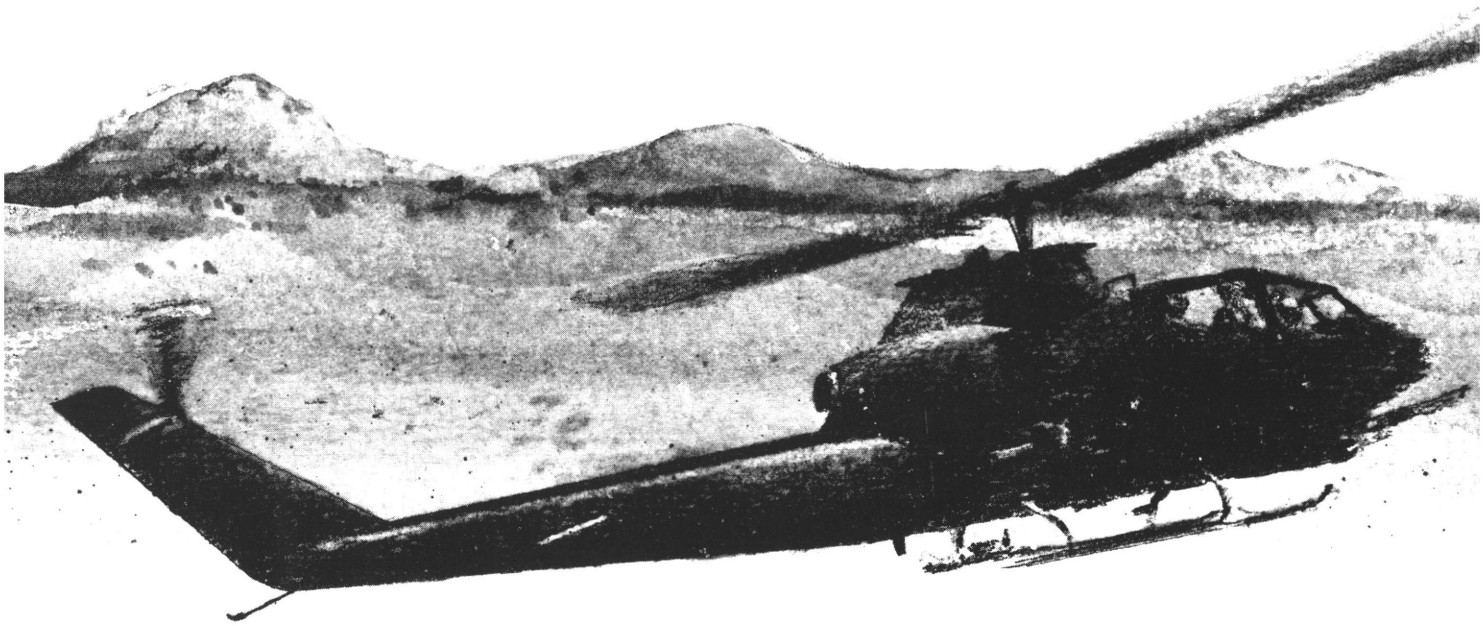
Maintenance test pilots are going to love hearing this because it will give them an opportunity to fine tune their unit's aircraft.

You've no doubt heard the adage, "For the want of a nail, the shoe was lost, for the want of a shoe, the horse was lost, for the want of a horse, the battle was lost." Five AH-1S aircraft took off on a dawn mission against the opposing force (OPFOR) in "The Valley of Death."

- The first aircraft had a compressor stall 15 minutes into the battle; reason: VIGV out of rig.
- The second aircraft suffered compressor stall on its second fuel load; reason: bleed band.

# Field Problem

**SFC Michael Shay**
D Company
229th Attack Helicopter Battalion
Fort Rucker, AL



• The third aircraft experienced high transmission oil temperature and had to set down; reason: sand accumulation in the oil cooler radiator fins.

• The OPFOR won the battle that day.

But wait, the story doesn't end yet. Chapter 1 of Technical Manual (TM) 55-1520-236-23-1 calls for an inspection of the aircraft after compressor stalls. Step B calls for an inspection of the 42-degree gearbox drive and coast down sides of the quill; this requires the quill to be removed.

The jack screws and "O" rings had to come from Ft. Ord, CA—a 4-hour flight one way by UH-1H. Once the quills were removed and passed inspection, the quills were placed in clean coffee cans that were then filled with MIL-L-23699C (engine transmission 42-degree and 90-degree gearbox lube oil) to the external edge of the quill. With the gracious consent of the people at Bicycle Lake, we placed the coffee cans with quills in their freezer for a few hours to make reinstallation a lot easier. I am aware that this method is not preferred; but, when the outside temperature was 116 degrees Fahrenheit, how much hotter could we heat the case of the 42-degree gearbox?

The lessons learned at the NTC have left an indelible sense of importance with the soldiers to adhere to the unit's pre-desert, desert and post-desert SOP. The following notes from our SOP, learned after personal experiences, will assist your unit to successfully operate in the desert environment.

**Pre-Desert SOP**

1. Aircraft must be identified (with back-ups) for preparation a minimum of 30 days in advance.
2. Safety of flight inspections performed, to include:
   a. Dial indicator readings on all questionable bearings.
   b. Special attention to main and tail rotor blades.
   c. Seeping seals repaired.
   d. Canopies in good shape, properly polished and rain repellent, national stock number (NSN) 6850-00-139-5297, applied in accordance with (IAW) the directions on the bottle.

3. All aircraft thoroughly washed to include:

a. External surface of oil cooler radiators cleaned with soap and water followed by compressed air, to blow out any build-up of sand and gunk between the radiator fins.

b. Oil cooler compartment cleaned.

c. Pylon area cleaned free of grease, oil and hydraulic fluid.

d. Area under plenum chamber cleaned.

e. On the AH-1S: 20 mm cannon disassembled, cleaned and *lubricated IAW lubrication order:* Be sure to use dry film lubricant on barrels. NOTE: United States Army Missile Command logistics assistance representatives recommend that you *DO NOT* LEAVE GUNS DRY.

4. Engine: Even though an engine performs well in your local flying area, the following measures must be accomplished. Once you arrive in the density altitude of the high desert, everything becomes amplified.

a. All engines flushed IAW appropriate technical manual.

b. Technical inspectors must become familiar with erosion damage limits and rollover limits of the first stage compressor blades.

c. Recheck of engine health indicator test by maintenance test pilot. (We had several aircraft jump from a normal +12 to +19, +22 readings upon arrival at NTC.)

d. VIGV begin to open check by MTP. Helps prevent compressor stalls.

e. Bleed band closure check by MTP.

5. Main rotor blades:

a. AH-1s must have sand and dust deflectors installed, and they must be in good condition.

b. Tape, pressure sensitive, NSN 7510-00-145-0171, installed (Aviation System Command APPROVED METHOD) on the leading edge of metal main rotor blades, by the following method:

(1) Clean leading edge of metal main rotor blades with aliphatic naptha.

(2) The UH-1H and AH-1S require a 2-foot piece of tape be applied to the bottom of the blade before applying the longer piece of tape called for in the next step (see figure, next page).

(3) Measure from outboard edge of blade doubler to tip of main rotor blade, cut tape to size.

(4) Apply tape to leading edge of blade working inboard to outboard. Use a heat gun to assist in removal of any bubbles and to complete the adhesion process. NOTE: Do not exceed 200 degrees Fahrenheit (93 degrees centigrade) with heat gun during installation of tape (*if heat gun is not used, proper adhesion will not occur).*

6. Inspect Department of the Army Form 2408-18 to ensure no major aircraft inspections will come due during the time you are at NTC. Naturally, 25- and 50-hour inspections will be accomplished while there. Examples of items to be accomplished prior to deployment are: (1) 120-day battery inspections, and (2) flex coupling repack. Even if these items do not fall within your normal 10 percent interval, TM 55-1500-328-25 with C-3, page 2-2, para 2-10 reads in part, "When unusual local conditions of environment, utilization, mission . . . are encountered, the maintenance officer will, at his [or her] discretion, increase the scope and/or frequency of maintenance or inspections as necessary to ensure safe flight."

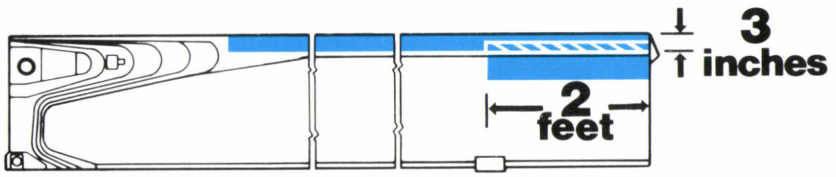
7. Prior coordination with Aviation intermediate maintenance to perform its level of maintenance on a case-by-case basis, if necessary.

8. Parts packets for 25- and 50-hour inspections gathered up and projected by the maximum number of aircraft hours to be flown.

9. Install all available multiple integrated laser engagement simulation (MILES) equipment on the OH-58. Tape should be applied to the upper portion of both chin bubbles where the MILES harness contacts the chin bubbles.

10. As with all aircraft, they sometimes break. So you will need to set up aircraft maintenance supply fund cites and coordinate with the following locations: Ft. Ord, CA, for OH-58, UH-1H and AH-1S MOD parts only: Edwards Air Force Base, CA, for servicing of AH-1 and UH-1 aircraft batteries; Los Alamitos Naval Air Station, CA, for OH-58 batteries and parts; Barstow Daggett, CA, for limited UH-1H parts.

11. Prior coordination with NTC Air Force police to determine what license is required to drive an aircraft tug on their flight line. Case in point: After down-loading a C-5A at Norton AFB, a staff sergeant was returning an aircraft tug to the Air Force motor pool. He was stopped by Air Force police and was asked to produce an Air Force ramp vehicle driver's license. The staff sergeant produced his Army driver's license for the aircraft tug and was told it was not sufficient and was forced to abandon the tug on the Air Force flight line.




**A tremendous reduction in blade erosion is achieved by carefully centering a 6-inch wide piece of pressure sensitive tape, NSN 7510-00-145-0171, on the leading edge of the rotor blade. An extra piece of tape 2 feet long should be applied on the bottom of the rotor blades of UH-1H and AH-1 helicopters.**

**Desert SOP**

1. Aircraft engines flushed every 25 hours.
2. Oil cooler radiators cleaned every 25 hours or when oil temps are higher than normal.
3. Aircraft lubed daily and excess grease wiped off.
4. As per the preventive maintenance daily cards and especially on the AH-1S, oil cooler compartment access panel removed daily and hard packed dust and sand removed from fan inner lip. Fan assembly (bearing thru bolt area): fan spun by hand and checked for play or unusual noises. (Four fan assemblies failed at NTC even though these checks were performed.)
5. Aircraft canopy flushed with clean water prior to applying polish.
6. Strict enforcement of the rule: "Once a POL product can is opened (oil or hydraulic), do not save what is left."
7. Engine inlet pillows and exhaust covers installed after each flight.
8. To prevent sand accumulation, aircraft cowlings should not be left open any longer than necessary.
9. On the AH-1S: 20 mm cannon, disassembled, cleaned and lubricated prior to any live fire.

**Post-Desert SOP**

1. Thorough inspection of first stage compressor blades for erosion and rollover.
2. Remove tape from metal main rotor blades leading edges.
3. Thorough cleaning and lube of 20 mm.
4. Aircraft thoroughly washed.

**The desert floor is a square of large quantities of sand that sandblasts crewchiefs during take-offs and landings (above) and forces pilots to idle back engines during hot refueling (right) to cut down on engine sand ingestion.**

CW2 Michael E. Vaclavik

5. All aircraft engines flushed.
6. Oil cooler radiator external surfaces cleaned with soap and water, followed with compressed air.
7. Removal and accounting of all MILES equipment.

**Special Equipment to Take to NTC**

1. Each aircraft must have a grounding cable for use at Air Force installations.
2. Jacking pads for aircraft, in case work on cross tube is called for.
3. Cargo camouflage parachute for shade can be found through property disposal office.
4. Extra 5-gallon water cans for cleaning aircraft canopy. One 5-gallon can per two aircraft; refilled daily.
5. Abundant supply of paper towels and clean rags.
6. Sufficient rolls of tape, pressure sensitive, NSN 7510-00-145-0171, and naptha to redo blades.
7. Grease: One 5-pound can of WTR MIL-G-81322, NSN 9150-00-944-8953, per aircraft for 1 month.
8. Burlap for wrapping around water containers to help keep cool.

Finally, an excellent field manual (FM) to read and become familiar with is FM 90-3, ''Desert Operations,'' to prepare yourself and your soldiers for the desert environment. The training experience received at the National Training Center impacted on me with as much force of importance as did my 18 months in Vietnam. Enjoy, but have your pilots watch out for ''The Rock Monster.'' (That's an ''inside'' joke.)

CW2 Michael E. Vaclavik

**Safety, coordination and teamwork are necessary for loading AH-1 helicopters into U.S. Air Force C-5 cargo planes.**

CW2 Michael E. Vaclavik

# College Credit for the Aviation Warrant Officer

**Ms. Theresa L. Locke**
Army Education Center
U. S. Army Aviation Center
Fort Rucker, AL

THE DEPARTMENT of the Army's educational goal for warrant officers is to complete an associate degree program or 2 academic years of undergraduate study by the 15th year of service. This study should be in a career field discipline related to the warrant officer's military occupational specialty (MOS). For study under the provisions of Army Regulation 621-1, the discipline must be MOS related. MOS/discipline relationships are listed in Department of the Army Pamphlet 600-11.

Many Aviation warrant officers are not aware of the college credit recommendations for their military experience and training given by the American Council on Education (ACE). (Please note, the ACE guide recommendation for college credit is not "college credit" in itself. Warrant officers must do residence study with the college or university from which they desire a degree. Residence means to actually take courses through traditional methods; attend classes, apply for correspondence study, take end of course exams, etc.) Aviation warrant officers have the advantage that they may acquire an associate degree in an Aviation related field with only a minimum amount of residence or actual classroom attendance.

The process of having the warrant officer specialty evaluated for college credit is an easy one. A visit to the local Army Education Center (AEC), consultation with a guidance counselor and later completion of DD Form 295, Application for the Evaluation of Learning Experiences During Military Service, is basically all that is necessary for the Active Duty warrant officer.

The completed DD 295 is the official instrument that provides information about one's military experience, regardless of how varied, to the civilian institutions (colleges or universities). This completed form provides the following information (The "*" indicates portions completed by the applicant; the "+" are portions completed by the military personnel office, prepared from the applicant's official 201 file):

* Education background of the applicant.
* Civilian education history.
* Educational courses completed at civilian institutions while in the Army (including the method of study, school location and date courses were completed).
* Tests taken through AECs while in the Army.
* Where and when basic/recruit training took place.
+ Service schools attended.
+ Military occupational history.

The DD 295 is signed by both the education services officer and the officer in charge at the local military personnel office.

The completed form is then submitted to the college or university the warrant officer desires to attend.

The American Council on Education began this procedure more than 35 years ago. It was at this time that the first ACE Guide to the Evaluation of Educational Experiences in the Armed Services came into being. Since then, the ACE Guide has been updated regularly and is the standard reference work used by colleges and universities to grant educational credit for military learning experiences. The ACE Guide describes more than 10,000 courses offered by the Department of Defense and all branches of the armed services and provides credit recommendations for each course. Hundreds of thousands of servicemembers have been able to achieve recognition for their learning through this method.

When a servicemember presents a completed DD 295 to a local college or university, the officials refer to the ACE Guide to see what credit recommendations have been made for the military service schools and courses the applicant has listed on the DD 295. The Aviation warrant officer will discover that the ACE Guide recommends 40 to 60 semester hours in aviation flight technology. This course work can be found in curricula leading to an associate in applied science, associate in arts or associate in science degrees. If the warrant officer desires to work toward a baccalaureate or 4-year degree, 9 additional semester hours of credit can be applied toward that degree.

Surveys have shown that most of the Nation's colleges and universities use the recommendations stipulated in the ACE Guide to award credit to veterans and Active Duty personnel. The recommendations have been widely accepted because military formal courses, such as the warrant officer Aviation courses, share certain key elements with traditional postsecondary programs. These courses are:

- Formally approved and administered.
- Designed for the sole purpose of achieving learning outcomes.
- Conducted by qualified persons with specific subject-matter expertise.
- Structured to provide the reliable and valid assessment of student learning.

Copies of the ACE Guide are available at your local Army Education Center and at local colleges. Anyone interested in obtaining additional information may do so by writing to:

Army Education Center
ATTN: Theresa A. Locke
Bldg 5009
Andrews Avenue
Ft. Rucker, AL 36362-5000

MONTHLY WRITING AWARD

# Price Tag of $urvival

CW3 E. Daniel Kingsley

THE 19TH OF October 1984 started as a dreary, breezy, overcast morning.

He arose around 0500 hours and began to rattle around the tent in anticipation of the mission. This was going to be a "milk-run," and he was secretly glad. Just a hop and a skip over the next hill and down the ridge; he would drop the executive officer (XO) at observation post 13 (a hill overlooking the Yakima Firing Center impact area in the state of Washington) and take a break for the entire morning. He had flown the past 24 flight hours in this helicopter, OH-58 Kiowa 683, and felt he knew the aircraft more intimately than anyone else in the squadron. He had a good book, and since there were only a few days left in this field exercise, he was ready to wind things up with an easy pace.

"Safety officers don't get no respect . . ." he grumbled to himself. How he hated these early morning missions. But, he thought, it didn't seem as cold as it had been on that hilltop over the past 3 weeks. He pulled on his clothes and shook the crewchief awake. During the preflight the evening before, they had agreed to run-up early to clear the frost off the windscreen. As good as the idea had seemed, there was no spare enthusiasm on this dark morning.

"Head out and unbutton the aircraft," he quietly told the crewchief. "Pull a fuel sample, and I'll get the weather and file." There was a little friendly banter about who was the ugliest this early in the day, and then he grabbed a couple MREs (meals, ready to eat; rations) and stepped out into the dark, chilly morning. The infernal humming of the generator was the only sound floating on the breeze. He peered into the darkness but could see no movement in the camp. Finally he got his bearings and shuffled downhill to the operations tent.

The operations clerk, PFC Nealy, was sort of droopy-eyed but cheerful. Weather was forecast to be good, with winds out of the east at about 10 knots, and little chance of precipitation throughout the day. Winds would pick up some later in the day, but they always did this time of year, and there was nothing unexpected in this forecast. Nealy logged the flight in and wished him well.

He stepped outside again and paused a moment to let his eyes adjust to the dark. He walked back up to the tent, picked up his flight gear and rousted out the crewchief, who had been sort of poking around. They arrived at the aircraft and went over it one last time. There was no frost on the aircraft, which was a pleasant surprise, but the pilot decided to run it up anyway, since he knew that the XO would probably be a little early. He got in and cranked it at around 0610.

The original departure was scheduled for 0630 and sure enough, on this morning, the executive officer (Major "Hawk" Ruth) was on time. The pilot had run it up and settled back to flight idle when the XO arrived at the aircraft, bundled up for an arctic winter. He, too, had been expecting a cold morning, and took a few minutes to stow his jacket and equipment in the back seat. The darkness hindered Hawk's efforts, but the crewchief assisted him in tying everything down and then walked around the aircraft one last time. The pilot called flight operations that the flight was off, and picked the aircraft up to a hover. The hover and health indicator test checks were good. As they paused for a last check, the pilot looked out into the early morning twilight.

Sunrise was supposed to be around 0625, but it was still dark. The pilot could just see the tops of the hills against the sky, and took note to hold altitude sufficient to maintain clearance. They saw the lights of a UH-1 Huey go up the valley just north of the ridge they were on, and knew it was from their counterpart, headed to the same observation post. The major leaned over to tune up a radio as the pilot pulled in around 75 percent torque and climbed off the hill to follow the Huey, headed east. The XO was still tuning up a radio when the pilot caught the flicker of the torque meter out of the corner of his eye. It was fluttering between 50 percent and 70 percent, and the first thought in his mind was that the gauge was going bad. It took a moment for him to realize that the gauge was a wet line indicator, and that gauge failure was rare. But, he had already begun a casual left turn to return to land.

The real eye opener was the way that gauge went to zero. (And I mean zero!) He could almost feel that needle thump the stop when it went to nothing; sort of like the knot he felt gripping his chest. He said something like, "Oh, #$%&!, engine failure!"

Hawk came off the radio like a man afire. His quote was something like, "Aw, C'mon Dan! What are you doing? Oh, #$%&, ENGINE FAILURE!"

As you might suppose, they were both pretty excited about developments after that. The pilot lowered the collective and banked left into that dark valley, with the only thought being to clear the hill prior to impact. He got into the long axis of the valley, paralleling the slope of the hill. Adrenalin was so high that the two yelled their communications at each other all the way to the ground.

The executive officer yelled to ask him if he had rolled the throttle off. It occurred to the pilot that if he weren't so busy, he could be pretty mad about such a question.

He was so scared that he couldn't locate the landing light switch, and the XO turned it on. It was not adjusted, and burned the eyes out of both of them, so the pilot turned it off.

They settled into the auto for a moment, and the pilot got off two Maydays which he thought were pretty John Waynish. (The flight operations clerk told him later they sounded more like a squawking soprano.) About that time, the pilot yelled for the XO to adjust the light and turn it on again, which he did. The light still blinded them, and the XO shut it off.

Sometime in this sequence, the pilot began to see the terrain (specifically, desert brush going by), and guessed that he was about flare altitude. It was hard to tell, especially with that darn big red (ENGINE OUT) light in the middle of the windscreen.

He knew that he wanted to stop the forward airspeed, whatever else he did, so the pilot entered a steep flare. The XO yelled that they were too high, but the pilot held it in.

When the pilot could finally make out the individual brush around the aircraft, the aircraft had developed a

rapid vertical rate of descent, and he pulled an abrupt initial pitch-pull. It seemed to only break the descent, not really stop it as he had hoped, and he frantically snatched the last bit of collective to stop it. He remembers, after hitting the stop, giving one last "super-tug" on the collective, as though he could wring another bit of pitch out of it. Then he caught his breath and braced for the impact, the way a football player does. They hit hard, and bounced twice.

The pilot was dazed and frozen to the controls. After a moment, the XO pushed the collective down. The pilot felt like his brains were fried, and wondered angrily why the world seemed so quiet, almost peaceful.

The XO, who a moment before had been screeching just like the pilot had been, suddenly began to talk on the radio like nothing at all was wrong.

The pilot could not tell whether he should cry or cuss, whether he should go back to the Infantry or join the Navy. He remembers the flight operations clerk's voice coming over the radio, trying to figure out just what was wrong—and he vaguely remembers trying to get through the "ENGINE FAILURE" actions in the checklist. He stumbled around the remainder of the day in a mental fog.

Makes pretty good reading, huh? You bet your life it does. I ought to know, because *it was my* engine failure. It is a very *special* moment which I will never want to relive—a moment of terror I would have done anything to avoid. It is the basis of my firm belief in emergency touchdown procedure training—and that is the purpose of this article.

I have never been excited about any aircraft except the '58—mostly, I suppose, because it had the mission I wanted. When I became a warrant officer in 1975, I went into a unit made up mostly of OH-58s and got most of my experience in that environment. When I came to this unit in February 1983, however, I had been flying AH-1 Cobras for more than a year, and there are substantial differences in the way we do autorotations in the two aircraft. I was having trouble relearning how to do OH-58 autorotations. In fact, I was told (by the instructor pilot (IP) who made me current) that, "You'll probably live, but you need to get your autos down before you have to land one of these things on the sod."

I went to another IP, and hanging my head the way you might do when you are doing something wrong and can't seem to quite figure it out, arranged to do a period of autorotations with him. That was about 2 years ago. Six hours after the accident related here, that same IP grabbed me, started pumping my arm and let me know just how mad he would have been if I had balled it up! The point, of course, is that I was able to receive training I needed before the real thing happened, and in this case, it has paid off.

I do not pretend that I have all the answers; I am not a Vietnam-era aviator, and cannot speak from that quality and quantity of flying experience. Additionally, my own investigation has shown that a great deal of thought and research went into the decision to terminate the majority of emergency touchdown procedures, as has been done (beginning in 1982), and that there have been no catastrophic incidents known which were caused by lack of proficiency in these maneuvers. Furthermore, we have saved a whole bunch of budget dollars that would have been required for the upkeep of emergency touchdown procedure training aircraft. But, I believe that the *level of aviation proficiency now is substantially reduced* across the Army Aviation community by a combination of things, not the least of which is the abolition of emergency touchdown procedure training. I think the Army Aviation community needs to reevaluate that decision.

There are other factors, to be sure. All of us know what they are. Budget constraints forbid the liberal use of flight hours to train-up the new aviators who need the stick in their hands to develop their air-sense. Support requirements are often the major beneficiary of our priceless flight hours, and by the very nature of support requirements (i.e., often the support of a ground element) are limited in their use for training. And, these days, it seems that nonaviation duties take the priority of the young

aviators who need to be out there knocking down some real flight time. It is not their fault; it is often their business to be doing those things as part of the unit mission. But, aviation proficiency is not created by nonaviation duties.

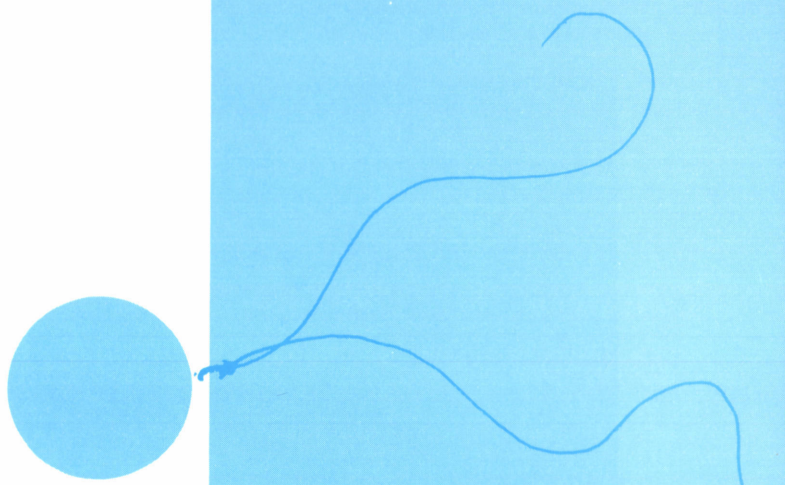
"It seems that comprehensive aviator training programs are encouraged at all levels, but taskings of the unit from higher levels many times cause the training program to be one in name only, or it is implemented on a 'shoestring' basis, with unit commitments always taking priority, even though this may be unintentional. This results in aviators in the cockpit who are marginally trained and only 'current' by regulation." (Taken from "An IP's Thoughts on Proficiency," *Flightfax,* 29 May 1985, by CW3 Terry W. Strong, E Co., 501st ABC, FRG.)

The effort Army Aviation can make at this moment to improve aviator proficiency across the Aviation community should be specific and well-aimed. I do not believe that we are going to improve the budget situation very soon. I do not believe we will change ground-unit support requirements, or that we are going to release the second lieutenant and warrant officer, WO1, from their other responsibilities, to fly until they have achieved the minimum desired level of proficiency. I believe we can afford the maintenance necessary to keep up emergency touchdown procedure aircraft, and that it is one of the less expensive of the alternatives available to provide aircraft maneuver experience. Emergency touchdown procedures training will not cure all our ills, but it will help immeasurably.

Emergency touchdown procedures do have a final, unsung benefit which seems to be mislaid among the administrative notes of the last conflict. The skill to accomplish a successful autorotation will pay big benefits to us in the next shooting war.

At that time, some of the starch will be removed from the cold statistics, and the figures will be measured in terms of aircrews and aircraft intact—not lack of catastrophic accidents. I believe this to be part of ***the price tag of survival.***

# Price Tag of $urvival



## ABOUT THE AUTHOR

CW3 Dan Kingsley was graduated from flight school in March 1975. He served in A/377 FA, Ft. Campbell, KY, and C/501st ABC, FRG. He obtained his BS in sociology in 1981. He graduated from the Warrant Officer Advanced Course in October 1981, Aviation Safety Officer Course in March 1982, and became the ASO of 3d Squadron, 5th (U. S.) Cavalry, Ft. Lewis, WA, in February 1983. He has published several articles in *Armor* and *Aviation Digest,* including the *Aviation Digest* article of the year in 1983. He was awarded the Broken Wing for the incident in this article.

U.S. Army Information Systems Command

# ATC ACTION LINE

## Circling Approach

Sitting around with the gang at the Flying Round House the other day, one of the local "squares" just couldn't pull all the pieces of a circling approach into a neat box. Gone are the days when boxing a field meant aligning with a runway during low visibility and flying a 1-minute, 90-degree box pattern or left turns to place yourself in a position to land. The box you'd get now might be the one you wish to avoid for many years.

It takes only a few moments to straighten out both squares.

First, a 1-minute-leg box pattern would most likely take you out of the terminal instrument approach procedures circling area for which obstruction protection is provided. For you who are curious, the protected area for a Category A aircraft is a 1.3-nautical mile radius. A minimum of 300 feet obstacle clearance is provided within this area. Stay in the circling area provided and avoid boxes with antique handles.

Second, a circling approach is a maneuver often conducted in weather conditions below visual flight rules minimums in visual contact conditions. It is an extension of the instrument flight rules (IFR) operation, and traffic patterns should be left turns unless otherwise directed or restricted. If you are "cleared VOR runway 4 approach, circle to land runway 13," you should apply the circling minimums associated with the VOR runway 4 procedure. Make sure both reported ceiling and visibility are equal to or better than circling minimums before starting the approach and, in the absence of any other directions, plan to cross the airfield and make a left hand pattern for runway 13. If at a controlled airfield, the tower provides any directions, you must ensure you fully understand and follow those instructions. Also, comply with restrictions that may be found on the approach chart or in the remarks section of the IFR Supplement when doing your thing at an uncontrolled airfield, as well as checking the wind "T" for valuable clues.

Third, dimension is how high? Well, how low? Fly published traffic pattern altitudes when possible. Never fly below minimum descent altitude until turning to final for landing on the assigned or proper runway—unless you are interested in spending a night at "Never, Never Land."

Consult notes on the procedure that may tell you of obstructions that exist or lighting that may not exist. See and be seen rules apply. Pilot judgment and planning pave the way for safety and are the most critical elements that assure the successful accomplishment of a circling approach.

Another question that occasionally comes up is, "What procedures are used to update sectional charts between the scheduled 6-month (semiannual) publication cycles and how can the average aviator locate the information?"

Although the sectional charts are designed for visual flight, their use is enhanced by conveying certain types of selective operational data. This selective and relatively stable data, displayed on the legend panel, includes airfield status (closed, private, civil, military, etc.), communications and navigational aids data, airspace designations and other useful information to complement the basic pilotage function for which the chart is designed. Changes in these selective operational items are made as necessary for current flight data services and reflected in the subsequent chart editions. A note on the legend, however, warns you—the user—that NOTAMs (notices to airmen) and related current flight information publications should be checked for the *latest* changes.

The sectional chart producers assure us that the best available information on changes occurring during the semiannual publication cycles is in the Department of Defense document aptly titled "The Chart Updating Manual (CHUM)." This basic document and the monthly supplements thereto are available for your use in airfield operations planning facilities. Additional updating is accomplished in the "Aeronautical Chart Bulletin" section of the civil airport/facility directory published by the Department of Commerce for the Federal Aviation Administration and should also be available in your base operations.

***Readers are encouraged to address matters concerning air traffic control to: Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22304-5050.***