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UNITED STATES ARMY

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ABOUT THE COVER

Although beautiful, the view from the cockpit can spawn a lonely feeling. But uncertainties are more than offset by the "presence" of Army air traffic controllers. This issue covers the ATC outlook with articles beginning on pages 2, 4, 6 and 8. Cover photograph by CW3 Mike Lopez

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commanding General, U. S. Army Aviation Center. Views expressed herein are not necessarily those of the Department of the Army or the U. S. Army Aviation Center. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

Articles, photos, and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, U. S. Army Aviation Digest, Fort Rucker, AL 36360.

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Those not eligible for official distribution or who desire personal copies of the DIGEST can order the magazine from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Annual subscription rates are $15.70 domestic and $19.65 overseas. Single copies are $1.20.

THE MEN AND WOMEN who make up the U. S. Army Communications Command (USACC) appreciate the interest and support of the U. S. ARMY AVIATION DIGEST in our new mission responsibilities in the vital area of Army air traffic control.

In the 18 months since the Department of the Army assigned single manager responsibility for Army air traffic control to USACC, we have taken a systems approach to the modernization and standardization of ATC training, personnel assignments, equipment and facilities.

Starting with little more than some very dedicated and highly competent people, progress has been made in many areas.

The finest ATC and NAVAIDs expertise available to us has been concentrated in a newly formed USACC subcommand, the U. S. Army Air Traffic Control Activity, headquartered at Fort Huachuca, AZ. This organization is dedicated to providing the centralized ATC management and technical direction required to support thousands of Army aircraft and the soldiers who fly them. These ATC professionals are supported by the full resources of this command.

In the area of specific accomplishments, the worldwide air traffic control communications-electronics upgrade is about 50 percent completed through the installation phase. Operation and maintenance of ATC facilities has been assigned to major USACC subcommands in the Pacific, Europe and CONUS. A long term master plan provides for standardization of the three major NAVAIDs systems, installation of new equipment where required, and the streamlining of a very complex logistical maintenance program.

Air traffic control tower structures are also being modernized and upgraded. A short range solution will utilize prefabricated, relocatable towers similar to those already in use by the FAA.

Many other improvements in the Army's air traffic control program are taking shape. With the continued support of the other major Army commands, the "Voice of the Army" will be heard loud and clear and an Army air traffic control program, second to none, will be established and maintained.

Jack A Albright

JACK A. ALBRIGHT
Major General, USA
Commander, USACC

Acronyms Used In This Issue

AAFIF: automated air facilities intelligence file
ACSI: Assistant Chief of Staff for Intelligence
ACSR: air crash search and rescue
AD: Airspace Division
AID: Aeronautical Information Division
ASCC: Air Standardization Coordinating Committee
ATC: air traffic control
ATCA: Air Traffic Control Activity
CONUS: continental United States
COPCOM: Controllers' Operations/Procedures Committee
CTO: control tower operator
DA: Department of the Army
DARR: Department of the Army Regional Representative
DCSOPS: Deputy Chief of Staff for Operations, Headquarters, Department of the Army
DMA: Defense Mapping Agency
FAA: Federal Aviation Administration
FAR: Federal Aviation Regulations
FLIP: flight information publication
FORG: Flight Operations Requirements Group
GCA: ground controlled approach
IAP: instrument approach procedures
ICAO: International Civil Aviation Organization
IGIA: Interagency Group on International Aviation
IMC: instrument meteorological conditions
LAHSR: low altitude, high speed routes
MAS: Military Agency for Standardization
NATO: North Atlantic Treaty Organization
NOTAM: notice to airmen
SID: standard instrument departure
STAR: standard terminal arrival routes
USAASO: U. S. Army Aeronatucial Services Office
USACC: U. S. Army Communications Command
USAFINO: U. S. Army Flight Information Office
VFR: visual flight rules

Managing

Colonel Lloyd J. Petty

Commander, U. S. Army
Air Traffic Control Activity
Fort Huachuca, AZ

MORE THAN A YEAR ago the mission for exercising responsibility over the life-cycle functions of Army air traffic control was assigned to Major General Jack A. Albright, commander of the U. S. Army Communications Command (USACC). The application of a systems approach to Army air traffic control (ATC) was something I had worked for in the early 1960s when I commanded the Army Flight Information Office—now the U. S. Army Aeronautical Services Office (USAASO).

It meant standardization of development and implementation for both tactical and nontactical ATC communications-electronics systems and facilities, and the establishment of policy and criteria for installation, operations and certification of ATC/NAVAIDs equipment and systems. From the economics standpoint alone, the move offered the opportunity to eliminate the equipment confusion that had resulted in there being more than 1,200 com-

The Army ATC Mission

ATC Master Plan
The Key

ponent items now in the system. New, improved and maintainable equipment will contribute to a far safer ATC operation than now exists.

To ensure rapid response in accomplishment of this newly assigned mission for ATC, General Albright directed establishment of a special staff-level element, the Air Traffic Control Office (ATCO). In addition the Air Traffic Control Activity (ATCA), a field operating element, was approved by Headquarters Department of the Army and was activated. Its mission is to implement a systems approach to ATC from concept development through the establishment of policy and procedures for the operation and maintenance of the Army's ATC systems.

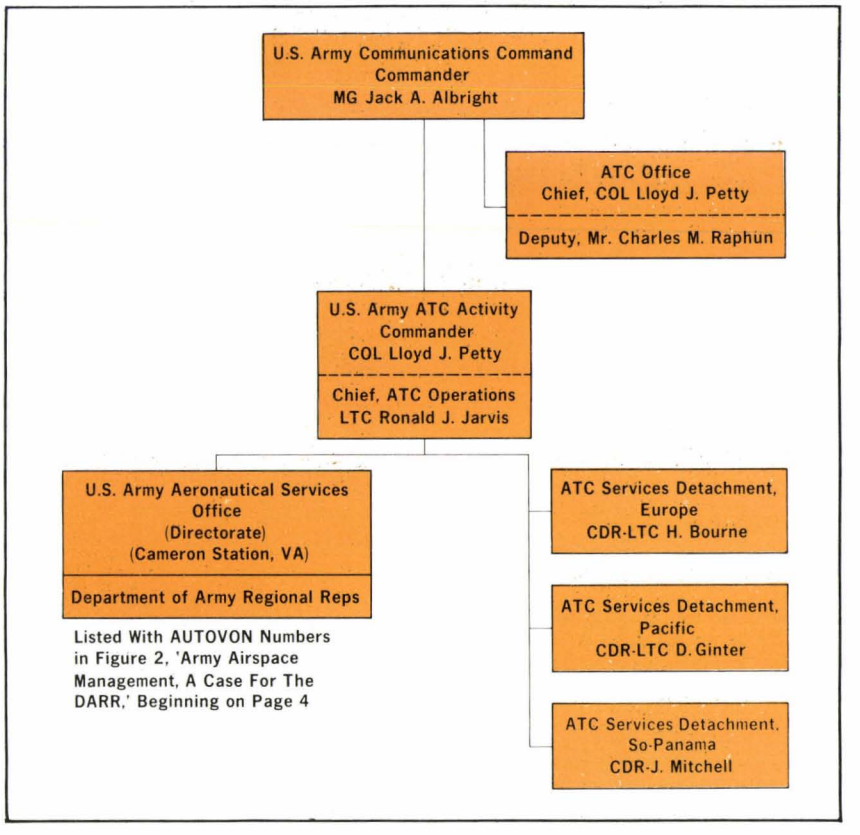
With USACC being responsible for the current Army airfield upgrade program, as well as being the principal proponent for combat development and user of Army ATC/NAVAIDs systems, it was felt that such a staff/field element relationship would be a most responsive management concept for an element of the Army that was in need of immediate improvement.

The ATCO provides the interface with the USACC staff for coordination to ensure program management, i.e., budget, personnel acquisition and training, communications-electronics, ATC/NAVAIDs equipment standardization and acquisition. The staff office also provides the interface with the U. S. Army Communications Systems Agency and the U. S. Army Communications-Electronics Engineering Installation Agency, and many others with responsibilities in ATC.

The ATCA, as a field element, is responsible for planning and coordinating for standardization purposes and for arranging installation, test and acceptance of fixed ATC/NAVAIDs systems. Additionally, it is responsible for developing centralized policy and procedures for the operation and management of the worldwide ATC/NAVAIDs activities assigned to the Army Communications Command.

ATCA's mission also is to maintain monitorship of life-cycle functions of aviation ATC support, which includes ATC/NAVAIDs systems, flight information and airspace control. We coordinated priorities for allocation of associated command resources. In other words, we fight for our share of the men and money. With the departure of

Continued on page 15



A Case For The DARR

ARMY AIRSPACE MANAGEMENT

Lieutenant Colonel Jody L. Williams
DARR Southwest Region

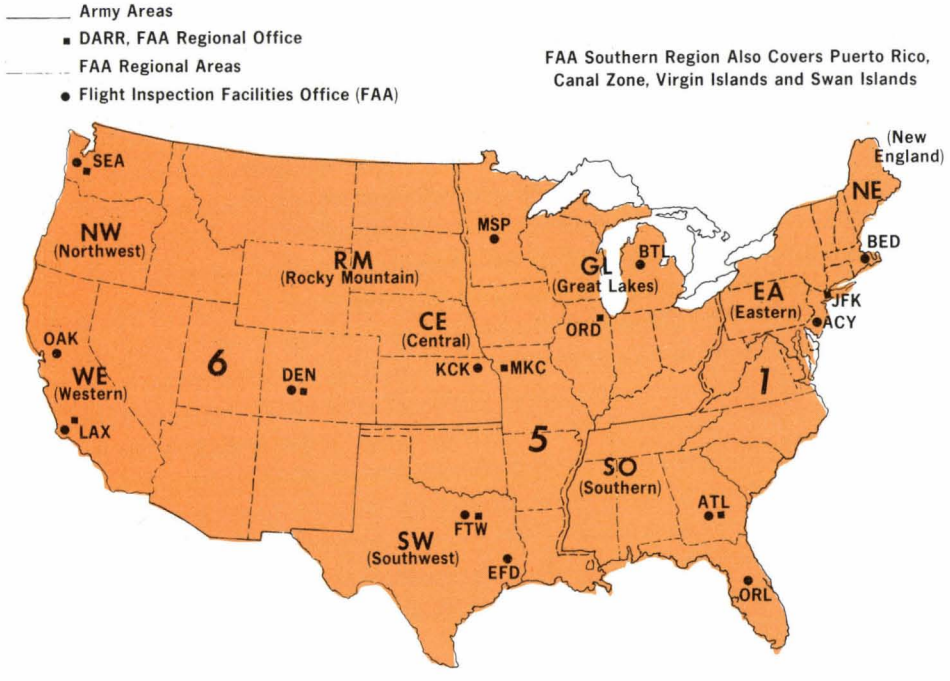
"The Act" puts FAA in charge and made the Department of the Army Regional Representative a key man

THE AVAILABILITY of airspace, as is the case for other national resources, has reached the critical stage due to the increasing demands for its use. Congress, having recognized the requirement to manage and coordinate the use of this national resource, by Public Law 85-726, established the Federal Aviation Agency, subsequently changed to the Federal Aviation Administration (FAA).

Public Law 85-726, commonly referred to as "The Act," assigns responsibility to the FAA for the promotion, regulation and safety of civil aviation and for safe and efficient use of airspace shared by both civil and military aircraft. The FAA is charged with development and operation of a common system for air traffic control (ATC) and navigation for both military and civil aircraft. It also controls the use of navigable airspace of the United States and regulates both civil and military operations in such

Figure 1

ARMY/FAA AREAS AND OFFICES



airspace in the interest of safety and efficiency.

The continental United States (CONUS) is subdivided into eight FAA regions (figure 1); each regional headquarters is responsible for carrying out the FAA's mission within its area. An Army office has been established at each of the FAA regional offices to provide an interface and to ensure that the Army interests are provided for and protected so that its mission can likewise be accomplished. These positions are called Department of the Army Regional Representatives (DARRs). The DARRs are members of the Army working for the Army.

Figure 2

DARR AUTOVON DIRECTORY*

Western Region
LTC Willie F. Dixon
AUTOVON 898-3875

Southern Region
LTC Larry D. Dotson
AUTOVON 431-1767

Eastern Region
LTC Albert L. Fournier
AUTOVON 938-3696

Central Region
LTC Norman J. Hughes
AUTOVON 886-3831

Southwest Region
LTC Jody L. Williams
AUTOVON 733-1424

Great Lakes Region
SFC Claude L. Burdick (temp)
AUTOVON 551-1501

Northwest Region
CW3 Jack L. Roberts
AC 206-767-2610

Rocky Mountain Region
CW3 Richard N. Woodward
AUTOVON 553-3795

***For additional listings see AR 95-50, Appendix B**

The DARR's mission in life is to provide local Army commanders with professional guidance in airspace matters and to present a coordinated Army position on airspace matters submitted to the FAA Regional Office. Because of a recent reorganization within the FAA increasing the regional offices, the DARRs are not uniformly aligned. Currently, there are eight—five staffed by commissioned officers and three by warrant officers—all Army aviators with considerable experience (figure 2). We have an E8 ATC noncommissioned officer (NCO) at most regions and a civilian secretary.

The DARR is an extension of the Department of the Army (DA) airspace executive agency, U. S. Army Communications Command (USACC), and performs duties appropriate to AR 95-50 and AR 10-13. The DARR is aligned in the Communications Command structure as indicated in figure 3.

The Communications Command was assigned responsibilities for Army air traffic control and airspace management in July 1973. Prior to that time the U. S. Army Aeronautical Services Office (USAASO), a class II activity established in 1967 working under the auspices of the Assistant Chief of Staff for Force Development (ACSFOR), was the agency dealing with the systems and publications required within the Army's air traffic management scope. Some of the oldtimers remember USAASO's forerunner as the U. S. Army Flight Information Office (USAFINO), which was under the chief signal officer. To quote a phrase popular today, "We've come a long way, baby"; however, there is still a long way to go within the Air Traffic Management System and the DARRs are playing a vital role for the Army in seeing that we get there with everything intact.

While it is not the intent of the FAA to take away airspace solely for general usage it does monitor the use, and if the special use airspace is not properly used or continuously used it will inquire as to the necessity of keeping it as such. Here the DARR can assist the commander in the preparation of the restricted area utilization report as required annually for justification. These reports are the record of the use and type of use the restricted areas had for the previous year and must be accurate. Seminars for airspace officers are being conducted periodically to give guidance in this respect. Due to a constant changeover in personnel it is anticipated that these will be continued on a recurring basis.

In some cases the FAA will request a special Army/FAA review

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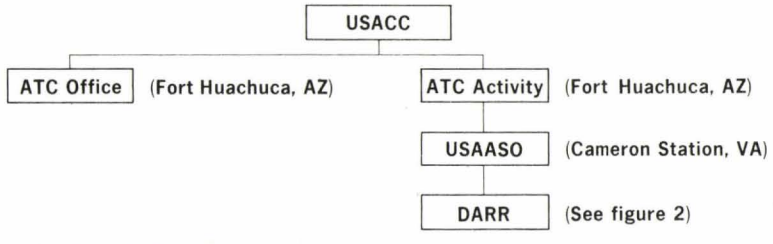
Figure 3



ARMY ATC SCHOOL

★

Staff Sergeant Michael A. Mansfield
Air Traffic Control Instructor
Department of Academic Training
U. S. Army Aviation Center

★ ★

No longer dependent on the Air Force, the Army trains air traffic controllers with the most modern equipment and techniques found anywhere

★ ★ ★

THE ARMY'S AIR TRAFFIC Control School located at the U. S. Army Aviation Center, Fort Rucker, AL, observed its fifth year of operation on 20 October 1974. More than 2,500 students have received control tower (MOS 93H), ground controlled approach (MOS 93J) and terminal area approach control (MOS 93K) training. In addition, about 200 officer/warrant officer students have successfully completed the fundamental requirements for obtaining the Federal Aviation Administration's (FAA) air traffic control certificate.

Prior to the opening of the school, Army air traffic controller (ATC) training was conducted at Keesler Air Force Base, Biloxi, MS, using Air Force oriented equipment and methods. While this training was adequate for Air Force controllers, it did not satisfy the Army's needs—especially in tactical environments encountered in combat areas.

The Department of the Army recognized the requirement for the Army to train its own air traffic controllers and directed the establishment of the Army school which is a division of the Department of Academic Training (DOAT) at the Aviation Center. The ATC School is divided into three functional areas: Basic Branch, Radar Branch and Advanced Branch.

In the Basic Branch the beginning student is introduced to the aviation world. He studies weather, navigational aids, air traffic rules and regulations, enroute separation standards, air traffic control procedures and special tactical subjects pertaining to Army airfield operations. In addition, officer and warrant officer students receive instruction on terminal instrument approach procedures, facility management and airfield operations.

After 9 weeks of intensive classroom instruction, the enlisted ATC trainee takes an FAA control tower operator (CTO) certification examination which is administered and controlled by the FAA. This certification is valid in both military and civilian facilities. It also is recognized internationally through the Internatonal Civil Aviation Organization (ICAO). Therefore, the Army's ATC trainees achieve worldwide certification after passing the FAA's CTO exam.

Officers and warrant officers conclude training when they take the CTO exam at the end of 6 weeks of classroom instruction. At this point they have acquired the basic knowledge required for their positions related to aviation management. However, enlisted

Training The Best ... To Control The Best

Simulated pilot data (right) provides the student controllers at left an indication on their scopes

trainees destined to actually perform duties in their respective MOSs (93H, 93J, 93K) branch out to training areas which concentrate on a particular MOS. Here students enter advanced training.

In the advanced portion students begin "hands-on training." Prospective control tower operators attend instruction in control tower simulators where nearly every conceivable traffic situation is presented to them.

Mistakes in the simulations are corrected as they occur, without casualties other than to the students' pride. After successful completion of this portion of training the control tower trainees move to field site training where for 13 days—under strict instructor supervision—they handle live traffic. Upon completion of this field training the students are familiar with the use of Army equipment and control technique used in controlling live traffic. They are ready for assignment to any Army ATC tower in the world. They have earned control tower operator, MOS 93H.

After passing the FAA CTO examination the ground controlled approach (GCA) (93J) students attend classes on the sighting and alignment of Army radar equipment that they will be using to control air traffic, both tactical (AN-TPN 18) and fixed installation (AN-FPN 40) radar.

Upon completing the equipment block of instruction, the students move to the radar lab simulator (see photo, page 7), a computer-operated device which can provide 40 simulated aircraft targets to 10 minilabs. As many as 40 students can be trained simultaneously.

The radar simulator is a totally new concept in ATC training. It can duplicate any ATC radar situation that controllers may encounter in a live facility. Students selected to attend the GCA (93J) or approach control (93K) courses are given intensive training with the simulator prior to controlling live traffic at field sites in the Fort Rucker complex.

From the radar lab GCA students advance to field site training. Here under the watchful eyes of a

Continued on page 17

ATMS

THE INCREASED densities and operational capabilities of Army aircraft have caused the Army to reassess its need for an air traffic management system for the combat area. The current system of air traffic control, as described in FM 1-60, consists of a series of flight operation centers (FOCs) and flight coordination centers (FCCs). Flight under instrument meteorological conditions (IMC) with this system is limited, at best, because controllers have information only on cooperating aircraft. They make decisions and base clearances on position report data provided by aircrews.

In 1973 the U. S. Army Aviation Center at Fort Rucker, AL, sought a solution to the problem through a study entitled, "Study of Air Traffic Management Systems for the Short Range (1974-1978) and Mid Range (1979-1986) Time Frames." It was completed last May and provides the basis for the design of air traffic management systems (ATMS) to be developed for the future.

Recent experience gained by studying results of the 1973 Mid-East war has confirmed the need for aircraft to operate at terrain flight altitudes in forward areas to survive. Aircraft operations in the brigade area will be integrated into the ground commander's scheme of maneuver. Flight following, when required, will be with the aviation unit operations. In this area the study identified the need to provide an instrument approach facility and to provide aircraft with a navigation and communication capability that will be effective at terrain flight altitudes to increase combat effectiveness both day and night under conditions of limited visibility.

In the division rear area the system must have the capability of moving aircraft under instrument and visual meteorological conditions. And to prevent conflicts it must interface with control systems of other airspace users and ensure timeliness of information exchange.

The system envisioned for the 1974-1978 time frame is shown in figure 1. Army air traffic in the corps rear area will be managed by the FOC established by the corps air traffic control unit. This facility will be collocated or in direct communication with the Air Force control and reporting center (CRC). Radar coverage of this area will be provided by the CRC, when possible, with the corps FOC modified to accept both Air Force and Army area surveillance radar input. This would assure the FOC of a surveil-

The Army's present Air Traffic Management System (ATMS) is a manual operation consisting of a network of flight operations centers (FOCs) and flight coordination centers (FCCs). Under this system the "see and be seen" principle is the primary hazard avoidance means. This requires constant vigilance by aircraft crews since controllers can only provide alerting information, to cooperating aircraft, based on position report data evaluation

Major Tommy W. Thornton
Chief, Organization Division
Deputy for Developments
U. S. Army Aviation Center

lance radar capability when the system is connected with the Air Force CRC or when operating independently. This radar capability will provide greater safety, reduce congestion and delays, and provide positive identification and location.

At division the FCC manages IMC traffic; provides an extension of communications of the FOC at corps; and interfaces with local airfields, division tactical operations centers and the Army air defense command post. It also provides visual meteorological conditions (VMC) flight following when requested.

To confirm activity in the airspace being managed and to expand the system's coordination capacity, a surveillance radar capability is required. This could be added by remoting a radar scope from Army air defense units or by providing the FCC with its own surveillance radar. Nondirectional radio beacons (NDBs) will be used throughout the division to assist in IMC flight routing and position determination and reporting.

For the short-range time frame a radar directed ground controlled approach (GCA) and an automatic direction finder (ADF) approach will be provided, from division assets, by at least one airfield in the division area and will include associated approach and departure operations. In future operations the FCC will be able to provide radar vectors to the tactical instrument landing system at these terminal facilities.

In the brigade area an instrument approach facility will be provided to allow aircraft entering the area from the rear under instrument conditions to let down to visual conditions to continue their mission. This approach facility also will aid aircraft returning to refuel and rearm under marginal weather conditions and will enable aircraft that enter unexpected instrument conditions to recover to visual conditions.

Until a tactical instrument landing system is available, an ADF approach using current equipment will be provided. The tactical instrument landing system is expected to be provided at the division and brigade airfields in the 1979-1986 time frame.

The vast majority of the corps aviation assets will be operating in the forward areas. As a result of agreements between the Tactical Air Command (TAC), U. S. Army Training and Doctrine Command (TRADOC) and U. S. Army Forces Command (FORSCOM) these aircraft will be operating under procedural rather than positive control. Operations in this area are

Continued on page 33

Figure 1

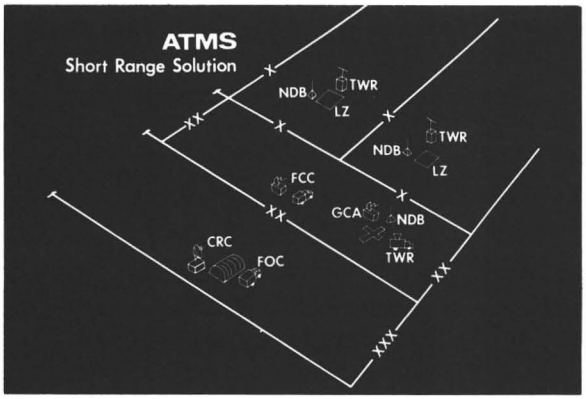
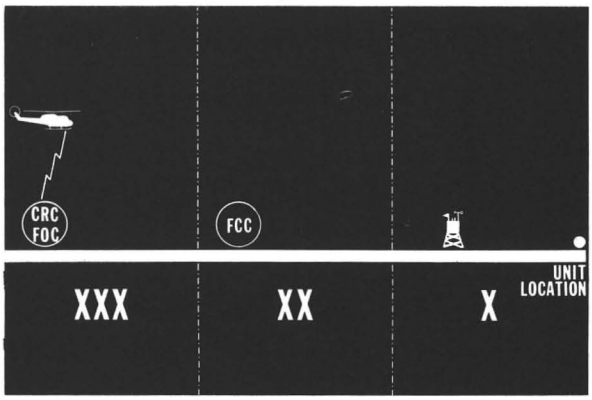


Figure 2



The United States Army Aeronautical Services Office (USAASO)

In 1973 USAASO (you-say-so) was transferred (mission, money and people) to the U. S. Army Communications Command (USACC) and became an office of the new Air Traffic Control Activity (ATCA)—see "Managing The Army ATC Mission," page 2. USAASO continues to provide services for airspace, air traffic regulation/procedures and aeronautical information matters

Lieutenant Colonel David A. Carroll

Acting Director, USAASO

AT THE NATIONAL and international level, the Federal Aviation Act of 1958 places certain responsibilities upon the Secretary of Defense to assist the administrator of the Federal Aviation Administration (FAA). One of these responsibilities requires the Secretary of Defense to establish, by cooperative agreement with the FAA, suitable arrangements for timely exchange of information pertaining to programs, policies and requirements directly related to the responsibilities of both parties.

To assist in carrying out the Department of Defense (DOD) responsibilities, the Secretary of Defense issued a directive which provides for the designation of DOD representatives to the FAA and the Interagency Group on International Aviation (IGIA). It also assigns responsibilities and establishes internal DOD committees, working groups and supporting elements to assist in carrying out these responsibilities.

The Federal Aviation Act, the Presidential Memorandum and the DOD Directive led to the establishment of the DOD Advisory Committee on Federal Aviation. This committee is a three-star level organization which coordinates DOD policy and provides necessary interface with the FAA. The Army member is the Deptuy Chief of Staff for Operations (DCSOPS), Headquarters, Department of the Army.

The committee is supported by two working groups —the Federal Aviation Working Group and the Working Group on IGIA matters. The U. S. Army Communications Command (USACC) is the Army member on the first group, and action is underway to designate it as the Army member on the second.

USACC members and alternate members of the supporting elements, such as the Airspace Subgroup

of the Federal Aviation Working Group and the various IGIA committees concerned with air traffic control (ATC) and associated equipment, are responsible for reviewing and evaluating each case received for action; identifying any effect on the Army; coordinating with other Army support elements or action agencies concerned; and preparing and transmitting Department of the Army (DA) comments, recommendations and proposals to action officers concerned.

Just as USACC is the "Voice of the Army," USAASO is the voice of the Communications Command at the Pentagon and FAA concerning airspace and aeronautical information.

USAASO has two functional divisions: Airspace Division (AD) and Aeronautical Information Division (AID).

Airspace Division: This division is the USACC commander's spokesman to the DOD and FAA on airspace matters. Specifically, the Airspace Division acts as the central DA coordinating authority for airspace/ATC procedural matters for all components of the Army and the DA point of contact with the FAA on airspace/ATC procedural matters.

In coordination with other interested staff agencies, the division prepares and recommends plans, policies and procedures pertaining to the establishment, utilization, modification, retention and revocation of Army-required controlled airspace and special use airspace.

The division directs, supervises and coordinates the execution of approved Army plans, policies and procedures pertaining to the establishment, utilization, modification, retention and revocation of Army-required controlled airspace and special use airspace.

It also directs, supervises and coordinates the preparation of the Army position on all airspace/ATC procedural matters, both in support of Army requirements and in defense of Army interests against detrimental proposals by other agencies. It coordinates Army airspace/ATC procedural matters with other military services and government agencies; furnishes DA staff membership on airspace boards, committees and panels, as required; and advises and assists DA staff agencies and Army field commands on airspace and certain aviation matters.

Although the FAA provides airways equipment and services for both civil and military users, equipment required solely for military purposes is the responsibility of the requiring military service. DA is responsible for planning and implementing equipment and systems in support of Army aviation. However, in the interest of economy and to avoid duplication of effort, the Federal Aviation Act of 1958 requires a free exchange of information on policies, requirements and programs between DOD and FAA. Additionally, it is the policy of the Army to ensure that new and improved materiel is standardized with other U. S. military services and allies to the extent practicable to facilitate a working capability with these forces.

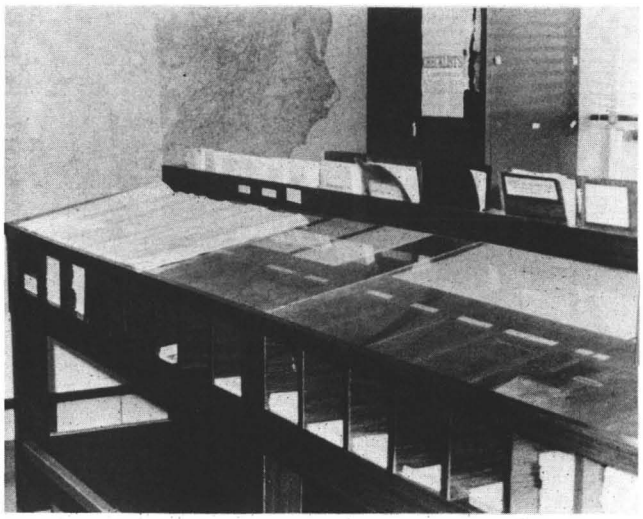
The basic objectives are to assure operational compatibility between tactical systems and the national aviation system and to avoid unnecessary duplication. In addition to the need for U. S. military equipment to be operationally compatible with U. S. national aviation standards, it is desirable for reasons of operational flexibility to configure military equipment for compatibility with international civil aviation organization standards and recommended practices.

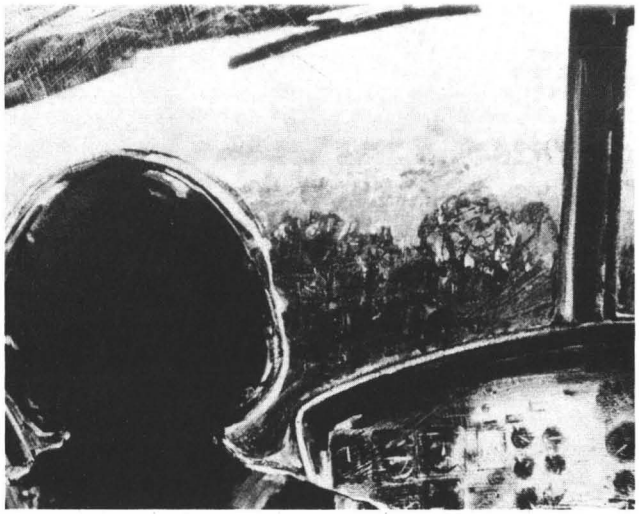
At the regional or local level USAASO has resident representatives at the FAA regional offices with authority to negotiate at the regional level on behalf of the Army on all matters of mutual interest involving airspace. These representatives are called the Department of the Army Regional Representatives (DARRs) and are the subject of "Army Airspace Management, A Case For The DARR" on page 4.

To summarize, the Airspace Division is directly concerned with supporting the Army's capability to fly within tactical and civil, domestic and international environments.

Aeronautical Information Division: On a parallel with the Airspace Division, AID implements the Communications Command's responsibility as spokesman on aeronautical information policy and programs. The safe conduct of Army operations within the U. S. national airspace, as well as the airspace of foreign nations, demands a continuing flow of complete and current aeronautical information. This includes monitoring changes occurring in the complex ATC environment as well as the operating status of airfield and support facilities. A small but enthusiastic staff of

AID makes sure it's here for preflight





To have a nice day (or night) airborne

military and civilian aviation experts within AID is dedicated to the task of providing this essential service. The USACC spokesman role is effectively accomplished in the overseas area by Air Traffic Control Activity detachments located in the Pacific (Hawaii), Europe (Heidelberg) and Latin America (Canal Zone).

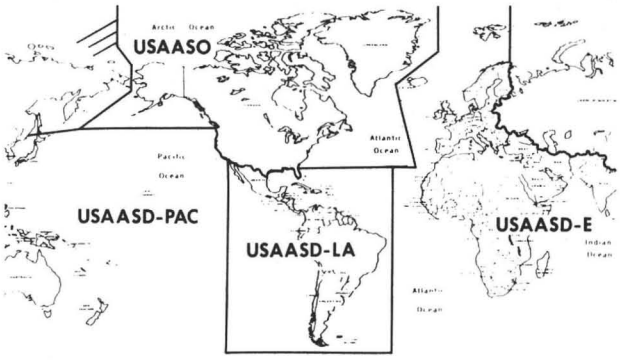
To ensure that Army aviation requirements are clearly defined, recognized and incorporated in pertinent flight products, AID maintains a continuing liaison with all aeronautical agencies involved in policy, regulatory authority, operational doctrine and production.

These include Department of the Army staff, Federal Aviation Administration, Defense Mapping Agency (DMA) and the other U. S. military department staff implementing their respective air operational requirements. On the international level, AID provides representation and/or operational input to the Air Standardization Coordinating Committee (ASCC), the NATO (North Atlantic Treaty Organization) Military Agency for Standardization (MAS) and the International Civil Aviation Organization which comprise the major activities engaged in international air standardization effort.

Continued liaison with other U. S. military departments is accomplished through the all-service Flight Operations Requirements Group (FORG). Both formal and ad hoc sessions of the group are conducted to discuss all problems affecting the design, format, technical content and standardization of DOD flight information publications (FLIPs) relative to operational requirements and operating procedures. The FAA provides representation to assist and assure input on the civil aviation aspects involved. A member of the DMA attends these sessions to advise on production implications and costs relative to requirements. This office led the tri-services development of operating procedures for the conduct of this essential coordination effort in FLIP matters. The group provides a forum to discuss the content and format of all products which convey regulatory (ATC) and other essential air operational data. The AID participation assures that the specific and often unique requirements of the Army aviation mission are incorporated in the DOD FLIP.

Effective operations cannot be accomplished on the ground or in the airspace unless rules of the air and related data are complete, current and available to the user. Both visual and instrument flight rules for navigation require adequate maps, charts and support data to help assure safety and mission accomplishment. Airfield layouts must be correctly depicted in standard format for easy identification in flight and ground operations. This graphic clarification is essential where certain airfields have a high density of both fixed and rotary wing operations. The staff closely monitors the format of flight publications and charts to assure optimum usefulness for airborne operations and technical coordination. AID also negotiates with the FAA in establishing rules and criteria for the design and production of standard instrument departure (SID), standard terminal arrival routes (STAR) and instrument approach procedures (IAP).

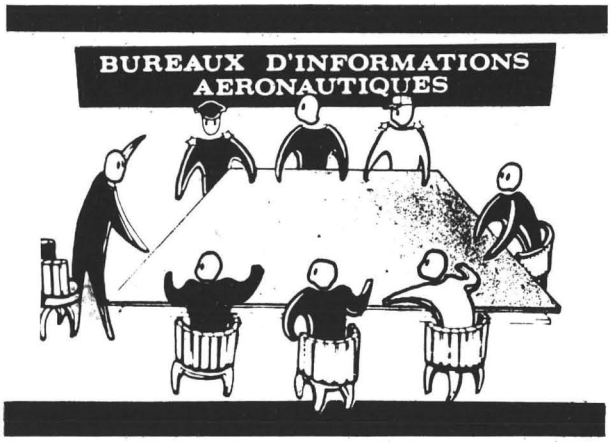
USAASO is participating in a DOD/tri-services project to improve the current FLIP products. The objective of this joint effort is primarily to reduce airborne research and cockpit clutter by producing a "single source" document to satisfy all airborne users.



We service wherever the Army serves

This objective also is being addressed in the planning phase. As an example, in FLIP planning action is being taken to relocate or remove material considered redundant or appropriate to service training directives. Prototype revised FLIP planning products have been in the field for review and comment and were enthusiastically accepted. Future products will provide compact flight information documents for the cockpit and planning documents for preflight use that bridge the gap between training manuals and require current operational knowledge. The latter will contain those more stable elements of information not necessary in flight and will be published less frequently at a considerable savings.

Extending the single source theme, a prototype terminal document, which combines airport data, IAPs and an expanded airport diagram (taxi chart) will be evaluated. In addition, all IAP booklets will be reviewed to eliminate unnecessary procedures and add many not now available. This division, as representative of the Department of the Army, will ensure that the selection criterion will fully meet the needs of users including the Army Reserve Components aviation activities.



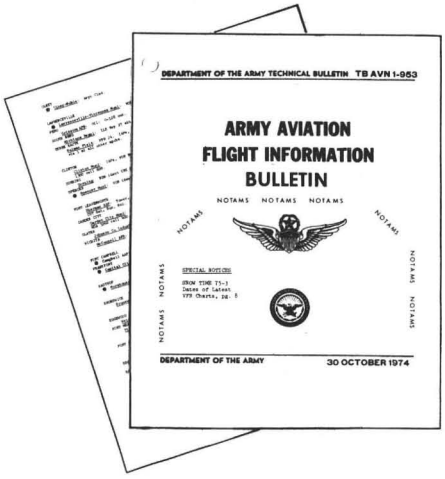
DA representation

The basic task of ensuring the publication of essential operational data in the FLIP products is complemented with AID innovative contributions to the Army aviation program. As an example, the AID developed the initial helicopter instrument approach procedure criteria and associated charting criteria thus enhancing the capability of this unique aircraft type under instrument meteorological conditions (IMC). Also developed was a special VFR arrival and departure chart booklet to facilitate helicopter operations in high density traffic terminal areas in Europe. This system establishes a standard format for future requirements in these terminal areas. As a further example, the AID air traffic control expertise in the rotary wing area is illustrated by the design and development of a special VFR (visual flight rules) helicopter route chart produced to enhance safe and expeditious transit within the Washington, DC, high density traffic area.

Joint air standards with Army input

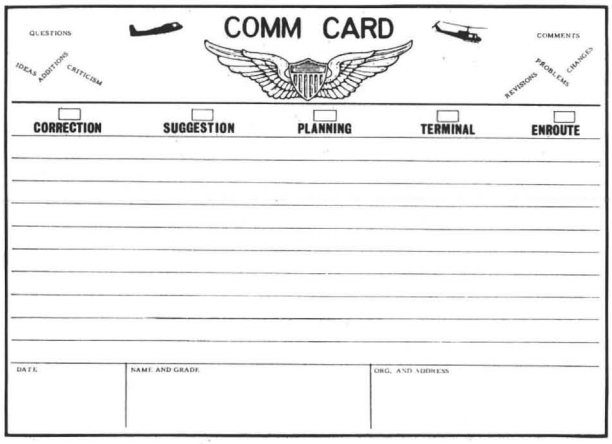
The AID input to the FLIP and chart products normally is confined to basic "throttle pushing" items involving operating status of enroute and terminal facilities. The AID, however, both in CONUS (continental United States) and especially through its oversea detachments is a major contributor to the DOD automated air facilities intelligence file (AAFIF). Effort expended on this comprehensive data program would seem to be superfluous to the needs of the average Army aviator as conveyed in the normal inventory of flight products. The ready access, however, of the Communications Command organization to a worldwide array of airfields owned, operated or tenanted by

Our direct line



Army aviation elements provides an excellent opportunity to obtain data which can be used for staff planning and contingency purposes. Thus, the Assistant Chief of Staff for Intelligence (ACSI) has turned to USAASO to fulfill this essential DOD commitment. It paid dividends when the Army aviation staff recently required comprehensive data on selected air facilities.

AID has been active in the aviation safety area, too. In coordination with ACSI we have participated in the design and development of a standard prototype air crash search and rescue (ACSR) map. This map provides an improved format and standard presentation for a grid map required by Army Regulations 95-5 and 95-26. The map is a considerable improvement over the improvised and nonstandard graphics produced through airfield resources.



Informal but informative
You send—we respond

We also are in the publication game on a diminutive but direct basis. In CONUS, USAASO-AID publishes a weekly bulletin containing current major notices to airmen (NOTAMs) and other pertinent operational data. The bulletin, designated Technical Bulletin Aviation-1 ( )—or TB AVN-1 ( )—is middle-aged by Army aviation standards, as it has been published continuously since 1956. The data published falls into two classes: material which is of a temporary nature not suitable for more stable flight documents, and permanent changes and corrections carried until published in the appropriate FLIP. The NOTAMs provide both data submitted on Army facilities and those national NOTAMs which would adversely affect flying for Army transient traffic. These include navigational aids (NAVAIDs) outages of significant duration, airfield closures, fuel shortages, instrument approach chart corrections and other essential items.

LTC David A. Carroll is the acting director of the U. S. Army Aeronautical Services Office. He is a graduate of the U. S. Military Academy and the Command and General Staff College. He is fixed wing and rotary wing qualified

The operational data published in the bulletin includes a number of "regulars." The airfield directory appears every month; the status of FAA publications is also monthly. The date of latest editions of VFR aeronautical charts is published quarterly. The status of Federal Aviation Regulations (FARs) is published as needed. The into-plane contract fuel locations are published annually, and republished as a corrected list upon accumulation of sufficient changes. The "irregulars" are legion, covering many aspects of Army aviation interest but the main consideration is primarily addressed to correction of the FLIP and other printed media.

In the area of cartography, AID is supporting the current Army emphasis on pilotage to include the nap-of-the-earth (NOE)—or terrain flying—concept. Recognizing that the Army mission may have to be carried out in certain world areas where NAVAIDs, radar and ATC agencies are virtually nonexistent, AID has been working with the DMA Topographic Command on the NOE cartographic project to assure that aeronautical detail of prime interest to the Army is included in all tri-service chart products. The division provides membership and service input into national and international air cartographic standardization working groups to guarantee recognition and acceptance of the Army's chart requirements.

Another USAASO service provides operational personnel, Army aviators and any others involved in the aviation program with a direct channel to the AID "editorial" staff. AR 95-14 authorizes direct contact with USAASO on operational matters affecting flight information. Contact may be made by phone, direct informal letter or expedited by use of a "Comm Card," which is a direct mail postcard and self-addressed to USAASO or the oversea detachments. Army airfield operations desk should have Comm Cards on hand.

AID, since its inception in 1955, has been and remains in a unique and advantageous position in the aviation arena. This organization possesses a dual characteristic which permits direct interface with both aviation staff as well as field operating elements. The benefits of this dual capability provide an improved requirements validation program as well as supplying Army aviation staff with the necessary technical expertise to represent DA on all matters relating to air traffic and aeronautical information services.

Managing The Army ATC Mission

Continued from page 3

the Aviation Directorate of Headquarters Department of the Army our responsibilities to serve as the Army's principal point-of-contact for airspace, enroute and terminal ATC/NAVAIDs services, air traffic regulation, control and procedures, flight information, and related facilities and systems gained even greater significance.

The Air Traffic Control Activity's principal responsibilities are to serve as the Army's point-of-contact and provide Department of the Army representation within the Department of Defense and liaison with other government agencies and international organizations in assigned mission areas.

The ATCA provides membership on Federal Aviation Administration (FAA), Department of Defense and Department of the Army committees, boards, councils and working groups, and administers the National Agreement (NAT) 127 between Department of the Army and the FAA. Also it directs the employment and monitors and coordinates the Army airfield ATC modernization program. Last but far from least it provides regional representatives to the FAA.

Although the proof of our ability may not be visible for some time, the organization has the expertise to do the job and do it well. Of the 34 aviators assigned, 18 are Master Army aviators. This we believe to be a record and doubt that any other Army aviation unit with as many as 20 aviators can boast 50 percent of their assigned aviators holding Master ratings. Of the remaining 17, all but 3 are Senior Army aviators, and this works out to 530 years of rated experience for the 34 aviators assigned—or an average of 15.58 years!

The key to managing the Army ATC/NAVAIDs mission is the ATC master plan covering the 1977—1986 timeframe. It now is being staffed for submission to the Department of the Army.

The purpose of this 10 year master plan is to present the general concepts and major objectives for modernization of the Army's ATC systems. The plan outlines the use of resources (men, money and materiel) during a 10 year span for the operation, installation, modernization and implementation of a successful ATC/NAVAIDs and communications-electronics standardization program.

The document addresses objectives to be accomplished in upgrading and controlling the airspace utilization by the latest concepts in air traffic regulations, equipment and equipment training, and the latest Army/FAA standards.

It cites goals to be attained for personnel performance, facility management, maintenance techniques and the latest air traffic control developments during a specific timeframe.

The methods for providing a flexible and quick-reacting air traffic control capability to meet changing situations, latest technological requirements, and operating techniques also are covered in the master plan.

The scope of the plan encompasses the guidance and direction to implement, operate and maintain a highly sophisticated air traffic control activity standardization program in such areas of responsibilities as centralized management over the acquisition, installation, operation and maintenance of worldwide air traffic control facilities and systems; upgrading of all Army airfields to conform to the latest Army/FAA standards, to include personnel and equipment; and standardization of air traffic control facilities/NAVAIDs flight information and supporting equipment.

Other areas include maintenance of air traffic control and NAVAIDs equipment on a near real-time basis; use and maintenance of ATC personnel data base and an on-the-job ATC training program for both military and civilian personnel; and providing staff supervision over facility improvement, development of new materiel and equipment, acquisition and installation to ensure timeliness of materiel meeting national airways systems standards.

General Albright has directed every member of the Army Communications Command to support this new responsibility as a top priority and to ensure that every action required is accomplished without delay.

Worldwide there are some 1,500 controllers dedicated to making Army ATC/NAVAIDs systems the safest, most efficient and reliable in military aviation history. All of them, with the full support of the 30,000 men and women of the Army Communications Command, are pulling together now but overall success still depends on *your* support and cooperation. We need the full dedication of *everyone* associated with the Army aviation program.

Colonel Petty enlisted in the Army in February 1946 and was commissioned in March 1947. He received his wings in 1955. His military schools include the U. S. Signal School basic and advanced officers courses and the Command and General Staff College. He presently commands the Air Traffic Control Activity

ARMY AIRSPACE MANAGEMENT

Continued from page 5

team visit to the installation. Here, again, the DARR is present to coordinate the visit and assist the commander in reviewing his needs and ensuring that the Army point of view is known to the FAA for full consideration. Where conflicts are not resolved at the regional level, the DARR will inform USAASO and the matter will be tabled at the Department of Defense/FAA Washington level for resolution of differences.

The DARR office also stands ready to conduct an extensive on-site airspace utilization survey at installations so desiring this service. This can be a valuable tool for the commander in evaluating the entire airspace posture of his installation and assist him in managing his aviation assets. Requests for this service should be made to the U. S. Army Communications Command, ATTN: USACC-ATC-SD, Fort Huachuca, AZ 85613, and the appropriate DARR will coordinate and participate in the survey.

The DARR is guided by AR 95-50 as pertains to airspace responsibilities. He becomes the man behind the scene working for the Army field commander to ensure that Army airspace requirements are fulfilled in the best interest of the Army. This involves screening of each issue of the Federal Register for proposed rulemaking actions that will conflict with Army interests.

The DARRs deal with various segments of what is called special use airspace. These are defined as prohibited, restricted, alert, controlled firing or intensive student jet training areas. Most military reservations have one or more of these areas close by. More often than not these become joint use and the controlling agency becomes the FAA while the military becomes the user. The working arrangement of this type operation permits the Army usage of this area wherever it needs it, but releases it back to the FAA for general use when not required. The DARR office, working with both the FAA and the Army, assists in the letters of agreement outlining the procedures to be used in these arrangements.

Airspace matters fall into two broad classes: rulemaking and nonrulemaking. Rulemaking actions are those relating to the designation, alteration or revocation of airspace by a rule, regulation or order. Restricted areas, control zones and like areas fall into this category. Nonrulemaking relates to FAA functions of a less stringent nature affecting airspace and includes airport alterations, equipment installations, etc. The FAA also conducts obstruction evaluations on which decisions are made but not referred to as nonrule cases. These latter items are screened by the DARR office and forwarded to the affected installation if it appears it will involve their areas of operation.

Of significant importance is the time element involved in the processing of rulemaking actions such as the request for a temporary restricted area for a maneuver. A 6 month leadtime is required for processing of rulemaking actions, but DARRs have, by working closely with the FAA, shortened this considerably when all the required information is available. Now, with the requirement for environmental impact statements it is doubtful if rush actions will be successful in the future except in rare instances.

There are many activities of a tri-service and FAA/military/general aviation nature that are attended by the DARR. On a recurring basis at the center area a meeting is held for the purpose of reviewing air traffic problems and new proposals. As a member of this committee the DARR ensures that the Army interests are known. The DARR office also actively participates, through the use of the ATC NCO, in the Controllers' Operations/Procedures Committee (COPCOM) which reviews and recommends the language and substance found in the FAA Air Traffic Controllers' Handbooks 7110.8 and 9. This area encourages controller participation in the development of ATC procedures through the organized collection of views and recommendations of working level controllers.

A review is made annually of the various low altitude, high speed routes (LAHSR). While the Army doesn't fly in this dimension, it does fly at the altitude (500 feet, 200-plus knots) that these routes traverse. The DARR reviews the existing routes and monitors modifications and proposals for new routes to ensure they will not interfere with existing Army training areas or impair air traffic activities. Information pertaining to these routes can be found in the Flight Information Publication, Section IIA.

Basically, this has been an approach to the overall airspace management picture where the DARR plays an ever-increasing role as a link or better yet an extension of the Department of the Army airspace agency. The interests of the DARR extend to all matters which significantly affect Army aviation or airspace interests within his geographic area. The DARR is providing this service in its entirety to commanders. He is as close as a phone call (figure 2) and is ready, willing and capable of providing professional guidance toward fulfilling the Army mission in airspace management. Know your DARR and use him!

ARMY ATC SCHOOL

Continued from page 7

facility rated instructor they receive live aircraft training. With completion of this phase of training ground controlled approach students are awarded the MOS 93J.

After completing the FAA CTO exam approach control (93K) students attend a 3-week course in conventional nonradar approach control. In a lab environment they learn to separate aircraft vertically, laterally and longitudinally through the correlation of time, distance and speed. Here they are taught to use pilot position reports, aircraft speed, altitude and designated navigational aids to keep traffic moving, both inbound and outbound.

Upon completion of this phase of training 93K students go to the equipment block of instruction. In this portion of training (the same as with GCA students) they are introduced to the radar equipment to be used to control air traffic in a tactical or fixed installation environment. From here the approach control students go to the radar simulator to continue advanced approach control training in a radar environment. After they have mastered all positions simulated in the radar laboratory, the students move into field training at HUB Control (the flight following center for the Fort Rucker flight training area). Now training given in a previously simulated environment is put to the test with live traffic, under the supervision of a rated and qualified instructor. With the completion of this phase of training, students are awarded the approach controller, MOS 93K.

In the near future an advanced tactical phase of training will be incorporated into all three programs of instruction of the Army's ATC School. This training will ensure that Army ATC personnel are familiar with the latest doctrine and equipment being used by units in the field and its application in a tactical environment.

The Army Air Traffic Control School has the capability and flexibility of adapting its ATC program to fit any requirement for air traffic control training requested by any branch of the armed forces or civilian agency. The adaptability of the Army's ATC training program has effectively shortened the length of time required to achieve an FAA facility rating by newly assigned controllers at a fixed installation. This capability was reinforced recently as a result of training received at Fort Rucker by U. S. Marine Corps air traffic control personnel assigned to the Cherry Point, NC, Radar Approach Control (RAPCON).

By all standards, the Army's air traffic control training program far exceeds any previous attempts in this field. The ATC School at Fort Rucker—justifiably proud of the students it graduates—offers the highest quality of air traffic control training and uses the most advanced equipment and training techniques found anywhere.

Supervised training at HUB Control—Fort Rucker's flight following center

OPMS QUESTIONS

In December the DIGEST started a series featuring questions on the Officer Personnel Management System (OPMS). Answers are by the Office of the Deputy Chief of Staff for Personnel, HQ, Department

The "gates" flight pay system provides that an aviator is entitled to receive flight pay, whether he flies or not, if he makes a specific gate. On the other hand, the aviator failing to attain gate requirements is paid flight pay only while performing aviation duties. During this time of increased cost awareness and emphasis on equal opportunity, what rationale can explain this inequity? I believe that it is an accepted fact that a certain percentage of aviators will fail to attain gates requirements because they are serving in either their primary or alternate specialty which may not be aviation oriented at the time. Why the gate? Why not flight pay for flight duty?

The "gate" system was designed as a control measure to ensure a minimum utilization of aviators in operational flying positions. Another alternative of only paying flight pay for flight duty was considered, but it was rejected. The rationale as expressed in House Report 93-799 is as follows:

> In overwhelming numbers junior officers who have completed their training and are in the period when they are making career decisions told the committee that they wanted a continuous pay system where they would have some reasonable certainty as to the level of income they could expect. The committee, therefore, concluded that it would not be rational to vote a retention incentive on a basis rejected by those the incentive is designed to retain.

When there is a RIF (reduction in force) a number of highly motivated officers are forced to leave the service who would otherwise make a career of the Army. At the same time there are other officers remaining on active duty who would be willing to leave the service voluntarily if they could receive the adjustment/severance pay. Can the law be amended to permit identification of those willing to leave, if paid, then pay and release them in place of those desiring to remain on active duty? It appears that the cost would be the same and it would help the morale of everyone.

While the suggestion sounds desirable it is, in fact, unworkable. All control of numbers, quality, year group content and branch balances is lost. It would be extremely difficult to attain a given end strength under such a program as "normal" losses would be indistinguishable from RIF losses. Quality control and year group content control are the biggest advantages of an involuntary RIF. In a voluntary program, there is a danger that high quality officers and junior officers in short year groups would be likely to take advantage of the monetary payment. However, there is another proposed program which would allow officers to accrue monetary benefits. A major element of the Department of Defense legislative proposal (H.R. 12505, the retirement bill which was submitted to Congress on 28 March 1973) was a provision which would provide monetary payments for personnel voluntarily separated before becoming eligible for retirement. This legislation would provide equity payments for voluntary separatees with at least 10 but less than 20 years' service in the form of a monthly annuity at age 60 equal to 2½ percent of final year's average monthly pay times years of service.

Do future plans include provisions for inclusion of Army Medical Department officers in OPMS?

No. OPMS was designed to apply to all the OPD (Officer Personnel Directorate, Office of Personnel Operations) managed branches and does not include the Army Medical Department, Judge Advocate Generals and Chaplains.

Newly rated aviators receive pinpoint assignment from DA to aviation slots. Why can't other aviators be assigned under a similar system —according to their needs—i.e., assigned to a post with orders specifying branch related or aviation related assignment based on officer's needs for branch qualification or "gate" time? This would not leave the aviator completely at the mercy of the post!

The current OPD Aviator Management System approved for implementation on 27 August 1974, provides for the inclusion of the follow-

& ANSWERS

of the Army. If you have questions send them to the Editor, U. S. ARMY AVIATION DIGEST, P. O. Drawer P, Fort Rucker, AL 36360. We will get an answer for you as soon as possible

ing statements on assignment orders as appropriate:

1. This is a directed assignment to an operational flying position for initial tour utilization. An officer may not be assigned against a nonoperational flying requirement without concurrence of DAPC-OPD-(appropriate career branch).
2. This officer is being assigned against an operational flying requirement in order to meet the provisions of the Aviation Career Incentive Act of 1974. Officers may not be assigned against a nonoperational flying requirement without concurrence of DAPC-OPD-(appropriate career branch).
3. This aviator is being assigned against a ground requirement and may not be assigned against an operational flying requirement without concurrence of DAPC-OPD-(appropriate career branch).

Will assignments switch from the primary to the secondary or will they follow in a series of one or the other?

The pattern of assignments an officer will receive will depend on his branch related specialty and the requirements in that specialty. A combat arms officer at the field grade level can look forward to several assignments in his alternate specialty for each one he receives in his primary specialty. This would not be true for a field grade officer with law enforcement as his primary specialty. The requirements in law enforcement are such that the number of assets are significantly short of the number of requirements. For this reason, a law enforcement officer will probably serve two or three assignments in law enforcement for every one he serves in his alternate specialty.

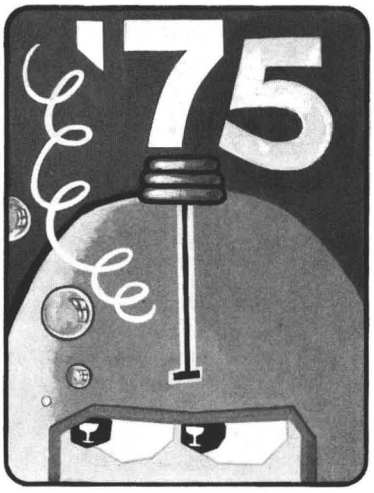
In the future, will officers be promoted to field grade ranks on their ability or will age be a determining factor? An example would be a 35-year-old captain with 14 to 16 years of service. What will be his chances of being promoted to major?

Promotion to all officer grades will continue to be based on ability and efficiency with due regard being given to seniority and age. This basic philosophy is prescribed in Title 10, United States Code. It is not possible to determine the chances for promotion of a 35-year-old captain with 14 to 16 years of service. Each officer is judged in competition with all other officers in the zone of eligibility. Those with the best record of demonstrated performance and indicated potential are recommended for promotion within the prescribed number indicated in the letter of instruction.

gorski's corner

I JUST LOVE IT WHEN THEY CLAIM THEY WERE "TEMPORARILY MISORIENTED" INSTEAD OF JUST PLAIN LOST.

VIEWS FROM READERS



Sir:

Mr. Harvey F. Jossen's article entitled "Air-to-Air Combat" was enlightening. He discusses an area that has been paid nothing but lip service in the past years. The article is especially interesting to me since I am researching that same subject.

At the present time, CPT Rick VanPelt and I are students in the Armor Officer Advanced Course. As a special project we are working for the Armor Training Task Force at Fort Knox and have the mission to write training guidelines for air-to-air combat techniques. Our ultimate goal is to publish a training circular on the subject.

We would appreciate any information that may have relevance to the subject from our fellow aviators. As Mr. Jossen states, the possibility is definitely there for a helicopter versus helicopter encounter. The Soviet Bloc nations do have an attack helicopter. It is indeed a formidable threat.

The assistance of all aviators with interest in the subject is greatly appreciated. Information can be sent to either CPT VanPelt or myself at the same Fort Knox address.

CPT Douglas H. Madigan
Armor Training Task
Force (D.O.T.)
U. S. Army Armor School
Sinclair Hall
Fort Knox, KY 40121

Sir:

The article by Mr. Britt entitled "Threat To United States Airmobile Operations" (September 1974) was most interesting and informative. However, I believe he forgot to include a most serious threat, perhaps the principal threat to our helicopters—the Russian MI-24 (HIND) armed helicopter. The HIND is in production and might well be deployed in quantity at this time. It is larger, faster and carries four times the armament load of current U. S. Army gunships.

Mr. Harvey F. Jossen's article on "Air-To-Air-Combat" (July 1974) alluded to such a threat but I fear few will take him seriously. Considering overall aircraft performance capabilities and current U. S. Army helicopter employment techniques (e.g., NOE), an enemy armed helicopter is a much more dangerous threat than a tactical fighter. A book could be written on this subject but here a comment must suffice. In determining our courses of action regarding helicopter operations *all* the enemy capabilities must be considered, and that includes his use of armed helicopters.

I would hope that the appropriate Army agencies are examining the seriousness of such a threat as well as the need for an effective air-to-air weapon on our helicopters.

LTC Vince Bailey (USA, Ret.)
284 Whiting Pond Road
Fairfield, CT 06430

Sir:

A symposium on aircraft crashworthiness will be held 6-8 October 1975 in Cincinnati, OH. The symposium is sponsored by the Office of Naval Research, Army Air Mobility Research and Development Laboratory, and the Air Force Aerospace Medical Research Laboratory in cooperation with the Federal Aviation Administration.

The objective of the symposium is to provide a forum for the exchange of information on:

- the need for crashworthy aircraft,
- the state-of-the-art of aircraft crashworthiness design, testing, analysis and simulation, and
- significant crashworthiness research and development.

It is intended that the symposium will provide a unique opportunity for aircraft researchers, designers, manufacturers and federal agencies to discuss the following aircraft crashworthiness topics:

- injury criteria,
- occupant protection (e.g., seats, restraint systems),
- crash impact loading of aircraft structures,
- crashworthiness simulation and analysis, and
- postcrash factors.

Leading authorities will present lectures on the above topics. A hardbound proceedings will be provided to participants.

For further information contact either:

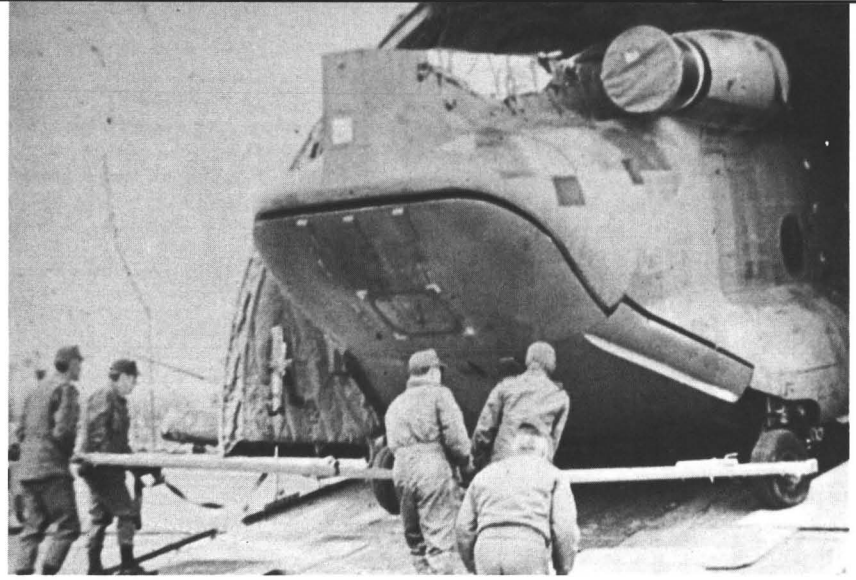
Dr. R. Huston
Department of Engineering Analysis
Mail Loc #112
University of Cincinnati
Cincinnati, OH 45221

Dr. K. Saczalski
Code 474
Office of Naval Research
800 N. Quincy Street
Arlington, VA 22217

Dr. W. Pilkey
Department of Engineering Science
& Systems
University of Virginia
Charlottesville, VA 22901

Thank you for this courtesy.

Dr. Walt Pilkey



Sir:

Reference: Major Roger J. Tancreti's article "Strategic Deployment of the 101st," October 1974. Your editor goofed! The lead photo shows a CH-47 being loaded into the gaping jaws of a a C-5, not a C-141 [see photo at right].

Roger's entire article concerning strategic deployment is timely and very informative. The 101st has demonstrated its ability to move via MAC in a very smooth and professional manner. As a matter of fact, the 101st has one of the best strategic movement plans and training programs for its aviation units going of any of the units I have evaluated during the past 2½ years on United States Readiness Command sponsored joint training exercises in the BRAVE SHIELD, GALLANT HAND and BRAVE CREW series.

All of the units of the 1st Cavalry Division, 82d Airborne Division and the 101st have made tremendous strides in deployment procedures and techniques for aircraft and ground equipment. Many personnel have been truly innovative in their approach to solving problems associated with air movement, such as redesigning and prefabrication of ramp extensions, modification of ground handling wheels for UH-1s and AH-1Gs, submitting proposed aircraft design changes, to include hard point tiedown brackets for the AH-1G to make the job easier. Proposing changes in TOEs and tool set components, updating service publications to include new techniques and procedures as a result of what is actually being accomplished by the units in the field.

It behooves all of us wearing Army wings to have a detailed knowledge of the techniques for deploying Army equipment, particularly helicopters, in Air Force aircraft and to continue making recommendations and developing new techniques, procedures and equipment to make the deployment job easier.

LTC Sylvester C. Berdux Jr.
Evaluation-Doctrine Division, J5
United States Readiness Command
MacDill AFB, FL 33608

• Colonel, you're right . . . the photo on page 8 shows a CH-47 being loaded into a C-5A. Thanks for bringing this to my attention.—Editor

Sir:

I am interested in building the AVIATION DIGEST library in our maintenance office. The back issues I have are limited and would appreciate your assistance in bringing our AVIATION DIGEST library up to date. If possible I would like to start the library from 1 January 1972 to the present. Any assistance you could give would be gratefully appreciated.

LT Kenneth E. Mehringer
Assistant Maintenance Officer
HHC, 222nd Avn Bn
Fort Wainwright, AK 99782

• Those back issues available are in the mail.

LTC Glenn A. Brown's byline was inadvertently omitted from his article "The Interview" which appeared in the November 1974 DIGEST. Colonel Brown's article was used as a portion of USAAAVS' briefings under the title "They Don't Care" prior to its publication.

Aviation Combat Development Ideas Invited

Have an idea to improve aviation? If so, read this.

Current aviation combat development efforts, though extensive in scope and intensive in nature, may or may not encompass all aspects of future aviation needs. Should gaps exist in the aviation combat development effort, they could impact adversely on national defense or as a minimum result in "crash" studies and hurried programs that may produce less than favorable results.

In consideration of the above, and aware that readers of the DIGEST have a common interest in the future of U. S. Army aviation, request that you submit your ideas concerning any facet of aviation—training, hardware, doctrine, tactics, equipment, countermeasures or other areas—to the address below. Concepts submitted will be more helpful if associated with a time frame similar to the following: "near"—up to 1980; "intermediate"—1980-1985; "far"—1985-1990.

You may say to yourself of an idea you have, "Someone surely has already thought of it." That may or may not be so . . . if it has been thought of, it's possible that the idea has not been presented for evaluation because others also assume that it is recorded and under consideration. Therefore, if you have any thoughts related to aviation combat developments, let us know. Write to:

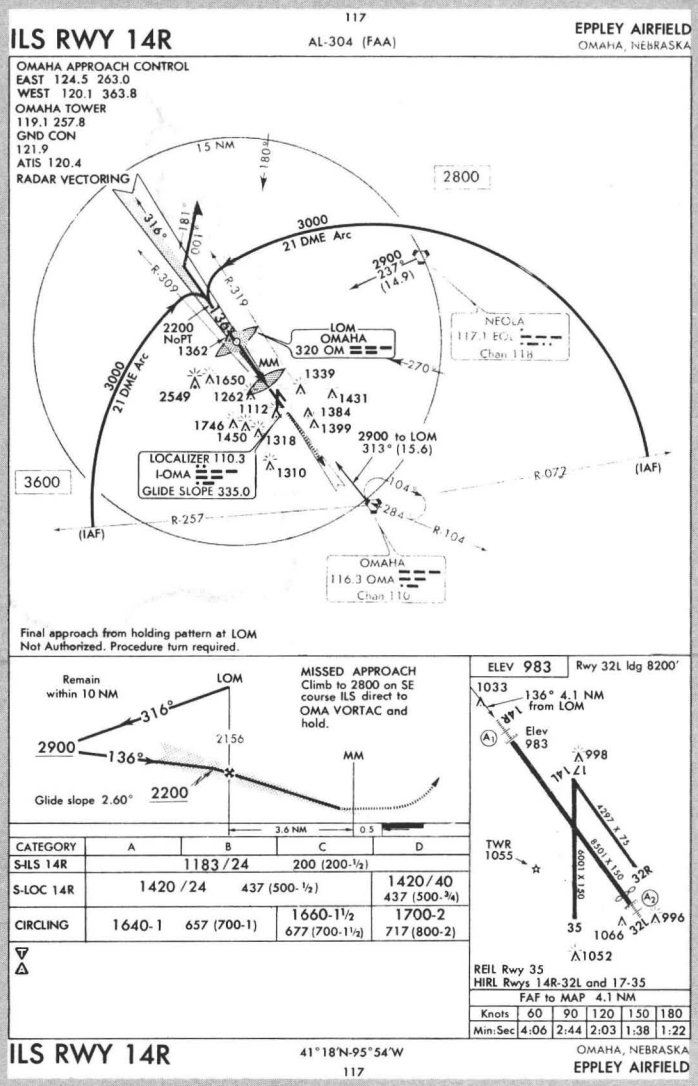
Commanding General
U. S. Army Aviation Center
ATTN: ATZQ-D
Fort Rucker, AL 36360

MG WILLIAM J. MADDOX JR.

STANDARDIZATION CORNER

SITUATION: You are being radar vectored for final approach course interception to ILS RWY 14R at EPPLEY AIRFIELD (see accompanying chart). The controller vectors you to a point 6 NM north northwest of the Omaha LOM at an altitude of 2800 feet, then turns you to a heading of 160 degrees and clears you for the approach. The procedure turn altitude is 2900 feet and the sector altitude is 3600 feet. What altitude do you fly until intercepting the localizer course?

ANSWER: Fly at 2800 feet until intercepting the localizer course, then continue the approach descending to 2200 prior to the LOM. TM 11-2557-29, The Terminal Air Traffic Control Manual, states that within 40 miles of an antenna, separate aircraft from prominent obstructions shown on the radar scope by a minimum of three (3) miles and that vertical separation of aircraft above a prominent obstruction, which is displayed as a permanent echo, may be discontinued after you observe that the aircraft has passed it. Adequate obstruction clearance must be assured before the controller can clear the aircraft for an unrestricted approach.



CATEGORY	A	B	C	D
S-ILS 14R	1183/24		200 (200-½)	
S-LOC 14R	1420/24	437 (500-½)		1420/40 437 (500-¾)
CIRCLING	1640-1	657 (700-1)	1660-1½ 677 (700-1½)	1700-2 717 (800-2)

Index to the 1974 U. S. ARMY AVIATION DIGEST

A comprehensive subject index to the calendar year 1974 issues of the DIGEST will be available upon request in February 1975. Interested readers may request a copy of the index by writing to:

Editor
U. S. ARMY AVIATION DIGEST
P. O. Drawer P
Fort Rucker, AL 36360

Army Aviation Hall Of Fame

This is the fourth article on the seven inductees of the U. S. Army Aviation Hall of Fame. Articles featuring LTG George Seneff, GEN Hamilton Howze and LTG Harry Kinnard follow in future issues.

LIEUTENANT General William Beehler Bunker was commissioned in the Cavalry upon graduation from West Point in 1934. Even though he never became rated as an Army aviator, in 1950 his career became inextricably involved with Army aviation. He authored a report to the Chief of Transportation that convinced the Army of the intrinsic value of the helicopter in logistical roles. This resulted in largescale procurement of cargo helicopters by the Army and earned General Bunker the appellation "Father of the Helicopter" from his Army contemporaries. He accurately envisioned the very important logistical role of helicopters as complements to ground transport vehicles and established the philosophical basis for airmobile logistics.

In his next assignment as Assistant Chief of Transportation (Army Aviation), General Bunker continued to work toward the perfection of an airmobile logistical system and was largely responsible for the Army's procurement of CV-2 Caribou aircraft. He was the force behind the transfer of aviation maintenance proponency from the Ordnance Corps to the Transportation Corps and assembled a strong nucleus of highly skilled aviators within the Transportation Corps. In 1955 he assumed command of the Transportation Supply and Maintenance Command where he developed and established sophisticated procurement and logistics systems for Army aviation.

In later assignments as both Comptroller and Deputy Commanding General, Army Materiel Command, General Bunker continued to emphasize his strong belief in the great importance of cargo helicopters to the success of airmobile logistics. He died in 1969 while serving as Deputy Commanding General, Army Materiel Command.

Smiling during a ceremony in 1967 are General Bunker and Bell Helicopter president E. J. Ducayet. The occasion was rollout of the 5,000th UH-1.

ANNUAL AWARD
Monthly Winner
CONTEST

HELL

ONE WAY TO clear an area heavily infested with snakes is to use a shotgun. You can stand off at a safe distance and the scattering effect of the shot leaves the snake with little chance of escape.

One way to clear an area heavily infested with hard point targets is to use a helicopter. You can stand off at a distance and fire at a tank or other target. Unfortunately for helicopters, there are no shotgun type armament available to kill tanks and in this case the "snake" can fire back.

It doesn't seem that a shotgun type weapon that will be effective against tanks will be developed for the helicopter nor that any means will be found to keep an enemy from firing back. Therefore, an effort is being made to make the present type of armament more effective and to reduce the time the helicopter remains vulnerable to enemy fire.

The project is called Helicopter Launched Fire and Forget (HELLFIRE) system. In its simplest description, a laser beam is used to guide a helicopter fired rocket to a target. Since the helicopter does not have to guide the rocket, it is free to hide or move out of range of enemy fire as soon as the launching is completed.

The system has a means to detect, locate and identify a target; to designate the target by a coded laser beam; to acquire and track the target; and to launch a missile from an airborne platform and guide it to the target. Command and control communications links are also part of the system.

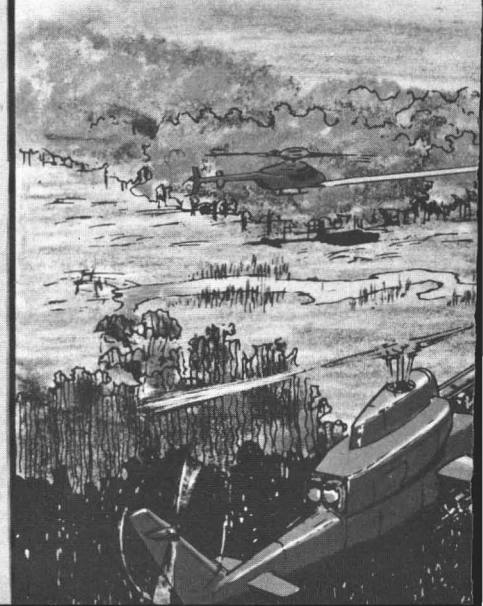
HELLFIRE already has shown that it can achieve high probability hits and can destroy or neutralize stationary or moving hard targets. Its primary targets are armor-protected vehicles, tanks and similar track-laying weapons systems. Secondary targets are all types of track-laying or mechanized vehicles, pill boxes, bunkers and hard, fixed fortifications. A HELLFIRE missile is expected to be able to destroy or disable any tank in operation dur-

Colonel John B. Hanby Jr.
HELLFIRE Project Officer
Redstone Arsenal, AL

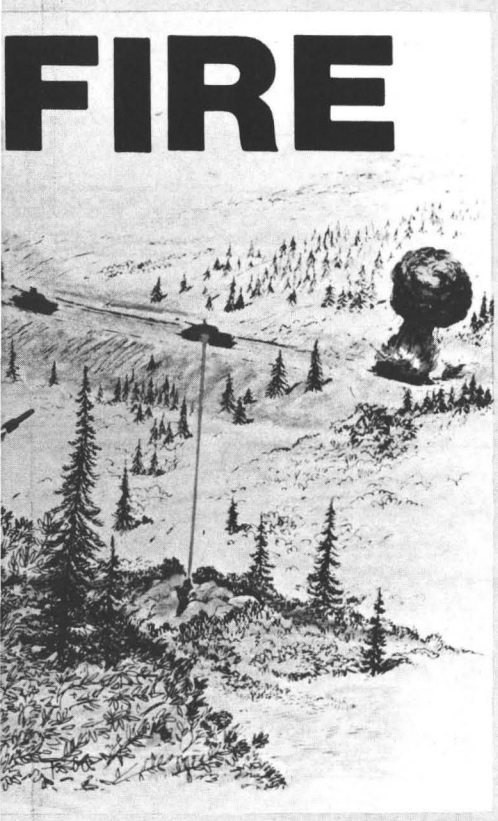
FIRE CONT

GROUND DESIGNATOR

HUNTER KILLER TEAM



FIRE



ing its fielded lifetime.

The system is designed to operate from a helicopter independently or with a ground subsystem. When operating independently it uses an airborne laser system to designate the target and to guide the missile. When operating with a ground unit it uses a ground based laser.

HELLFIRE will be most effective when enemy armored forces are located at extended ranges. It probably will be used as an offensive weapon even if the overall or supporting force is engaged in defensive operations.

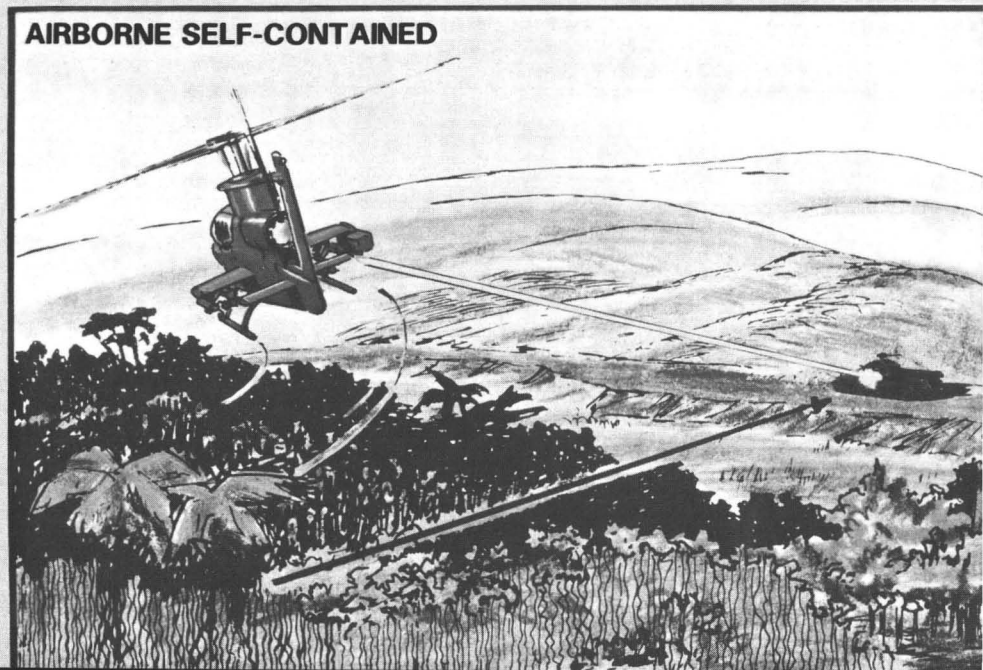
In making a smaller military force equal to a larger, high hit-kill probability weapons must be used to counter firepower superiority. The high mobility of the helicopter makes it a prime candidate as the launch platform. HELLFIRE missiles are being developed with the idea of giving the helicopter the needed firepower to get the job done.

The advanced attack helicopter (AAH) will provide a stable, manned, aerial weapons platform for attacking ground targets. It will be a two-placed helicopter with the necessary controls for both the pilot and copilot/gunner to fire the weapons systems and to fly the helicopter. Although the AAH will have short wings, they provide only limited lift and serve a primary function as attacking points for weapons systems.

The effective range of HELLFIRE depends on the radius of action of the attack helicopter (AH), plus the distance the missile can travel with accuracy. HELLFIRE is capable of destroying enemy armored vehicles at ranges significantly greater than any other weapons systems organic to ground maneuver forces. Under favorable conditions it can intercede and neutralize enemy tanks at ranges that make them incapable of effective fire on friendly forces. HELLFIRE is expected to be able to fill the antiarmor gap between the deep support areas in which friendly tactical air engages armor and the area in which ground

The doctrine for employment of aircraft firing the HELLFIRE missile system calls for terrain flying to take advantage of the protective cover it affords. Photos and artist's concepts here are used only to illustrate the systems to our readers. They do not reflect accurate tactical procedures . . . . . Editor

ROL MODES



An AH-1 HueyCobra . . .

Army Attack Helicopter . . .

Testfires The HELLFIRE Missile . . .

forces can use their own weapons against armor.

The full capabilities and limitations of the system are still being explored. The weapon delivery platform for the HELLFIRE system may either be an AH-1 HueyCobra or an AAH. The aircraft capabilities are those envisioned for an advanced aerial fire support system and need not be associated with any particular helicopter; nonetheless, it can be effectively fired when the helicopter is flying in excess of 130 knots and rapidly engage and disengage at critical times and places. It can be used against individual tanks or small groups or to concentrate a heavy volume of fire in a single target area. It is employable in a variety of situations and is responsive to virtually any command and support relationship.

The operational radius of an AH in temperate zones, at altitudes up to 6,000 feet, with a medium fuel load and a full ordnance (missile) load is more than 100 nautical miles. The radius may be extended by a variety of techniques including tradeoff between fuel and ordnance.

This radius, however, may be decreased by atmospheric pressure, temperature and altitude that normally influences helicopter flight. As a practical matter, the radius is decreased proportionately by hovering flight, power changes and variation of course noted during nap-of-the-earth (NOE) flight.

An attack helicopter can load, externally, more than six missiles of the type to be used. Current hardware under test is configured for up to 10 missiles on the AH-1 HueyCobra if the helicopter is not equipped with an airborne laser locator designator. One missile should be able to engage and destroy a hard point target with high single-shot probability at medium range for moving targets and long ranges for stationary targets. Depending on the situation, the helicopter should be able to fire every

1 to 10 seconds. The missile system has full capability at night and is compatible with night vision equipment.

The missile used is primarily an antiarmor weapon controlled by a self-contained guidance system. The missile homes in on a laser illuminated target. The tracker/seeker subsystem detects coded laser energy pulses to control the missile. Any laser energy detected which is not compatible with the programed coding is rejected. The system also provides an indication to the fire control system of the helicopter that the missile has locked onto the reflected laser energy and that launch is possible.

The launcher consists of the housing, support rails, automatic sequencing unit and umbilical connections. It can launch a missile at the required rate of fire at any altitude and speed, with minimum effect upon the helicopter.

The HELLFIRE missile management system is in two parts: an *airborne* laser locator designator and the *ground* laser locator designator.

The purpose of the laser locator designator system is to detect the reflected laser energy returning from an illuminated target and use the signals to align itself to the laser spot. The laser locator designator system allows the aircraft to detect coded laser pulses originating from a designator other than that aboard the helicopter. The tracking system uses the detected energy to provide inputs to an electromechanical control system which aligns the optical sighting device and, therefore, the *helicopter's* laser designator. The laser is slaved to the optics, with the line of sight (LOS) to the illuminated target. This system allows the helicopter to automatically acquire targets illuminated by other designators and to participate in "hand-off" operations. When the helicopter itself is acting as the designator, the target tracking can be either a manual or automatic operation. The optical sighting mechanism and the designator, which it aims, are mounted on a stable platform that compensates in some part for the motion on the helicopter. The above components are used on both the attack and observation helicopter platforms. Locator designators on attack helicopters are used for self-contained firepower while observation helicopters are the locator designator for target hand-off or directing support fires.

The ground laser locator designator tracking system consists of a laser designator on a tripod mount using an optical sighting device. The laser designator is mechanically slaved to the sighting device. The radiated laser energy is directed along the LOS parallel to the optical path. Boresighting capability eliminates error due to parallax. An electromechanical interface between the sighting/training device and the tripod mount makes it possible to provide azimuth and elevation information, in digital form, to the locator designator interface.

The laser designator emits a highly focused, minimally divergent beam-coded laser energy pulse. The pulse coding is selected by the designator operator as is the mode of operation. The designate mode causes repetitive output of energy pulses, as long as the switch is activated. The range finder modes causes the energy output only long enough to receive the reflected energy returning from the target; this may be as little as a single pulse. An indication of the range to the target being illuminated is given in meters on a visual readout device and is made available in digital form to the locator designator interface. The laser designator is slaved to the optical sighting/training mechanism so that the LOS of the optics is equivalent to the LOS of the radiated laser energy.

The HELLFIRE system still must undergo extensive developmental and operational testing in the near future. The results should provide additional data which will answer unresolved developmental/operational uncertainties and demonstrate the capabilities and performance characteristics of the system.

Upon successful demonstration of the HELLFIRE system, it should be no longer necessary for a helicopter to overexpose itself when delivering fire against hard targets and the Army will have another system which will improve firepower, flexibility and survivability in a high air defense threat tactical environment.

A Direct Hit Coming Up, BINGO!

1974 Roundup

William H. Smith
Staff Writer

ARMY AVIATION went into 1974 with a big first. A CH-54 helicopter with a four-point suspension picked up a 20-foot Mil-Van container, transported it, set it down and released it . . . all without ground crew assistance. This is believed to be the first time this feat has been accomplished by anyone, anywhere with a helicopter. The achievement was made possible through the use of a container top life device developed and built by The Boeing-Vertol Company under a contract with the U. S. Army Air Mobility R&D Laboratory (AMRDL), Moffett Field, CA. The demonstration took place at Fort Eustis, VA, with help from a crew of the 355th Aviation Company.

Members of the aviation unit who took part in the tests were Major P. J. Gruschetsky, commanding officer; CW3 D. I. Spivey, project officer and pilot; CW4 H. Proctor, pilot; CW3 T. P. Hall, pilot; Sergeant R. Browning; and Specialist 5 P. Parker.

* * *

In February the responsibility for operations, maintenance and upgrade of air traffic control/navigational aids at Army airfields/heliports was assigned to the U. S. Army Air Traffic Control Activity (ATCA) at Fort Huachuca, AZ.

The organization was given responsibility for the planning and coordination of engineering and arranging for installation, tests and acceptance, operating and maintaining fixed air traffic control and navigational aids systems throughout the Army.

Five and a half months later the ATCA celebrated its first anniversary having been established in July 1973. The organization now has 2,000 personnel operating and maintaining towers and radar facilities which serve 94 airfields and heliports providing systems to support air traffic control, navigational aids and safety for the Army's 10,000 aircraft. In addition to daily ATC operations, controllers play a vital role in helping pilots out of dangerous situations.

Also in July the first air traffic control conference sponsored by ATCA was held. There were 45 ATC personnel from throughout the world brought together to participate.

The conference provided the first opportunity for ATCA personnel to discuss air traffic control training and standardization; airspace; procurement and maintenance of ATC equipment; administrative policies and procedures; areas of responsibility; and a variety of other topics.

CH-54 using top lift device can pick-up, transport and release containers without help from a ground crew

* * *

Occasionally research in one problem can lead to the solution of an entirely different problem. This happened with the camouflage experts of the Modern Army Selected Systems Test, Evaluation and Review (MASSTER) at Fort Hood, TX.

They were testing various materials to camouflage the distinctive shape of a helicopter. They found that no matter what was tried, a camouflaged helicopter still looked like a helicopter, especially since it was almost impossible to move it under trees and other natural concealment.

As a result, MASSTER is now testing different helicopter ground-moving systems and is examining the mechanical capabilities, the repair requirements, and safety and human factors involved in operating each system.

* * *

An Army unit from Fort Huachuca helped the National Aeronautics and Space Administration (NASA) and Lewis Research Laboratories to keep shipping moving in the St. Lawrence Seaway during last winter's ice floes.

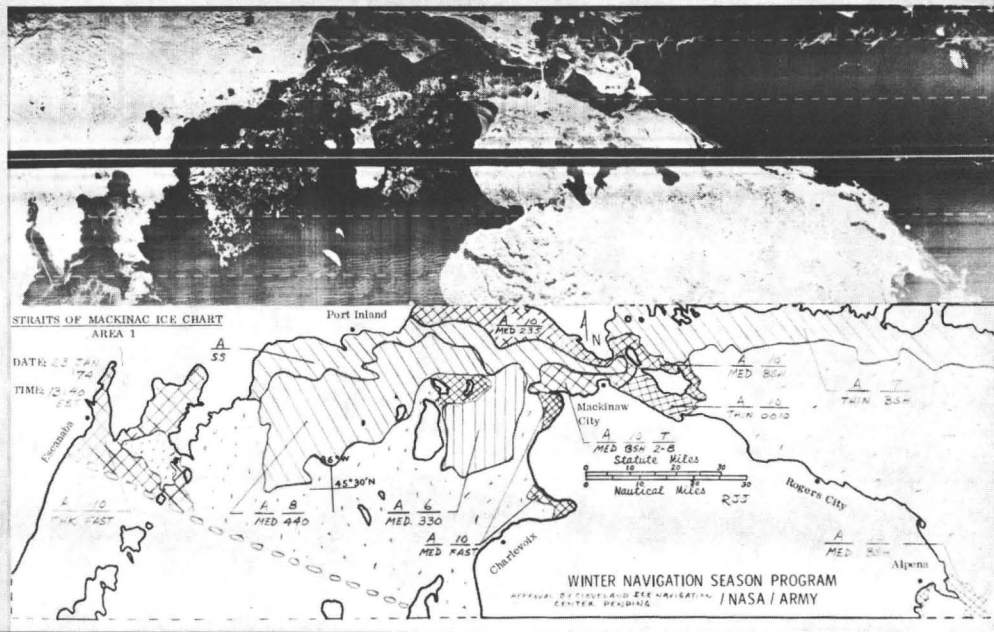
Two Army Electronic Proving Ground Mohawks equipped with side-looking airborne radar (SLAR) and a CH-47 carrying support equipment worked in the area performing daily reconnaissance flights over all of the waterways.

The mission was to locate ice formations that were obstructing shipping. The Mohawks not only located the ice but also were able to determine depth, character and even the age of the ice.

The results were almost unbelievable even to the NASA experts who are accustomed to the unlimited horizons of space. In spite of temperatures as low as minus 34 degrees, 30-knot winds, and sleet and

Colonel Lloyd J. Petty (right), commander of ATCA, presents Major General Jack A. Albright, commanding general of the U. S. Army Communications Command, a certificate making him an honorary air traffic controller

Field wheels, one of six methods under test at MASSTER used to move helicopters with engine off over rough, unimproved terrain as in forward combat areas



Army/NASA St. Lawrence Seaway ice project. OV-1D SLAR picture top. White line is the flight path

Iowa ARNG CH-47 makes aft wheel only landing on offshore rocks during mission with U. S. Coast Guard on Poverty Island

ice the Mohawks kept a steady stream of data coming in.

* * *

The Iowa Army National Guard's 1105th Aviation Company (Assault Support Helicopter) of Davenport came to the aid of the U. S. Coast Guard.

The Coast Guard had to build a 68-foot marine navigation light tower on Poverty Island, a densely forested pile of rocks in Lake Michigan. When they discovered that the usable water approaches were too shallow to accommodate a craft large enough to carry construction materials, they had to find some other means of transportation.

The only choice left was to airlift the 50,000 pounds of building materials and support equipment to the island. A search for a suitable mode of air transportation led to the Guard unit with its CH-47s.

To avoid overflights of populated areas, the unit used a municipal park as a pickup zone. On the island a 40-foot by 60-foot landing zone had to be cleared before the Guardsmen could begin shuttling external loads of equipment. The loads included a cement mixer, electric welder, power generator, water pump, 1,000 feet of water hose, 36,000 pounds of bagged sand, gravel, cement and reinforcing rods, and all component parts of the navigation tower and light.

* * *

Six officers and three enlisted men of the 222d Aviation Battalion, Fort Wainwright, AK, took a 4-day, high-altitude rescue course at Fairchild AFB, Spokane, WA. Their purpose was to ready themselves for the influx of high-altitude rescue missions expected during the summer.

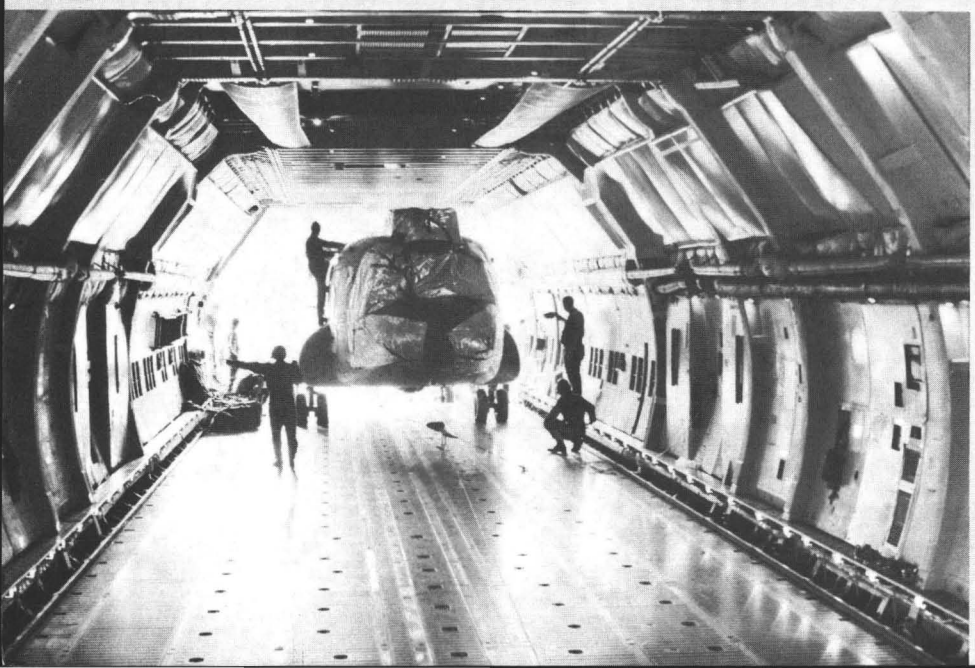
The course consisted of rescue operations instruction in the classroom and 2 days of "rides" in the altitude chamber which simulates conditions at high altitude. The chamber rides acquainted the men with the adverse effects of high-altitude flying.

The 222d usually maintains three complete crews qualified to perform high-altitude rescue missions up to 21,000 feet, equivalent to the height of the summit of Mount McKinley.

* * *

An air movement seminar was held at Pope AFB, Fayetteville, NC, to examine techniques of transporting Army helicopters via Air Force aircraft to expedite combat deployment.

Sponsored by the XVIII Airborne Corps and Fort Bragg, the meeting served to broaden understanding of the deployment of Army helicopters. During the seminar, efforts were made to identify and dis-



On 17 April at Pope AFB air movement seminar a CH-47 is loaded into a C-5A showing transportability

cuss problem areas and to recommend methods of improving these techniques of deployment.

The attendees were able to observe firsthand the disassembly, loading, unloading and reassembly of all Army helicopters in the current inventory.

* * *

In April a chemical storage tank on the south side of Chicago, IL, sprung a leak releasing silicone tetrachloride which formed dangerous clouds of hydrochloric acid fumes when it mixed with the atmosphere and water. Thousands of persons had to evacuate their homes and more than 100 were sent to nearby hospitals.

The Army was asked to help. Among the units responding was the Army Aviation Support Facility at Midway Airport.

* * *

The year wasn't entirely all work and no play with Army aviation units. Many had parties, parades and picnics. So many, in fact, that it's impossible to list them all.

One unit that had a picnic was the U. S. Army Aeromedical Research Laboratory (USAARL) which celebrated its twelfth anniversary. From a very small beginning the unit has steadily grown in importance and strength; USAARL now has 100 military and civilian personnel. The laboratory consists of five research divisions and two support divisions. The research divisions are: Aviation Medicine Research, Bioengineering and Evaluation, Aviation Psychology, Bioacoustics and Biooptics.

* * *

While on Annual Training at Camp A. P. Hill, near Richmond, VA, Company "A" of the 28th Aviation Battalion (Assault Helicopter) was called upon to rescue a 290-pound man from a swamped boat in the James River. Anthony Branch was swept over a small dam when the engine on his boat quit and his paddle broke. Richmond firemen and rescue squadsmen tried six times to get a line to him but failed.

The boat, which had been lodged upon rocks for 3½ hours, was partially swamped. The call for help was made to the Aviation Support Facility at Sandston, VA. The Support Facility contacted Major Duane Simson's unit which was training at Camp A. P. Hill. In short order a UH-1 helicopter commanded by Captain James Holden and piloted by CW2 Larry Brooks was dispatched to the scene. Specialist 5 Michael Tobias was lowered into the boat and helped attach the rescue vest to Mr. Branch who was lifted into the helicopter. Once he was aboard, Specialist

Dangerous hydrochloric acid fumes carried by wind from a storage tank in Chicago (below). Firemen and soldiers from Edgewood Arsenal try to seal the leak with cement (right) and exhausted firemen rest briefly after battling to stop the leaking chemical

Specialist 5 Linda L. Terezkiewicz (left) is the woman medic on duty as air medevac. At right, helicopter rescues man from boat in the James River

Tobias was then brought up and the mission was concluded without incident.

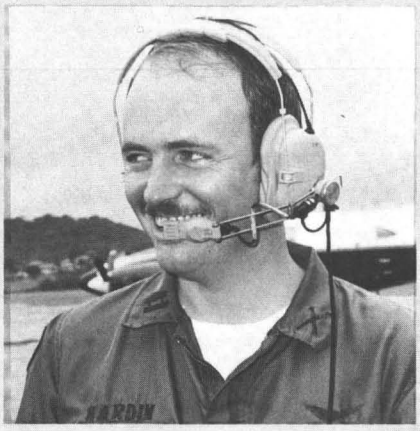
* * *

During the year women became more active in the Army aviation program. Second Lieutenant Sally D. Woolfolk Murphy received her wings in June to become the first woman aviator in the Army (see inside back cover, August 1974 DIGEST) and Specialist 5 Linda L. Terezkiewicz became the first woman to be assigned to the Air Ambulance (Helicopter) Branch of Lyster Army Hospital at Fort Rucker, AL. Specialist Terezkiewicz is believed to be the first female medic on flying status. The February 1974 DIGEST cited Private Linda Plock, the first woman to complete the Army's aviation maintenance training course at Fort Rucker, and Private Susan Schionning, the first WAC in the previously all-male airplane repairman course at Fort Eustis, VA.

* * *

In October three flight crewmen of the U. S. Army Forces Southern Command, Fort Amador, Canal Zone, completed what is believed to be a record flight for a U. S. Army aircraft.

Captain Charles A. Hardin, pilot; Chief Warrant Officer Jack M. Lewis, copilot; and Specialist 6 Robert D. Rose, technical observer and crewchief—all from the 210th Aviation Battalion—went to Singapore to pick up a U-21 aircraft.



Crew of the U-21's 16,300 mile Singapore to Panama flight. Left, (P) CPT Hardin, below left, (CP) CWO Lewis and crewchief SP6 Rose

Their mission: fly the two-engined, propeller-driven aircraft to Panama where it would become a permanent part of their unit's inventory.

Two weeks of preparation and technical inspections were required in Singapore before the crew felt everything was ready. The main problem was with the ferry fuel system, two 120-gallon auxiliary tanks inside the aircraft which increases the U-21 cruising range by 800 miles. The system should work either by gravity or force-feed; the men experienced trouble in the gravity mode.

The first leg of the 16,300-mile return trip took them to Bangkok, Thailand, and the next 30 days saw them at stopovers in Calcutta, India; Karachi, Pakistan; Tehran, Iran; Athens, Greece; Sandhofen and Wiesbaden, Germany; Mildenhall, England; Keflavick, Iceland; Sanderstrom, Greenland; Washington, DC; New Orleans, LA; Belize in Central America; and finally Albrook Air Force Base, Canal Zone.

The longest leg of the trip was a 2,500-mile stint between Greenland and Washington which took a little more than 10 hours.

Did we miss you? Let the DIGEST know about your outstanding accomplishments this year so that they will be included in the 1975 roundup.—Editor

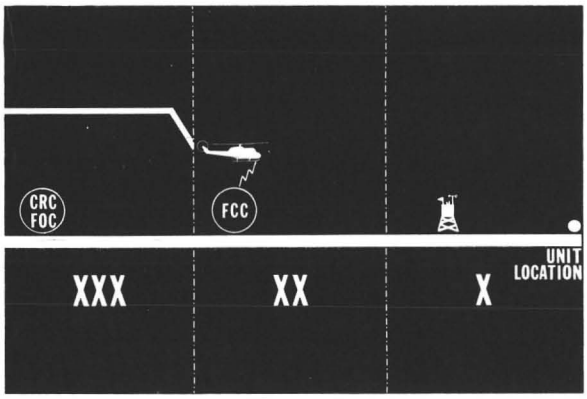


Figure 3

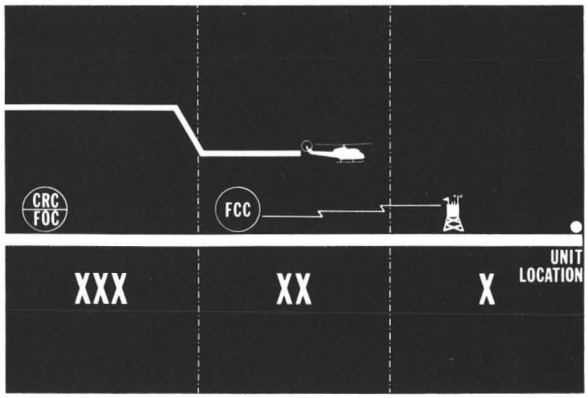


Figure 4

ATMS

Continued from page 9

characterized by the need for rapid and flexible response to the ground commander's requirements. The system is an extension of the local unit control which allows aviation assets throughout the corps to be responsive around the clock.

To illustrate the operation of this concept the progression of flight for a replacement UH-1H from the corps support command to a forward brigade can be used. After a flight plan is filed and air traffic control clearance received (assuming instrument conditions), the aircraft takes off (figure 2) and communications are initiated with the FOC/Air Force CRC. Location and identification are confirmed by Air Force surveillance radar and interrogator.

The aircraft proceeds at its assigned altitude from nondirectional beacon to nondirectional beacon while being monitored by the area surveillance radar of the control and reporting center. At a transition point based upon the threat (figure 3) the aircraft is stepped down to an appropriate altitude and handed off to the FCC in the division area.

The FCC *directs* the aircraft and *monitors* the aircraft's track on an area surveillance radar scope (figure 4), *contacts* the control facility located in the brigade, and *notifies* them of the estimated time of arrival (ETA) and point of entry of the inbound UH-1H. As the aircraft approaches the brigade rear boundary (figure 5), further stepdowns may be directed in consideration of the threat. The FCC then will provide vector service for the aircraft or direct it to navigate to the nondirectional beacon for an approach. The FCC may direct a further stepdown at this point, depending on the threat.

As the aircraft nears the brigade approach facility, the brigade manportable tower will be informed of the incoming flight. The aircraft then makes the instrument approach, breaks out into VMC and is cleared by the tower to the unit location (figure 6). Flight from this point to the unit would be at the terrain flight altitude considered appropriate for the threat considerations and local unit SOPs.

The air traffic management system described is designed to provide as simple a system as possible based upon the principle of management by exception. Aircraft operating under VMC will be able to move within the area of operations without undue restrictions on their movements. By providing a surveillance radar to the FOCs and FCCs and by placing approach facilities as far forward as the brigade rear area, the effectiveness of Army aviation under marginal and adverse weather conditions will be greatly improved. The air traffic management system is another step forward toward increasing the combat power and capabilities of Army aviation.

Figure 5

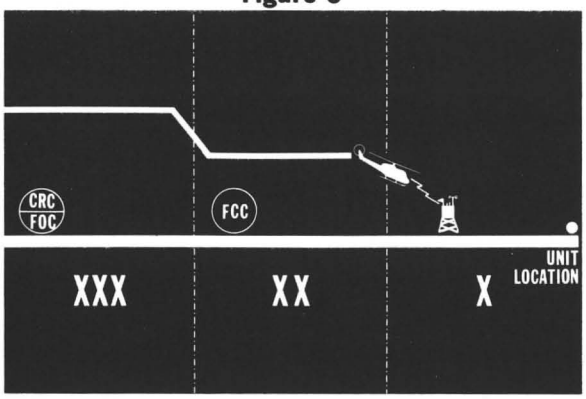
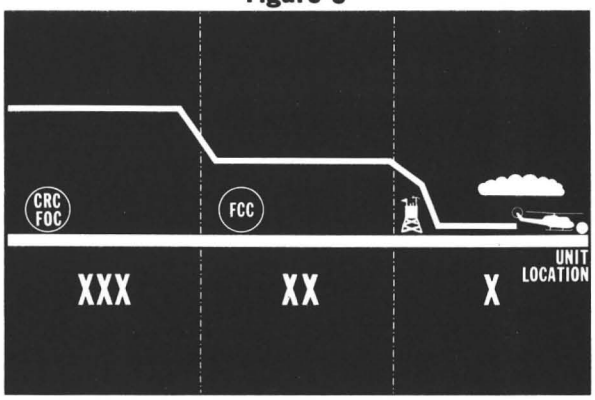
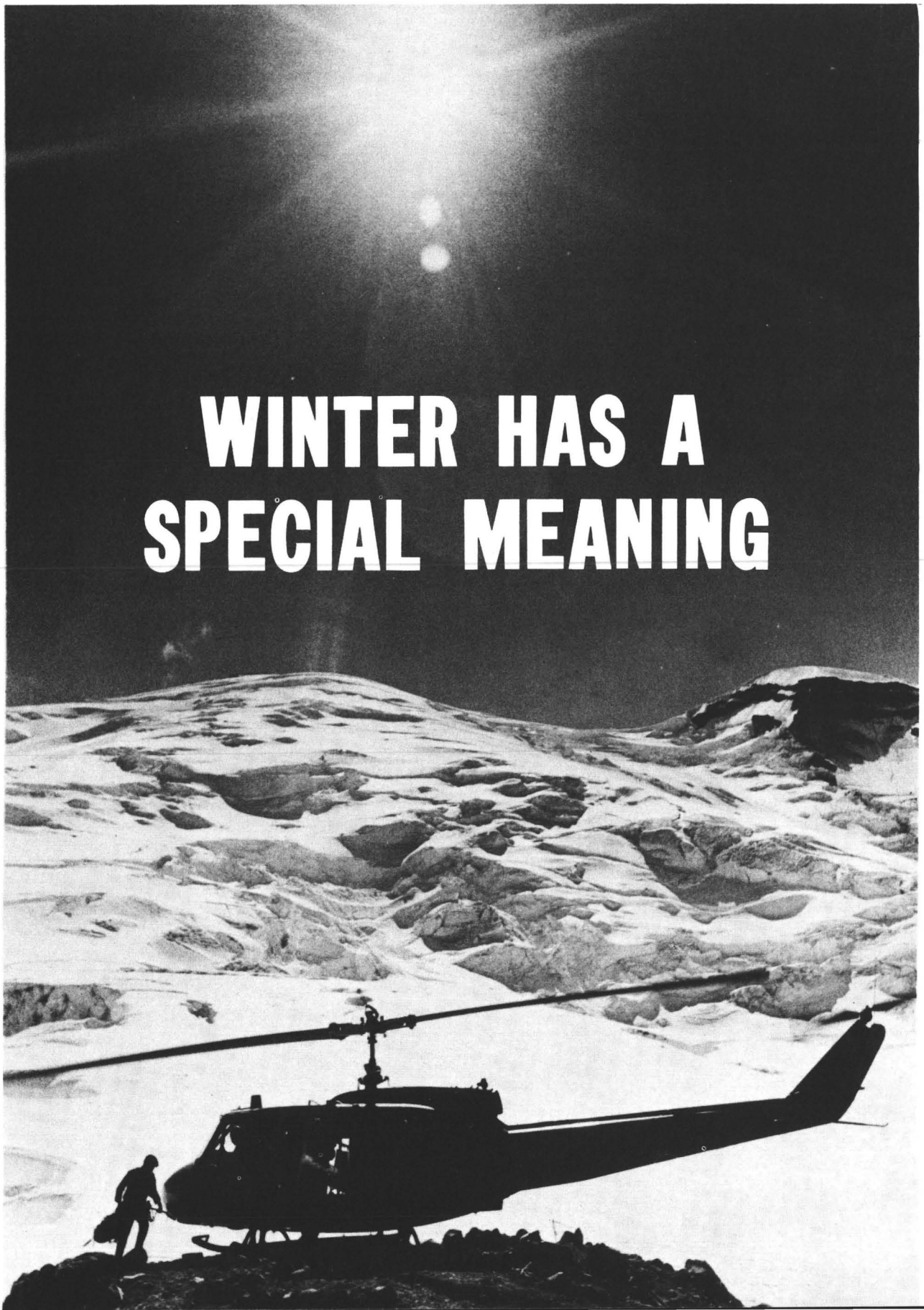


Figure 6




WINTER HAS A
SPECIAL MEANING

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WHAT DOES WINTER mean to you? The obvious and most frequent answer is, simply, cold weather. But thinking beyond the obvious, winter has a special meaning to most of us.

To the youngsters winter means catching snowflakes on their tongues, building a snowman, having a snowball fight or skating on a frozen pond. And if they're lucky, maybe a few days out of school if the weather gets really rotten.

To a young mother winter means sore throats, runny noses, overshoes, coats and gloves and a mop at the back door. At the same time the young father is thinking about ice and snow on the windshield of his car, tire chains and antifreeze, the miserable drive to work, high heating bills and doctor bills.

Ask a policeman and he will tell you winter means snarled traffic, stalled vehicles, fender benders and scads of accident reports.

A merchant will no doubt smile and tell you how many sleds, snow shovels, overcoats and overshoes he expects to sell when the first snow comes. A doctor will ask how many sleds and snow shovels were sold and then tell you approximately how many broken bones and heart attacks there will be.

Winter has a special meaning to Army aviators, too, and here are some of the operational problems that have been encountered winter after winter.

Weather-Induced Whiteout. A UH-1 crew was attempting to pick up two men from a peak approximately 10 miles northwest of the base camp. They had been dropped on the peak about 0930 that morning. Weather conditions deteriorated shortly afterwards and prevented the scheduled pickup. Base camp monitored a radio transmission from the two men at 1300, stating they were O.K. at that time. No other positive contact was made.

Winds had been high, with blowing snow throughout the day. At 2030 there was a break in the weather and another pickup attempt was initiated.

The pilot took off at 2045 with a copilot, crewchief, medic and passenger aboard. Weather at takeoff was high overcast, visibility 3 to 5 miles and winds 15 to 18 knots from the northwest. The pickup point weather was broken, visibility one-half to 1 mile in the northeast quadrant and 3 miles plus in all other quadrants. The two men were spotted on the peak, but the crew encountered severe turbulence. Winds were in excess of 60 knots at the pickup site.

Since both men indicated they were O.K. the pilot did not consider it necessary or safe to attempt a landing. The crew decided to return to camp and wait for better weather. They contacted base camp and were advised that weather was also deteriorating at the camp site. As they passed the camp at approximately 800 feet above the terrain, the pilot started a letdown and a 180-degree turn to approach camp into the wind and from the quadrant of best visibility and surface definition.

The crew had the camp in sight as they started the turn to final. Shortly after the turn was started, they experienced severe turbulence and a partial whiteout condition. Within seconds, the aircraft struck the snow and came to rest in an upright position after sliding about 300 feet. At the time, windspeed was estimated to be 35 knots and the crew was experiencing a complete whiteout.

The crew was operating in uncharted areas and the altitude above the terrain had to be estimated. This, coupled with the fact that no approach facility was available, left the crew no choice but to attempt a VFR (visual flight rules) approach.

Aircraft-Induced Whiteout. The pilot was told that he was to be the standby aircraft pilot, with a 0625 crank time. He was not told who his copilot would be, nor was he given a landing zone (LZ) briefing. The two pilots met at 0545, preflighted the UH-1H and cranked at 0625. A communications check was performed and the pilots were told they would be flying Chalk 9 in a formation of 10 on a tactical training mission. The aircraft left the staging area one at a time due to weather conditions and the flight formed en route to the troop pickup zone (PZ). The aircrews were in the PZ for 2½ hours with the temperature at –35 degrees F.

The flight departed the PZ at 1130. Time en route to the LZ was 50 minutes. Upon arrival at the LZ, the flight leader broke the flight into two flights, one of four and one of six, due to the size and shape of the LZ. The flight of four landed with no difficulties other than self-induced blowing snow. The blowing snow created a whiteout condition, which had not completely cleared when the flight of six prepared to land. The flight of six initiated their approach, but had to make a go-around for spacing. During the go-around, the flight leader split the flight of six into two flights of three each, the first three to go to the

Pilot lost all visual ground reference in blowing snow and aircraft struck trees

right of the LZ and the second three to the left side, with Chalk 8 as their flight leader.

Chalk 8 initiated his approach with Chalk 9 and 10 in a trail formation. On short final, Chalk 8 created a blowing snow condition, causing Chalk 9 to make his landing in a whiteout condition. The pilot of Chalk 9 continued his approach to his intended landing point, which had become obscured by blowing snow. About 20 to 30 feet AGL (above ground level), the pilot lost all visual ground reference and the aircraft struck the trees, then rolled to the left in a nose-low attitude. The crew and passengers were thrown around violently, but were able to exit the aircraft uninjured.

Crew error was a factor. The pilot talked on the radios while attempting to land the aircraft in formation to a difficult landing zone with blowing snow.

Supervisory error was the major factor. The pilot of Chalk 9 lacked experience in formation flying and landing. His copilot's flight experience in this type environment was very limited. The pilot received no briefing other than the tail number of the aircraft he was to fly and the crank time. The mission was delayed for 2½ hours and the crewmembers were exposed to –35 degrees F. temperatures for the entire period. The landing zone was not big enough to accommodate the entire flight of 10 aircraft. This caused the flight commander to break his formation into three flights at the LZ.

Communications was a contributing factor. The number of radio transmissions was abnormally high. This pilot received three radio calls on short final and he attempted to acknowledge these distracting calls while trying to land.

Icing Conditions. Icing on a cake is what makes it appealing to the eye and taste buds, but icing on an aircraft is one of the most serious winter hazards and there is nothing appealing about it. Ice accumulation on an aircraft can be slow or dangerously rapid.

Weather conditions normally associated with icing are:

• Icing occurs when the temperature is at or below freezing and visible moisture, such as a cloud, drizzle, rain or wet snow, is present.

• Icing occurs in stratiform clouds when air is stable and water droplets are present. Water droplets may become supercooled at or below freezing and still be in a liquid state. Supercooled droplets freeze on contact with aircraft and form layers of ice. Stratiform clouds also may contain ice crystals which are not hazardous to flight because they do not adhere to aircraft.

• Icing in cumuliform clouds, with high moisture content, can occur rapidly. Unstable air with vertical currents may carry very large supercooled droplets which spread before freezing and cause rapid accumulation of ice.

• Icing in mountainous terrain occurs mainly when moist air is lifted over high peaks. Ice-producing areas are mostly on the windward side of peaks to about 4,000 feet above the peak and possibly higher when the air is unstable.

• Icing in frontal inversions also can be very rapid. Air temperatures are normally colder at higher altitudes but when air from a warm front rises above colder air, freezing rain may occur. Rain falling from the upper (warmer) layer into a colder layer is cooled to below freezing but remains a liquid. The liquid freezes upon contact with the aircraft and accumulation can be very rapid.

Winter operations require special precautions from the planning phase to touchdown at destination. The following weather rules should be observed at all times.

Planning. Planning a flight in winter weather should always be done with the thought in mind that you would hate having to walk back. Obtain current detailed weather briefing and be certain you understand all weather conditions that exist or could occur en route and at destination and plan for an alternate airfield. It is essential that cold weather survival gear be carried at all times.

Pretakeoff. Check surrounding area before making runup so as not to blow snow and slush over other aircraft, runways or taxiways. Remember pitot heat, and use it. On reciprocating engines, apply carburetor heat on those so equipped in accordance with procedures prescribed by the dash 10 before takeoff—it is just as important before takeoff as during landing—when conditions warrant its use. Clear all frost from your aircraft before taking off. Frost increases drag and is hazardous at low airspeeds during takeoff. Frost also provides a surface that accelerates accumulation of ice.

Taxiing. Check condition of ramps and taxiways for ice, water, etc. Nose wheels and tail wheels are not effective on wet or icy ramps—EXCEPT AT SLOW SPEEDS. Use wing walkers when needed and allow yourself lots of space. Apply brakes smoothly, and avoid taxiing through deep water.

During Flight. Avoid flight into icing conditions. Choose altitude below freezing level if possible. Remain VFR. Staying clear of clouds will keep you away from most icing situations.

For flights in vicinity of a warm front, determine if temperatures in cold air mass are in ice-producing range (0 to –10 degrees or –20 degrees C.). Determine altitude of inversion layer. Knowledge of these facts will govern necessary action in the event you encounter precipitation.

Rotor blade icing begins near the root and ice buildup causes loss of airspeed. This requires an increase in power which leads to increases of exhaust gas temperature (EGT) and rpm and causes vibration.

Ice on the windscreen of a helicopter will be the pilot's first sure sign he has entered icing conditions. Even in the worst icing conditions, side windows in a helicopter usually provide visibility.

Windscreen heaters can be effective in preventing ice from forming but are often ineffective for removing ice that has already formed. This also applies to pitot heat. Use heaters when icing conditions are anticipated.

Once icing begins, the pilot should take action to avoid further icing. Rotor blade icing causes loss of lift and increased drag. The pilot must increase torque to maintain airspeed. If torque must be increased as much as 5 psi (pounds per square inch), flight must not be continued into icing. Further icing would cause the aircraft to lose autorotational capability in a matter of minutes.

Asymmetrical shedding occurs when one rotor blade sheds ice, leaving the rotor out of balance. This can lead to severe vibrations. Shaking the stick is not a cure because this could place undue stress on the aircraft and may actually lead to even greater imbalance. Ice shedding can also cause FOD (foreign object damage) from ice ingested into the engine.

When icing is encountered, descend to altitude clear of clouds. If icing is moderate to heavy, land. Remember that autorotational capability may be lost in a matter of minutes if flight is continued into clouds.

In freezing rain, it is vital to know the altitude of inversion layer and freezing level. If freezing level

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is at surface, landing is not recommended. Depending on circumstances, the best solution may be to climb through the inversion layer to the warmer air mass, where ice will melt off.

Be extra alert during morning flying periods for sudden weather changes. Morning flying periods are characterized by the poorest and most changeable weather of the day. The sun's heat does not have an appreciable effect much before noon. Consequently, nighttime fogs and low stratus clouds are slow to lift. Oftentimes, a temporary shift in the winds will blow a low stratus deck or fog bank away, only to have it come back in when least expected.

Be critical of visibilities reported as reduced by rain, drizzle or snow. Whenever a visibility of less than 6 miles is reported, the obstruction to visibility is included in the observation. (Thus the visibility will be reported "2 miles in rain, 1 mile in snow, 3 miles in light drizzle," etc.). Oftentimes, the significance of this information is overlooked. Rain and snow have an invalidating effect on vision from the cockpit. For instance, visibility as seen by a weather observer in rain is not realistic from the viewpoint of the pilot who encounters the rain at tremendous speeds—sometimes equivalent to directing a firehose at the window of the weather station. A weather observation wherein the reported visibility is obscured by precipitation should be viewed with some skepticism.

Exercise extreme care whenever the words "partial obscuration" or "obscuration" are contained in a weather report. The weather observer defines the ceiling and visibility by taking measurements in the vertical and horizontal. However, the pilot on his approach is interested in a factor known as slant range visibility, a factor the weather observer is unable to determine. Therefore, whenever an obscuration is reported, the pilot should be prepared for the possibility that the conditions he encounters will be poorer than those reported by the observer on the ground.

Where snow is forecast or listed as a possibility at destination, select an alternate where snow is definitely not expected and, if snow is encountered, proceed to it without delay. When snow reduces visibility to below minimums, it also reduces the radar capabilities of ground controlled approach (especially wet snow) by blurring the scopes, and it lowers the ceiling by obscurations. Icing may be encountered. Snow intensity is difficult to forecast and heavy snow often persists for a long period of time.

When in fixed wing aircraft, check runway conditions closely and cancel flight when the destination has ice-coated runways and temperatures are near freezing and/or rain is falling. Also cancel flight if fresh snow is on the runway or forecast to be on the runway.

Ice and snow on runways are dangerous for landing and takeoffs. Snow is particularly slippery when temperatures are near freezing. Wet snow on runways offers little friction. Ice is always slick, and when it is wet with rain, it offers practically no friction.

Where weather at destination is reported below minimums in winter, proceed to alternate without delay. In summer, daytime weather deterioration such as stratus and rainshowers may quickly give way to improvement. In winter, the sun's heating is far less than in summer and often weather deterioration and then persistence of poor conditions occur in the daytime.

In regions of suspected icing, when climbing, letting down or landing, keep a safe margin of airspeed and a minimum of extra exposed surfaces, such as wheels and flaps. Ice accumulation reduces dynamic lift and thus increases stalling speed. Extra exposed surfaces add to the amount of ice accumulation.

Landing. All anti-icing equipment should be on and everything warmed up before starting descent through clouds. On reciprocating engines, exposure to carburetor ice rises sharply when throttle openings are reduced. Lower powered descent in clouds and rain should always be made with carburetor heat on.

If you have flown through icing conditions, remember the effect on airfoils and carry an airspeed margin for unpredicted stall speeds. Also, landing on wet or icy runways requires longer runs. Exercise great care when landing in high winds. Crosswinds are especially hazardous in winter because they may be coupled with icy runways and blowing snow.

After a helicopter lands with ice on the rotor blades, ground crewmen should keep clear until rotor slows. Aircrew should remain in the aircraft until the rotor stops. Ice thrown from turning rotors can be extremely hazardous.

Ask your fellow aviators what winter means to them. If their answer is simply, cold weather, tell them to think beyond the obvious because winter should have a special meaning to all of them.

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, USAAAVS, Ft. Rucker, AL 36360

Wearing of Nomex

The following item appeared in the July 1974 issue of the GUARDSMAN magazine: "As required by AR 95-1, all Army Guard crewmembers and noncrewmembers must wear Nomex protective flying clothing while performing aerial duties. The old style cotton flight suit has been proven ineffective in postcrash fires. To assist in reducing supply problems caused by the clothing requirement, an April 26 NGB-ARL letter called for a limited central issue facility to be established at all ARNG aviation support facilities and flight activities. The exclusive mission of this facility is to ensure that specific items of protective clothing and safety equipment are immediately available for issue, replacement or loan to Guardsmen required to fly in ARNG aircraft."

As this item covers only the old type cotton one-piece flight suit, what about the use of TWs and khakis while flying VIPs? I would like to get a ruling on this matter. This issue is one of the most controversial concerning the older fixed-wing aviators.

Paragraph 3-32, Army Regulation 95-1, dated 18 October 1973, states that leather boots, helmet, fire retardant clothing with sleeves rolled down, and flying gloves will be worn by crewmembers on combat, tactical, training, test or similar flights that involve unusual hazards, and at other times prescribed by unit commanders. The one-piece cotton flight suit has been deleted from the Army inventory. The only authorized flight uniform is composed of Shirt, Flyers: Men's High Temperature Resistant Nylon Twill OG 106, Line Item No. T03002, and Trousers, Flying, Men's: High Temperature Resistant Nylon Twill OG 106, Line Item No. X35980. The introduction of the shirt and trousers has reduced thermal injuries of aviation crewmembers during postcrash fires. The United States Army Agency for Aviation Safety (USAAAVS) recommends that all aviation crewmembers wear the high temperature resistant nylon twill clothing (Nomex) on all rotary and fixed wing flights.

Miscellaneous Personal and Survival Equipment

Would you please furnish the manufacturers' addresses for the following equipment: Helmet, SPH-4; Night Vision Goggles, AN/PYS-5; and Infrared Searchlight Set, AN/ASS-2 and AN/ASS-3.

The SPH-4 pilot's protective helmet is procured through contract from acceptable production firms. One such firm is Gentex Corporation, Carbondale, PA 18407.

Procurement information for the AN/PYS-5 night vision goggles can be obtained from Director, U. S. Army Night Vision Laboratory, ATTN: AMSEL-NV-SD/Mr. Charles Arduini, Fort Belvoir, VA 22060.

The AN/ASS-2 searchlight was manufactured by Air Research, 9851 Sepulveda Blvd, Los Angeles, CA 90009. The AN/ASS-2 was developed for use aboard aircraft; however, only six units were acquired by the Army. A similar searchlight system for ground vehicles is covered in TM 11-6230-219-12, dated 25 June 1970, with changes.

Corrective Lenses

I am very interested in Army aviation for one day I would like to join the Army or Coast Guard to become a helicopter pilot. But, is it true that to be an aviator one must have 20/20 vision and why? I do not have 20/20, yet I have seen Army aviators wearing glasses. Are Army aviators authorized HGU-4/P impact-resistant lens, in other words sunglasses?

Department of the Army Regulation 40-501 establishes medical fitness standards for Army aviators. Presently, this regulation requires that all individuals undergoing pilot training have uncorrected 20/20 vision.

If, after successful completion of flight training, an aviator needs glasses to correct a vision discrepancy, he can remain on flight status and wear corrective lenses (glasses) while performing flight duties. Usually, older aviators require glasses while performing pilot duties. This is due to natural degeneration of the individual with age. Army aviators are authorized sunglasses, HGU-4/P, with impact-resistant lens while performing pilot/copilot duties.

AIRMOBILITY HANDBOOK – BETTER BELIEVE IT

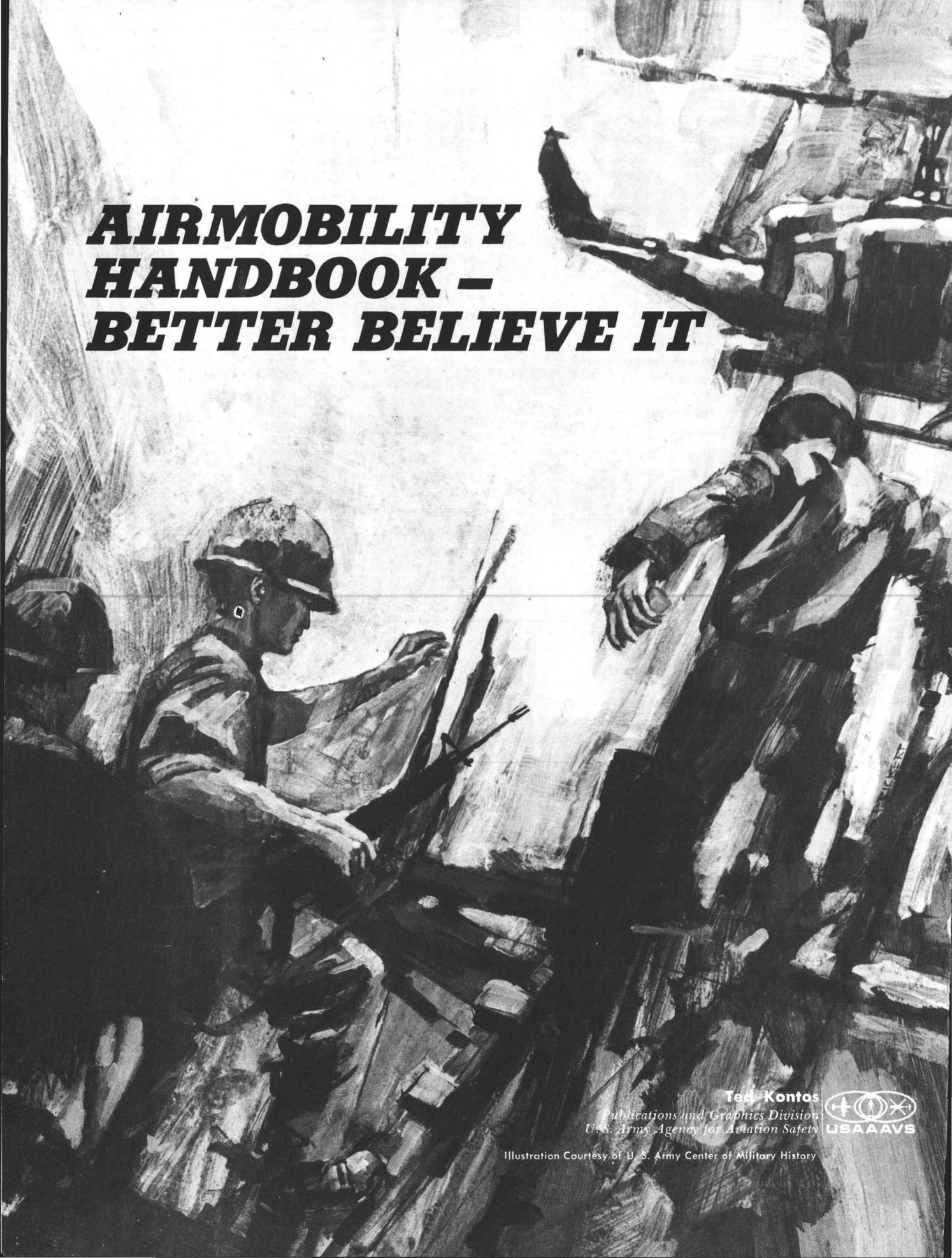

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Illustration Courtesy of U. S. Army Center of Military History

WE ARE ALL familiar with handbooks. They are available for virtually every subject applicable to Army personnel. Each is designed to serve as an authoritative reference on a particular topic, and the Airmobility Handbook prepared and used by the U. S. Army Infantry School, Ft. Benning, GA, is no exception. While this particular manual is provided for resident and nonresident instruction at the Army Infantry School only, it conforms closely to published Department of the Army doctrine, concepts, organization, tactics, and techniques for employment of airmobile forces in combat operations as stated in Appendix B, FM 57-35.

Since an airmobile operation is one in which combat forces and their equipment are transported about the battlefield in air vehicles to engage in ground combat, aviation safety is imperative to mission success. Consequently, approved operational procedures must be rigidly adhered to if needless losses under combat (or combat training) conditions are to be prevented. While the Airmobility Handbook provides necessary guidance in the all important area of safety, the myriad of accidents on record clearly shows the policies advocated by the handbook have not always been followed. The following examples were taken from a recently completed survey of accidents that occurred either during airmobile or closely related types of operations.

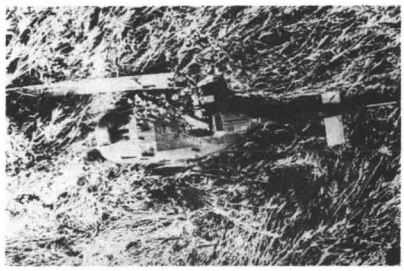
Weather. The two types of weather accidents that have historically caused the greatest loss of personnel and equipment during airmobile operations are those associated with high density altitude and inadvertent instrument meteorological conditions (IMC). Yet, the majority of these mishaps could have been prevented. In many instances, pilots knew they were violating the performance parameters of their aircraft before they began their missions. Similarly, many commanders knew they were exceeding the performance capabilities of their aircraft, and sometimes, the capabilities of their pilots when they planned the operations. In many instances, their lack of judgment resulted in loss of lives and equipment.

In one such instance, a UH-1 assigned a routine supply mission was loaded with 25 cases of C-rations and four passengers. The aircraft then proceeded to the landing zone (LZ) which was cluttered with stumps and bunkers. On arrival, the pilot began a slow, normal approach, but at the bottom of the approach, he noted a torque reading of 45 pounds (high) at an rpm of 6400 (low). He attempted a go-around, but the left pedal became increasingly ineffective until the aircraft finally spun to the right and downward, striking trees adjacent to the pinnacle. It then came to rest approximately 110 feet below the pinnacle. On impact, the gunner was thrown from the aircraft and killed.

This accident resulted in one fatality, two minor injuries and damage costs of nearly $267,000.

Accident investigators determined the aircraft was overloaded for the existing density altitude of 3,000 feet. Several other cause factors were also involved. Two days before the accident, the LZ had been reported as a safety hazard because of its small size and the high barriers nearby. Also, the existing winds during the attempted landing were gusty and variable. It is significant that the individual fatally injured was the only occupant not wearing a safety belt.

In another instance, a UH-1 was assigned a mission to extract a six-man reconnaissance team. The wind was light and the outside air temperature was approximately 85 degrees F. The pickup site was located on a 30-degree slope at an elevation of about 2,000 feet, with the approach path clear of obstructions. The pilot made his approach and turned the aircraft slightly to the right to position the ladder more advantageously for the team members. He then lowered the aircraft until the personnel could get a handhold on the ladder. During extraction, the pilot lost directional control of the aircraft and the main rotor rpm decayed. The aircraft made several clockwise spins before striking the ground, fatally injuring one team member who was pinned beneath a main rotor blade.



This accident resulted in one fatality, one major injury, one minor injury and damage costs exceeding $244,000.

During extraction, the aircraft became overloaded for the existing conditions of temperature and elevation. The pilot failed to plan the mission in accordance with the performance parameters of the aircraft. Had he done so, he would have known the impossibility of hovering out of ground effect under the prevailing conditions of altitude, temperature and wind velocity. Although the aircraft maintained a hover initially, it crashed when the passenger weight became excessive.

Making two sorties or using two aircraft for the extraction would have prevented this accident.

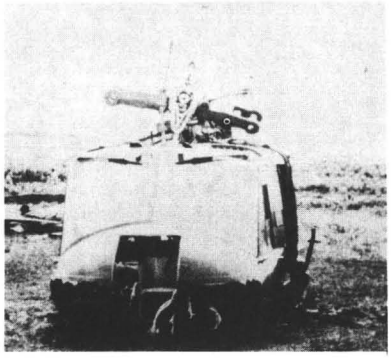
Another major accident involved a CH-47 that was being used for an administrative extraction mission. This aircraft departed its home base at 1220 hours. The original pickup zone (PZ) time had been 1200 hours, but due to bad weather the mission was put on hold status. The weather at 1235 hours between home base and the LZ was observed to be ceiling 600 feet and visibility 5 miles in light rain and fog. The weather in the vicinity of the LZ had been forecast to be intermittently 300 scattered, 800 overcast in light rain, fog and drizzle. The CH-47 made it into the LZ, picked up a load of 29 passengers and departed for home base at 1310 hours. The weather in the area started deteriorating and at 1328 hours, approach control received a call from the pilot of the CH-47 stating that he was in the clouds and was declaring an emergency. The aircraft was not heard from again. It was later found crashed on a mountain. All occupants sustained fatal injuries.

This accident resulted in 34 fatalities and damage costs exceeding $2 million.

Weather and supervision were the primary cause factors involved in this mishap. The weather had been marginal throughout the day, and another pilot had reported a ceiling of 150 feet and one-fourth mile visibility at the time and in the vicinity of this accident. There was command pressure from higher headquarters to accomplish the mission expeditiously. This may have influenced the operations officer who assigned an inexperienced crew, the only crew immediately available, to the mission. The copilot had not flown for 32 days. The report also made reference to the low level of instrument training proficiency of the unit aviators.

PZs and LZs. Careful selection of PZs and LZs is an important consideration for safe and successful airmobile operations. Adequate size to accommodate the number of aircraft involved, obstacles, surface conditions and restrictions to visibility are just a few factors that must be considered. And while smoke may be employed along the flight route or in the PZ or LZ areas for concealment, extreme care must be used to ensure it does not obscure the pilots' vision. Similarly, every effort should be made to prevent undesirable fires that can restrict visibility from smoke and blowing ashes. The following accident brief shows the importance of thorough flight planning.

A UH-1 was in position number four in a staggered trail for a pickup for a combat assault. The landing in the PZ was uneventful and eight combat troops were loaded in each aircraft. The pickup zone consisted of an area about 1 mile long on a north-south axis with a width of at least one-half mile. The area to the immediate north of the pickup zone included a small road and powder-like dust, three large bomb craters, several small trees and two 4-foot-deep gullies. The flight started its takeoff to the north and when the number two ship in the formation crossed the small dirt road, it created a rather large dust cloud. The pilot of number four was following closely, and when the dust created by his own aircraft combined with the existing cloud, he found himself inadvertently IMC. The pilot realized the danger and attempted to go on instruments but because of his low altitude (estimated 10 feet) he flew the aircraft into the ground before he could make the transition. The aircraft hit in a gully and the main rotor struck the ground. The blade then separated and hit the tail boom, partially severing it.



This accident resulted in damage costs of more than $82,000. Fortunately, no one was injured.

Insufficient clearance between aircraft in formation created an excessive amount of blowing dust. The pilot of the rear aircraft in the formation inadvertently lost visual contact with outside references and crashed. More separation between aircraft and a more thorough reconnaissance for safety hazards within pickup zones are definite recommendations if accidents from similar causes are to be prevented.

Winter Operations. LZs and PZs for winter operations require the same consideration as those for summer and desert. In addition, snow on LZs and PZs should be packed down by tracked vehicles or by personnel snowshoeing over the area, if possible. This procedure will help to reveal obstacles beneath the snow and reduce the possibility of blowing snow when landing.

During winter, a flight of 10 UH-1s loaded with troops approached the LZ in marginal weather. The flight was then divided into smaller

flights to space the aircraft for landing. Radio traffic was heavy with pilots reporting transmission oil pressure fluctuations and low fuel. The pilot of one aircraft being escorted to the refueling area by another aircraft encountered blowing snow at approximately 20 to 30 feet agl, and elected to revert to his preselected touchdown point. At about 6 to 8 feet he went completely IMC and the aircraft struck trees.

This accident resulted in damage costs of approximately $8,000. No injuries were sustained.

Crew error was a factor. The pilot talked on the radios while attempting to land the aircraft in formation to a difficult landing zone with blowing snow.

Supervisory error was the major factor. The pilot lacked experience in formation flying and landing. His copilot's flight experience in this type environment was also very limited. The pilot received no briefing other than the tail number of the aircraft he was to fly and the crank time. The mission was delayed for 2½ hours and the crewmembers were exposed to –35 degrees F. temperatures for the entire period. The landing zone was not big enough to accommodate the entire flight of 10 aircraft and this caused the flight commander to break his formation into smaller flights at the LZ.

Communications was a contributing factor. The number of radio transmissions was abnormally high. This pilot received three radio calls on short final and he attempted to acknowledge these distracting calls while trying to land.

FOD. Clearing LZs and PZs of objects that can cause damage to aircraft structures and engines is another important safety consideration. Obviously, FOD (foreign object damage) hazards are greatly increased when aircraft must be landed at unprepared field sites, and unnecessary landings at such areas should be avoided. The following example shows why.

The pilot of a UH-1 made an approach to an unsecure LZ so that the crew could locate and recover flare parachutes as souvenirs. On landing, the crew could not see any of the parachutes because of tall grass, and the pilot decided to hover until they could find some. They first saw one as it was blown into the air by the rotorwash—right into the main rotor. The parachute, along with a piece of cable about 18 inches long attached to it, was sucked through the main rotor and became entangled in the tail rotor, twisting the drive shaft and causing tail rotor failure. The aircraft spun approximately 180 degrees and crashed.

This accident resulted in damage costs of nearly $31,000.

Although this landing was not necessary, the mishap portrays what loose debris can do to a helicopter. Policing of landing zones and pickup zones should be emphasized by everyone involved in airmobile operations. The souvenir this crew was seeking turned out to be an expensive one.

Air Traffic Control. The Airmobility Handbook recognizes the need for coordination among pilots of aircraft operating together in combat and in strange areas. The usual methods of coordination are through use of a command and control (C&C) ship, pathfinders or air traffic controllers. The duties of the C&C ship include maintaining adequate airspace separation between aircraft, controlling arrivals and departures, LZ or PZ advisory service, etc. LZs and PZs should be organized if possible to include visual and electronic navigational aids and ground-to-air voice radio communication to the aircraft. On some occasions when air traffic control was not provided, we paid an exorbitant price.

One accident, that involved a UH-1, occurred during a scramble from a PZ for a combat assault operation. No air traffic controller was on duty at the PZ. Because of the heavy flow of both fixed wing and rotary wing aircraft, and a crosswind condition, the traffic at the airfield was not in an orderly state. As the UH-1 pilot approached the active runway in a near IMC condition (blowing dust), he was unable to see a fixed wing aircraft taking off. When the pilot did see the fixed wing aircraft, a midair collision appeared inevitable, and he instinctively applied aft cyclic, causing the tail rotor to hit the ground. The aircraft spun to the right and the left synchronized elevator struck the ground. The main rotor then hit the ground, causing the transmission to be torn from the engine and major damage to the aircraft.

This accident resulted in two injuries and damage costs of nearly $250,000.

Lack of air traffic control at an airfield having both fixed wing and rotary wing operations contributed

to this accident. Also the hazardous condition to visibility (dust) around the POL and rearming area was a cause factor. The accident report showed a written request had been submitted 7 days before this accident, asking that dust suppressant action be taken immediately at this location. Needless to say, none had been taken.

A second accident involved a CH-47 that entered the PZ airspace from the northwest and circled right. Two gunships were escorting another CH-47 out of the PZ area to the east. The pilot of the incoming CH-47 transmitted that he was letting down and the gunships started turning back to the west to escort the arriving Chinook. The first gunship was in a steep right turn circling the PZ while the second one was in a shallow right turn. The pilot of the first gunship observed the CH-47 descending over the second one, and transmitted a warning to the CH-47. But the warning came too late. The CH-47's forward blades struck the tail rotor of the UH-1, cutting off the pylon, tail rotor and 90-degree gearbox. The CH-47's forward rotor blades began disintegrating, the nose dropped and the aircraft started spinning left. The aircraft then struck the ground in a nose-down attitude and impacted inverted, fatally injuring all five persons aboard. The UH-1 was successfully autorotated with only minor injuries to the four persons aboard.

This accident resulted in five fatalities, four minor injuries and damage costs of nearly $1,900,000.

The lack of air traffic control was the main cause factor of this accident. If no pathfinders are available, a command and control aircraft usually is used for control of traffic. In this case, two command and control aircraft were in the vicinity of the PZ, but neither was performing air traffic control functions at the time.

Weight and Balance. On most helicopters, center of gravity (cg) limits can easily be exceeded, and loads must be properly placed and secured. If a helicopter is "out of cg limits," the aviator may find that when he applies corrective flight control, the helicopter will not respond. It is also extremely important to avoid any sudden changes in cg. Troops exiting an aircraft before the aircraft is solidly on the ground or before the pilot expects such an action has caused many aircraft accidents.

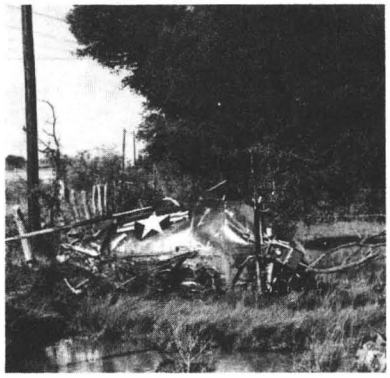
A UH-1H was on an insertion mission with six troops and 250 pounds of cargo. The LZ consisted of a 3- to 4-foot-wide lip of an old bomb crater on the side of a mountain. During touchdown and while the aircraft was still light on the skids, the troops unexpectedly started jumping from the skids of the aircraft. This rapid change of the center of gravity caused the aircraft to slip backwards off the crater lip. The pilot applied full pitch and forward cyclic without success, and the tail rotor struck trees. The aircraft rolled off the crater, causing injury to personnel and loss of the aircraft.

This accident resulted in three major injuries, one minor injury and destruction of the aircraft at a cost of nearly $243,000.

Although the infantry troops had been briefed not to exit the aircraft until given the command by the aircrew, thev failed to follow instructions. This accident stresses the necessity for proper coordination between aircrews and passengers, and points out the need to emphasize the importance of such coordination during troop training.

Wires. In past combat operations, most wire strikes occurred during administrative missions. Because of a near total absence of wires in the Republic of Vietnam, they did not pose a major problem during airmobile operations. However, the hazards posed by wires may be of great concern in future combat areas, especially at night and during nap-of-the-earth flying. The following accident occurred during unit airmobile training.

The UH-1 involved in the accident was the trail aircraft in a flight of five on an authorized transport mission. The trail aircraft contacted ground personnel and advised them the flight was inbound to the PZ for landing. The flight landed in the PZ, loaded troops and departed downwind. Thirty-three-foot-high powerlines were located 1,200 feet from the takeoff point. The first four aircraft cleared the powerlines, but the pilot of the trail aircraft did not have sufficient altitude or airspeed to clear the wires and he attempted to go under them between two telephone poles. He then saw a large steel cable hanging from the top wires and he attempted to slide the aircraft under it. He was unsuccessful and the rotor blade struck the cable, causing the aircraft to spin to the right and crash.



This accident resulted in minor injuries to crewmembers and troops on board, and in damage costs of nearly $50,000.

Supervisory error was a contributing factor in this accident. The wire strike and subsequent damage to the aircraft would have been avoided if the flight leader had not elected to depart downwind toward

the wires. More emphasis should be placed on the purpose of PZ and LZ reconnaissance.

Aircraft Availability. Aircraft availability is an overriding consideration in airmobile operations. It is directly influenced by the adequacy and efficiency of maintenance and supply activities and aircraft utilization and scheduling procedures, as well as by the distance of support units from operating units. Commanders should be aware that everyday use over an extended period of all available aircraft will result in a reduced mission availability rate for future operations. In the course of sustained operations, aircraft maintenance must be carefully considered and programmed so that heavy flying requirements will not cause a continued decrease in aircraft availability. In the past some commanders overcommitted their aviation assets and many accidents resulted because of hurry-up maintenance. Performing periodic inspections overnight, failure to determine causes of reported discrepancies and assigning aircraft without clearing writeups are some of the procedures that were instrumental in causing mishaps.

Collectively, the 10 accidents described resulted in 41 fatalities, more than 15 injuries and damage costs of more than $5 million. And these mishaps represent only a small fraction of all the accidents that occurred during conductance of airmobile or closely related types of operations. Yet most could have been prevented. While we do not have solutions that are 100 percent effective, we do have approved policies that if followed can prevent most accidents. These are found in a variety of publications. And the Airmobility Handbook is one of these—a most important one. It has a lot to offer and if we are to prevent accidents, particularly those that are associated with airmobile operations, we had better believe it.

This month USAAAVS kicks off the "Army Aviation Professionals Do It Right" 6-month safety campaign designed to instill a greater sense of professional pride and safety consciousness in all aviation personnel.

To measure up to professionalism, each member of the Army aviation team must be dedicated to the service he performs and recognize and accept the trust and responsibility placed upon him.

Pilot error continues to be the number one safety problem of Army aviation, contributing to more accidents than any other factor. Responsibility for this does not rest solely with the aviator. In addition to his skills he must depend upon all members of the aviation team to use their skills and training to "do it right."

The following article will explain how inadequacies in other elements of the system overload the pilot and play a significant role in human-error accidents.

PILOT-ERROR ACCIDENTS AREN'T ALL PILOT

PART 1

Darwin S. Ricketson

Directorate for Technical Research and Applications ▪ U. S. Army Agency for Aviation Safety **USAAAVS**

DURING THE 15-year period from 1958 to 1972, human error by itself or in combination with other factors caused or contributed to more Army aircraft accidents than any other factor. In fact, pilot error by itself was a factor in 80 percent of all accidents and cost an average of $58 million per year in terms of injuries, fatalities and aircraft damage. When accidents caused or contributed to by supervisory and maintenance error are added, almost all accidents involve some human-error factor.

What is so striking about the human-error problem is its persistence. The proportion of accidents due to human error has not changed more than 10 percent in any of the last 15 years. However, in the same time span:

1. The orientation of aviation operations changed from peacetime to combat and back to peacetime.
2. Annual flight time ranged more than 5 million hours from the lowest to the highest year.
3. Annual accidents ranged more than 800 from the lowest to the highest year.

In sum, human error has been a large and stable cause of accidents in a very unstable aviation environment.

Man: Strongest and Weakest Element. The magnitude and persistence of human error as a cause of aircraft accidents might lead one to wonder about the quality of Army aviation personnel. Fortunately, the quality of personnel is not the problem. The problem is that most expect maximum mission performance from the aviation system and place demands on it accordingly. In truth, however, one or more of the basic system elements will be operating below maximum performance at any given time during the mis-

sion and it is this submaximum performance that causes or contributes to accidents.

In almost all instances man is the system element that causes or contributes to accidents by what he does/does not do or can/cannot do. This is true because man is simultaneously the strongest and weakest element in the aviation system. He is the *strongest* because he can learn, has diverse skills and knowledges, is adaptable and can share his attention between several on-going tasks. These attributes are why he has been made the overall manager and manipulator of the aviation system. He is the *weakest* because his performance is unreliable, i.e., he cannot perform the same task in the same manner time and time again. His performance is unreliable because it is subject to the influences of his widely varying psychological and physiological limitations. His performance is also unreliable because of his unique troubleshooting role; when anything goes wrong in the system, he must continue his normal tasks and simultaneously correct or adjust for mistakes imposed on his duty position by all elements in the Army aviation system. It is not surprising then that man, who has the most important and demanding role in the system, is unreliable in the performance of his duties and this unreliable performance causes or contributes to more aircraft accidents than the performance of any other element in the aviation system.

The Human-Error Accident. We have seen that human error results from man's psychological and physiological limitations and his demanding role in the aviation system. The next step is to show what causes man's limitations to be exceeded, his system role to be overloaded and human-error accidents to result.

Figure 1 provides a functional definition of the human-error accident. Items 1 through 8 are the basic man-machine-environment elements of the aviation system. When these elements get out of tolerance, an overload (item 9) is put on man's system role (item 10) in that he must continue to perform his normal tasks while correcting or adjusting for the abnormal system condition. When this overload becomes too large or occurs at a critical time, man starts making errors (item 11) in his normal tasks and/or in his handling of the abnormal system condition. Most of these errors slip by without causing an accident (item 12). But, when lady luck frowns, the error results in an accident (item 13).

It should be emphasized that the overload (item 9) placed on man's role in the system (item 10):

1. *May originate with man* because of his inherent psychological (item 7) and physiological (item 8) limitations, e.g., distraction and fatigue, or

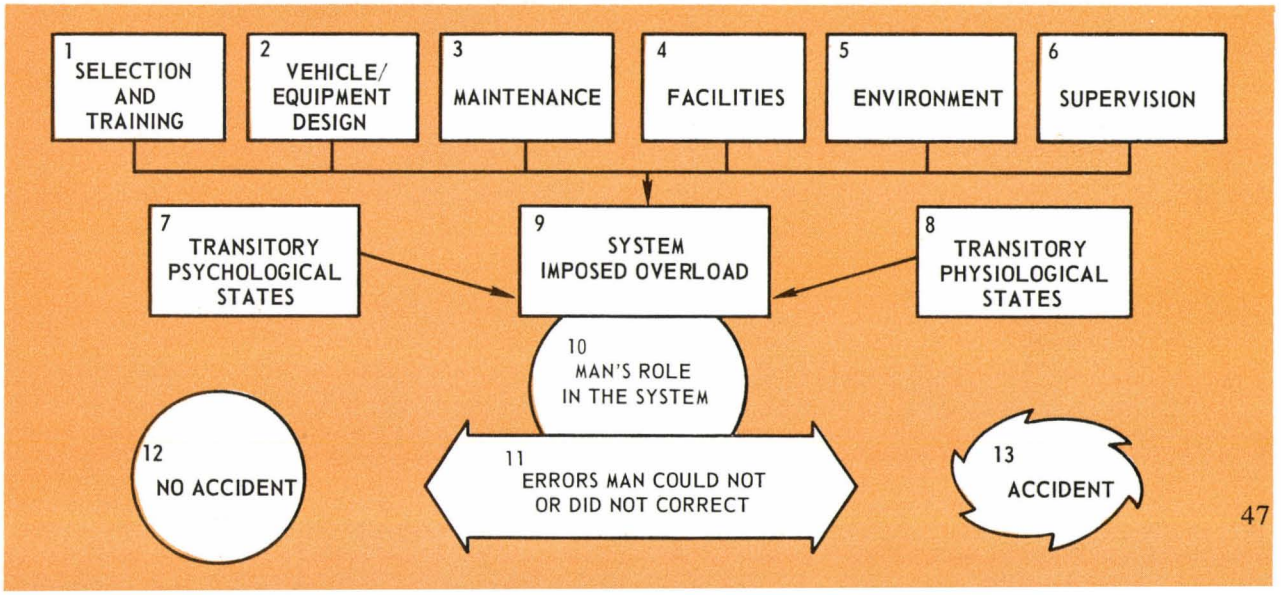
2. *May be imposed on man* because of his managerial/troubleshooting duties, e.g., improper maintenance (item 3) can lead to an overload (item 9) in the form of equipment/vehicle failure that man must correct or adjust for, or

3. *May be both* imposed on the man and originated by the man, e.g., improper supervisory practices (item 6) may allow personnel to be worked too long or too hard which produces fatigue (item 8) and a system overload (item 9) in the form of a decreased capacity of the man to perform his duties.

In sum, human error results from man's system role being overloaded and this overload can be the fault of man, other system elements or a combination of both.

This is the first of two articles dealing with the relationship between human-error accidents and aviation system inadequacies. In next month's issue the second article will provide information showing how accident investigation teams can help cure this problem by identifying, reporting and recommending corrective action for human errors.

FIGURE 1—USAAAVS Model of the Human-Error Accident



USAASO Sez

The U. S. Army Aeronautical Services Office Congratulates

Sergeant First Class Herbert Denmark, 1974 Air Traffic Controller of the Year

Army Air Traffic Controller Of The Year: Sergeant First Class Herbert W. Denmark of the 284th Aviation Company (ATC) has been named the 1974 Army Air Traffic Controller of the Year. He was honored at the annual meeting of the Air Traffic Controllers' Association in Las Vegas, NV, last October when he received honorable mention for the George W. Kriske Memorial Award of that association.

The Army award is given each year by the U. S. Army Air Traffic Control Activity, Fort Huachuca, AZ, and the U. S. Army Aeronautical Services Office, Alexandria, VA. This is the third time the Army Air Traffic Controller of the Year award has been presented. Previous selectees were Master Sergeant Russell G. Ritter, 1972, and Staff Sergeant Roger W. Crowley, 1973 (see "USAASO Sez," March 1973 and November 1973 DIGESTs, respectively).

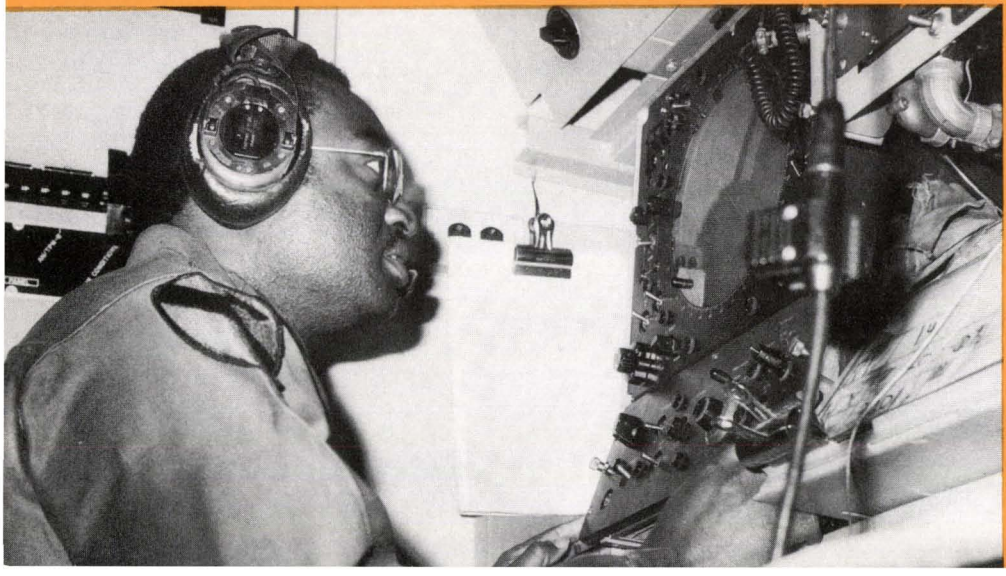
SFC Denmark currently is serving with the 284th Aviation Company as the air traffic control chief at Desiderio Army Airfield in Pyongtaek, Republic of Korea. This is the only airfield in Korea with three air traffic control facilities. Among the facilities at the field are ground controlled approach radar, flight following and a control tower.

The detachment is attached to the 19th Aviation Battalion and since there is not an officer assigned SFC Denmark is the top man in the unit. He is both the air traffic control chief and the unit noncommissioned officer in charge. The 284th has 23 men to man the three ATC facilities.

Joining the Army 19 years ago, SFC Denmark originally was an infantryman. He choose the ATC program in 1960. At that time the Army didn't have a school for controllers and sent SFC Denmark to Keesler Air Force Base, Biloxi, MS, for 6 months of training. In 1965 he attended a 3-month ground control school at Glynco Naval Air Station, GA.

Prior to his current assignment, SFC Denmark was stationed at Fort Rucker, AL, where he was named Fort Rucker's NCO of the Year, 1972. The following year at the same location he completed studies for a Bachelor of Science degree in social science and United States history at Troy State University. He graduated with honors and even managed to get an additional 15 hours toward a master's degree. Eventually he plans to study for a doctorate and go into the education field as a teacher in social science or as a counselor.

Other 1974 nominees include: SFC Charles P. Bowen, ATC chief, Gray AAF, Fort Lewis, WA; Maynard P. Cox, ATC Division, Army Aviation Center, Fort Rucker, AL; SFC Frank H. Dennis, ATC chief, Fort Hood, TX; SP5 Anthony R. Sanichara, U. S. Army Communications Command Agency, Fort Rucker, AL; and Andrew A. Treskon, U. S. Army Communications Command Detachment, Sharpe Army Depot, CA.



Sergeant First Class Herbert Denmark at work as air traffic control chief at Desiderio Army Airfield, Pyongtaek, Republic of Korea

Familiarity and Respect

Familiarity with the current air defense and electronic warfare threat breeds respect, the old saw notwithstanding. Indeed, our respect grows healthier as we familiarize ourselves with threat capabilities. We come to the inevitable conclusion that our best protection lies in our acquaintance with the air defense weapons and electronic warfare devices the enemy employs against us. Assuming that we know the threat, there are techniques we can use to employ aviation successfully and around the clock in the high threat environment. These techniques apply to both day and night operations.

First, we must suppress the enemy's air defense weapons including his aircraft. Inherent in air defense suppression is the employment of our own air defense weapons against enemy aircraft.

Second, we must exploit the capability of the other services, both to suppress the enemy's air defense, electronic warfare and artillery and to give us local air superiority or parity.

Third, we must use countermeasures (electronic, chaff, smoke, etc.) to jam enemy radars, defeat his optical target acquisition devices, disrupt his communications and deny him access to our communications.

Fourth, some form of terrain flying (low level, contour, nap-of-the-earth) will be normal procedure for aviators flying in the division area, and even into corps, because flight at higher altitudes invites antiaircraft fire or, at the minimum, identifies rear area complexes that could be lucrative airstrike targets.

Fifth, the commander will want to take maximum advantage of intelligence information available to select flight routes plus alternates to the target—routes for his aircraft to follow going to the target, different ones for their return and alternates for each. The routes he chooses should be as free as possible of air defense weapons and other flight hazards, both man-made and natural, but should allow aviators to make the most of masking afforded by terrain features.

Sixth, we must compensate for loss of electronic communication through every action and bear in mind that line-of-sight radio communication becomes unreliable during nap-of-the-earth flight.

These six we know about now. As we prepare to operate in the high threat environment, we may discover other techniques that should be included in this list, and we should be alert to any additional needs.

Obviously, such exacting techniques demand proficiency. And proficiency does not just happen —it results from practice which is an adjunct to training. The commander who is successful on the battlefield will have initiated a program of combat preparation that has brought himself, his aircrews, his staff, his mechanics, his ground troops to peak proficiency.

If we are to employ aviation successfully in the high threat environment we must know the threat, we must respect the threat, we must be proficient in techniques to survive the threat, and our combat plans must include these techniques. Failure in any one of these areas will exact its inevitable, deadly toll . . . unnecessarily!

MG WILLIAM J. MADDOX JR.
Commander
U. S. Army Aviation Center

Know the Threat — Train to Win!

CPT Charles F. Nowlin and his wife Kirsten proudly display the James H. McClellan Aviation Safety Award for 1974. The Honorable Howard E. Haugerud, president of the McClellan Memorial Foundation, presented the award to CPT Nowlin in October 1974 at the sixteenth annual AAAA honors luncheon in Washington, DC.

McCLELLAN AVIATION SAFETY AWARD WINNER

CPT CHARLES F. NOWLIN, 1974 winner of the James H. McClellan Aviation Safety Award, sustained third-degree burns to 35 percent of his body when his OH-6 helicopter was downed by enemy fire in the Republic of Vietnam in December 1970. He was evacuated to Brooke General Hospital, Ft. Sam Houston, TX, where he underwent three years of plastic surgery.

Because of his thermal injuries and those of other Army aviation personnel with whom he became closely associated, CPT Nowlin began an independent study in the proper use of personal equipment. Not content to limit his safety activities to his own unit, CPT Nowlin began liaison with the Institute of Surgical Research, the Aeromedical Research Laboratories and the U. S. Army Agency for Aviation Safety to develop a presentation on thermal injuries and life support equipment. He has delivered his presentation to more than 4,000 crewmembers throughout the active Army, National Guard and Reserve.

He has also delved into the role of the aviator's wife as an overlooked safety factor, and has prepared and presented a special safety program for wives, designed to help them protect their families from thermal injury in and around the home.

CPT Nowlin returned to full flying status in July 1973, 30 months after his near-fatal crash. His determination, expertise and dedicated work in the field of aviation safety earned him the McClellan award.

CPT Nowlin is currently assigned to the Officer Instructional Division, Directorate for Plans, Operations and Education, U. S. Army Agency for Aviation Safety, Ft. Rucker, AL.