aerospace

SAFETY JANUARY 1978

UNITED STATES AIR FORCE

aerospace SAFETY

THE MISSION - - - - - - SAFELY!

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

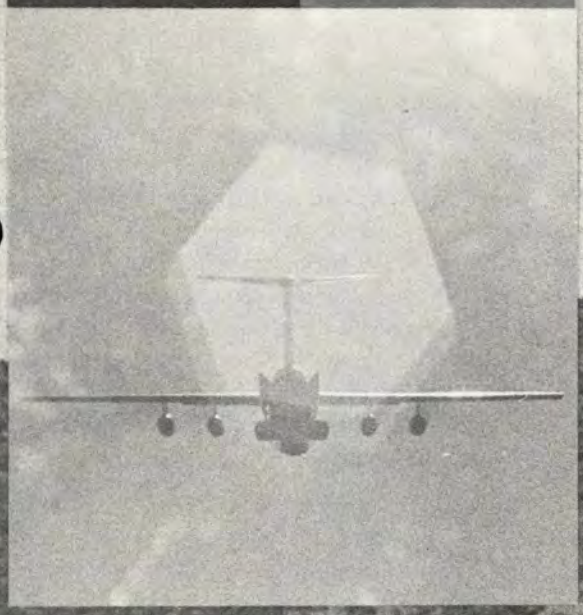
SUBSCRIPTION—AEROSPACE SAFETY is available on subscription for $12.00 per year domestic; $15.00 foreign; $1.00 per copy, domestic; $1.30 per copy, foreign, through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in accident stories are fictitious. No payment can be made for manuscripts submitted for publication in the Aerospace Safety Magazine. Contributions are welcome as are comments and criticism. Address all correspondence to Editor, Aerospace Safety Magazine, Air Force Inspection and Safety Center, Norton Air Force Base, California, 92409. The Editor reserves the right to make any editorial change in manuscripts which he believes will improve the material without altering the intended meaning. Air Force organizations may reprint articles from AEROSPACE SAFETY without further authorization. Prior to reprinting by non-Air Force organizations, it is requested that the Editor be queried, advising the intended use of material. Such action will insure complete accuracy of material, amended in light of most recent developments. The contents of this magazine are informative and should not be construed as regulations, technical orders or directives unless so stated.

JANUARY 1978 AFRP 127-2 VOLUME 34 NUMBER 1

Readiness

C-141 Participation In RED FLAG

CAPTAIN JAMES J. LAWRENCE
Directorate of Aerospace Safety



"National security policy and the very real threats the US faces have changed considerably since 1947, and evolution of the Air Force has been necessary to keep pace with these changes. I can report that the Air Force today is in good shape." This quote was from Air Force Chief of Staff General David C. Jones, made during a recent interview with *Air Force Magazine.*

The average airman, however, might ask, "How can the Air Force be in good shape?" since we all face the growing challenge of doing more with less. This question becomes especially relevant when you view the increasing dedication of the Soviet government to the building of their offensive and defensive capability.

Aerospace Safety magazine feels that part of the answer lies in personnel. Our people today are better trained, more dedicated, and have a higher level of motivation than ever before in the 30 years of Air Force history. Still another part of the answer lies in our weapon systems capability and new weapon system development. Modernization of our tactical fighter force is progressing steadily, and several new aircraft and missiles are planned for the near future.

The best people and the best equipment, however, are two entities that must totally mesh together to achieve the responsiveness necessary to meet the threat of Soviet military build-up. Support strategy must also be integrated so that the whole system reach-

This specially camouflaged C-141, nicknamed the "Star Lizard," was on loan to the 63d MAW from Twenty-First Air Force headquarters. Aggressors reported it significantly harder to sight than the standard painted Starlifters.

READINESS continued

es its utmost efficiency. In order to ensure that the armed forces are prepared to meet any enemy threat in any theater of operations, the DOD is emphasizing the concept of readiness. Training to achieve this readiness state is a continuous Air Force concern. The best people, equipment and support need to be integrated and tested through a program of operational exercises to refine plans and procedures.

This is the first of a series of *Aerospace Safety* articles dealing with the Air Force's efforts in readiness training. Our first look is into MAC's strategic and tactical airlift role in the nation's offensive and defensive strategy. The concept of tactical airlift is obviously critical. One of our major concerns is our ability or inability to meet the full requirement for rapid deployment of US Armed Forces or supporting equipment to the NATO theater. To test this airlift capability, MAC participates in the RED FLAG training program at Nellis AFB, Nevada.

For the unenlightened, RED FLAG is a training program with the goal of exposing tactical and combat airlift crews to the most realistic combat simulation that peacetime conditions allow. It simulates a NATO scenario and tests USAF procedures and plans by creating a war game situation, complete with expected ground and air enemy military strengths.

One portion of the RED FLAG exercise deals with MAC's ability to penetrate enemy defenses and make a simulated troop airdrop on a designated drop zone (DZ). The exercise includes all planned close air support, surface to air missile (SAM) suppression, high altitude combat air patrol defense (MIG CAP), aggressors and ground SAM and AAA, 57 millimeter defense sites. It also provides airlift with the opportunity to practice their combat airdrop mission (CAM) tactics in a real war, real time scenario.

Upon invitation from the 63d Military Airlift Wing at Norton AFB, *Aerospace Safety* participated in the RED FLAG exercise held in November. I attended the tactical briefings and debriefings and acted as a flight deck observer on number three of the four ship C-141 Starlifter formation that flew to the simulated battlefield at Nellis AFB. This article will recap the events of that experience from a crew member's viewpoint. Although not a supersonic, G pulling terror, the C-141 displayed capabilities that impressed and, quite frankly, surprised me.

RED FLAG planning begins in the 63d's combat tactics shop. There, the liaison with the TAC support people at Nellis AFB takes place. RED FLAG 78-1 was by no means limited to just a measure of airlift capability. The exercise, scheduled to run from 25 October to 18 November 1977, tested all aspects of offensive and defensive tactical strategies in the European theater. Aircrews engage in activities such as search and air rescue (SAR), interdiction, composite strikes, sector attacks, and nuclear strikes. CAP escort is practiced in defense of strike, reconnaissance, SAR or airlift forces. SAM suppression is flown in support of attack forces with enemy ground defense sites attacked. FACs generate targets for close air support strike sorties. All encounters and engagements are scored by the Nellis RED FLAG training facility. The data are then analyzed and form the basis for tactics or planning changes.

Well. where does a MAC C-141 or C-130 fit into this world of fighters? The ability to move ground troops and support equipment is an intgeral part of the wartime simulation, just as significant as air superiority. The survivability of these air lifters must be adequate to meet the ground force needs. Tactics for

Approaching the Drop Zone, the number two C-141 opens its cargo doors in preparation for a simulated drop of ground reinforcement troops.

The C-141 performs a "Weed Slowdown Maneuver," popping up to 1,000' AGL and dropping payload over the center of the Drop Zone.

An aggressor aircraft sights in on a Starlifter after successfully evading F-15 MIG CAP support. The C-141 takes evasive action.

The route of TWAIN 21 flight from orbit point to Drop Zone took 33 minutes to fly. SAM and AAA sites were set up along the entire track.

Number three moves into formation position behind number two prior to the orbit point.

protecting them must be developed, practiced, and refined, and the effect of their combat maneuvering must be evaluated. A C-141's ability to pinpoint the drop of troops or much needed supplies could spell the difference between success or failure of our ground forces.

This is one of MAC's tactical airlift roles in America's war plans. The 63d MAW is the only C-141 wing in MAC's Twenty-Second Air Force tasked with the CAM role. The crews are specially trained in the CAM tactics required to effectively accomplish this demanding and important mission.

The process begins with the Blue Force (good guys) planners issuance of a fragmentary order (FRAG) to the combat tactics people at Norton. This FRAG outlines the Blue Force's aircraft requirements, takeoff time, routes, range area reservation, target, and time over target. Combat Tactics then tasks the flying squadrons for crews to man the missions. The 15th and the 53d Military Airlift Squadrons are the two units that fulfill the CAM role for the 63d. I decided to fly with the 53d Blackjacks in number three. There were two reasons for this selection. First, number three is in a good visual position to observe the maneuvering and tactics of numbers one and two. Secondly, number three was a specially camouflaged, inertial navigation system-equipped, C-141 Starlifter on loan from Twenty-First Air Force headquarters at McGuire AFB.

The stage was set for this mission a week prior when personnel from the RED FLAG planning staff came down to brief the MAC aircrews. A full airdrop profile was planned with complimentary support. The C-141s would pick up A-7 escort at the orbit point and fly navigation legs at 500' above the highest ground point. The drop altitude was decided as 1,000' AGL over the DZ. A bundle would be parachuted out of the troop doors to simulate the airdrop of personnel.

My mission was to be flown on the morning of 2 November 1977. To allow sufficient time for premission briefings, the ungodly hour of 0245 was designated as show time. I dragged myself into the CAM briefing room, just barely on time, and was amazed by the tolerance of MAC crews to such inordinate crew scheduling procedures. They not only appeared awake, but there was an encouraging enthusiasm which I found to be highly contagious. CAM to the MAC aircrew is a pleasant respite from the hour-upon-hour monotony of over-the-pond flights. For all pilots, the occasional escape from the ATC womb of

Number four moves up on number three during Combat Airdrop Mission exercises.

READINESS continued

flight restrictions brings them back closer to their aviation roots. Today would be special, and today would be fun.

My flight crew wore shoulder patches indicating they were a Select Lead Crew. This was comforting to me and my life insurance company. The maneuvers planned for the 200,000 pound monolith were disconcerting, to say the least, for this novice observer. These were the men I flew with:

Capt Rich Musch—Flight Examiner/Aircraft Commander performing copilot duties.

Capt Kirk Benson—Instructor performing pilot duties.

Capt Steve Bunn—Instructor Navigator for the CAM portion of the flight.

1Lt Dave Marjamaa—Instructor Navigator for the mission.

1Lt Ken Hahlbeck—Copilot qualified system operator.

MSgt Bill St. Clair—Flight Examiner Loadmaster.

SSgt Raul Pequeno—Flight Engineer.

After weather, intell, and final instruction briefings, we headed out to the camouflaged Starlifter. The paint scheme on this C-141 is in the test and evaluation phase and was developed specifically for tactical airlift operations. On a previous RED FLAG sortie, aggressor aircraft found it significantly harder to pick out the camouflaged bird over those with standard grey and white paint and markings. Its success affectionately warranted a new nickname. The "Star Lizard" seemed most appropriate.

Preflights and checklists were completed, and at 0500 TWAIN 21, flight of four C-141s, started engines. The formation taxied out for takeoff. At scheduled departure time, the first Starlifter released brakes and began its takeoff roll. Simultaneously, number two moved into takeoff position and ran up its throttles to takeoff power. As soon as number one was airborne, two began its roll; three and four followed suit. The four ships were safely airborne and tucked in, so to speak, in 6,000-foot trail. The flight was cleared to a block altitude of 15,000 to 17,000' MSL. Each aircraft was to maintain a 500' altitude separation on each other during the enroute portion.

As the flight approached its designated orbit point, a descent was initiated to 1,500' AGL. Numbers two, three and four set up their proper formation position while in the orbit and at the FRAG range reservation time, TWAIN 21 flight began its run. The first sighting of friendlies came shortly thereafter as eight A-7s from the 169th Tactical Fighter Group at McEntire ANGB, SC, and the 355th Tactical Fighter Wing at Davis-Monthan AFB, AZ, moved in on the formation. Their role is to provide escort and close air support for the airlifters.

Ground threats in the form of enemy troops, AAA 57 millimeter guns, and SAM installations are attacked. At this point, the C-141s have accelerated to 300 kts indicated and the A-7s circle the formation, reminiscent of indians surrounding the wagon train. Here the Starlifter crew practice CAM tactics while still keeping the flight tight enough for the A-7s to patrol.

Up ahead, but out of sight, are the F-105G Wild Weasels from the 35th Tactical Fighter Wing at George AFB, CA. These daring young men move in ahead of the convoy to root out and destroy the SAM and AAA threats. Keep in mind that the exercise is constantly being graded. That is, SAM and AAA sites have computer-generated kill or miss parameters. The F-105s are also computer scored as to site destruction and aircraft lost. By the time the C-141s come over, many of these defense sites are gone. Even if computer destroyed, however, aircraft and ground defense continue operating to maximize training opportunities. Later, the RED FLAG White Force (scorekeepers) study the inputs and decide who got who and when. A SAM site destroyed earlier can't get a hit credit on the C-141

A-7 escort/close air support aircraft joined the flight at the orbit point and stayed with us until the Drop Zone.

In poor visibility or IFR conditions, the C-141s can maintain formation position by usng their airborne radar.

Number three's shadow is seen moving across the desolate Nevada desert. At this point in the flight profile, the C-141s were at 500' AGL moving at 300 knots.

when he later streaks by.

Shortly after picking up the A-7 escorts, a Navy EA6B, out of the Naval Air Station at Whidbey Island in Washington, joined the center of the C-141 formation. His purpose was to supply airborne radar advisories on potential aggressors. Working the GCI UHF radio frequencies, the EA6B soon called enemy aggressors up high. These aggressors came courtesy of the Fighter Weapons School at Nellis AFB. There, specially equipped T-38s and F-5s are used as MIG simulations and are painted in Soviet colors. The T-38 and F-5 were chosen because of their light weight and maneuverability which are similar to the capability of Soviet MIG fighters.

Flying combat air patrol (CAP) for TWAIN 21 flight were F-15 Eagles out of the 1st Tactical Fighter Wing at Langley AFB, VA. The F-15s engaged the aggressors at high altitudes in an attempt to protect the formation and its precious cargo. Any aggressor that survived the F-15 encounter could come down and engage the slower moving cargo aircraft. The F-5s did come down to attack the flight of C-141s and the A-7 escorts. This gave the C-141s an opportunity to practice evasive maneuvers. At this point in the profile, the C-141s had dropped to 500' AGL. As the aggressor was called at a Starlifter's 6 o'clock position, the cargo aircraft would initiate hard 60° bank moves, left and right, in an attempt to avoid being hit, until an A-7 could get over to help out. A 60° bank in a C-141 at 300 knots and 500' up can be sporting, indeed.

After the aggressors broke their engagements, the C-141s reached their IP. The flight moved into position for the run to the DZ. At 6 miles out, the flight deploys spoilers to slow down to 190 knots. Flaps then come down, and the flight maintains an airspeed of 160 knots at 500' AGL. Each aircraft performs what is called a "weed slowdown maneuver" just prior to the DZ. Here, the Starlifter pops up to 1,000' AGL and slows to 130 knots. At the navigator's signal, the loadmaster pushes the load out the rear cargo doors, simulating the bailout of troops and supplies.

Immediately following the drop, the aircraft dives back down, raising the flaps and closing the cargo doors as the airspeed increases. They accelerate to 300 knots and perform escape maneuvers until out of the restricted area. The flight then slows down to 250 knots for an IFR assembly and return to Norton AFB.

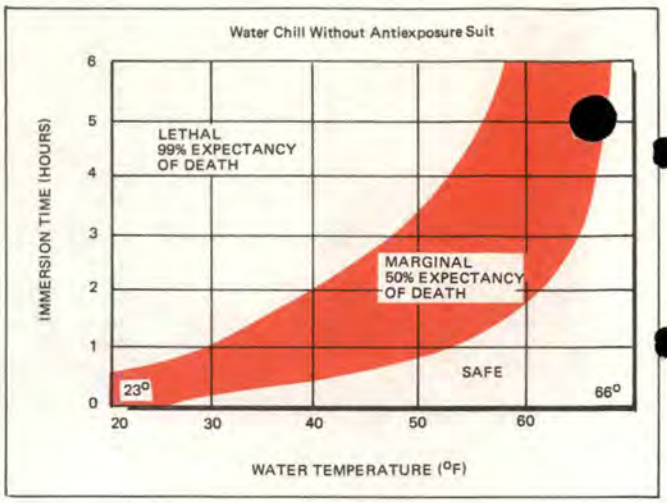
Drop results were announced after the mission at the debrief/hangar flying session. The 63d was again successful in meeting its airdrop commitment on time and on target. RED FLAG requirements state that the drop can be anywhere in the designated drop zone. The 63d further delineates a successful drop as within 360 yards of the center point of target zone. Number one's load hit within 50 yards at the target's one o'clock position. Dead-eye number two was right on the center of the zone. Number three hit 150 yards at 6 o'clock, probably due to the extra weight in the cockpit. Four tallied a hit 80 yards at 3 o'clock.

The concept of readiness is one of the major challenges facing the US Armed Forces today and in the near future. Preparation for this demand can only come with realistic training simulations to evaluate the effectiveness of our plans and performance. This is the goal of readiness training. The Military Airlift Command strives to meet its tactical airlift commitment through extensive CAM training and participates in joint command and joint service exercises. *Aerospace Safety* will continue to report the USAF readiness training program in a series of articles dedicated to that subject.

Aerospace Safety wishes to thank the 63d Military Airlift Wing, the 53d Military Airlift Squadron, and especially Capt Jeff Groggan of the 63d's Combat Tactics Office for their assistance during this mission and during preparation of this article. ★

Cold Water Immersion

SSGT WILLIAM C. JOINER
Det 1, 3636 CCTW (ATC)
Eielson AFB AK



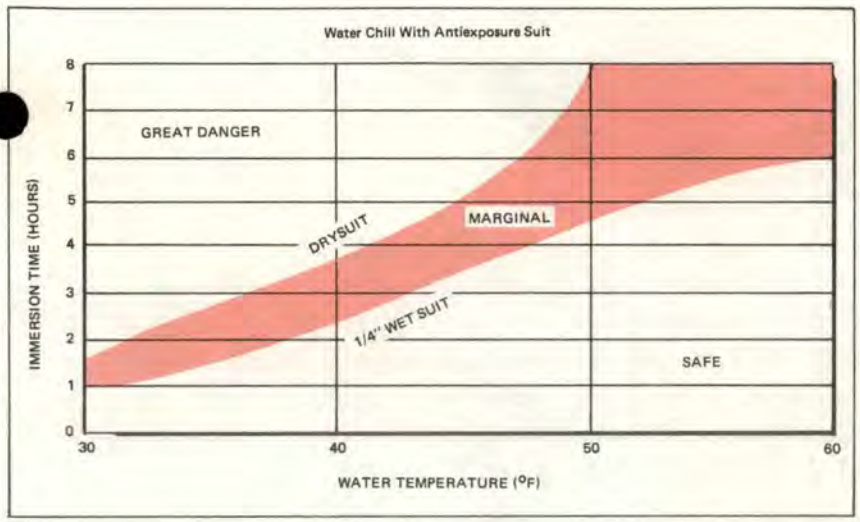
Survival in icy arctic waters is a subject that grabs the attention of all aircrew members. They know that mechanical failure, human error, or enemy action could render their aircraft unsafe. Since such mishaps only happen to the OTHER GUY, many of us unconsciously drift into a state of complacency and become a liability rather than an asset to the search and rescue (SAR) system.

In a survival situation the life expectancy of an injured person decreases as much as 80 percent in the first 24 hours following an accident, while the chances of survival of an uninjured survivor rapidly diminishes after the first 3 days. In the case of a seriously injured survivor in frigid waters, the reaction time of the SAR system must be measured in minutes. These times become more important when adverse weather prevails in, or approaches, an area where survivors are located, since it will limit the time available to conduct a SAR mission. Not only are survivors more difficult to detect in adverse weather, but the SAR units operate at much less efficiency due to the turbulence, rough seas, and higher stresses on both the search personnel and their aircraft.

Each individual will vary in his reaction to cold stresses. Physical factors which will affect a survivor's life expectancy include the type of clothing worn, the clothing's wetness, the survivor's activity during his exposure, initial body temperature, physical condition, thirst, exhaustion, and hunger. Various psychological stresses such as isolation, loneliness, remoteness, and the all important individual will-to-live, also impact upon one's survivability. Some individuals will exceed the life expectancy or tolerance times indicated by the graphs, and therefore we should consider these figures as helpful guidelines rather than absolute controlling factors.

The body will cool when immersed in water having a temperature of less than 92°F. The warmest ocean water that can be expected at any time of the year is 84°F. The rate of body heat loss increases as the temperature of air and water decreases. Water allows a rate of heat exchange approximately 25 times greater than that of air at the same temperature, causing hypothermia (lowering of body core temperature) to occur very rapidly. If a survivor could be removed from the water and put aboard a raft, his survivability would increase even though he may be exposed to the cooling effects of water evaporating on his skin. Figure 1, Water Chill Without Antiexposure Suit, depicts the life expectancy of survivors immersed in water wearing typical clothing. The spread of time indicated in the marginal portion of the graph is the period in which survivors will usually lose consciousness and then drown.

In water temperatures above 70°F, survival time depends solely upon the fatigue factor of the individual. Some individuals have survived in excess of 80 hours at these temperatures. Staying afloat and dealing with boredom are the major problems at these temperatures. Between 60° and 70°F a



person can survive up to 12 hours. From 50° to 60°F, a survivor has a reasonably good chance if rescue is completed within 6 hours. In the temperature range from 40° to 50°F, only about 50 percent of any group of people can be expected to survive longer than 1 hour. Water temperatures between 35° and 40°F impose severe conditions for survival, and most survivors will not live longer than 1 hour. In water temperatures of 35°F and below the survivor suffers severe shock and intense pain on entering the water. This shock in some instances may be fatal due to loss of consciousness and subsequent drowning.

Figure 2, Water Chill With Antiexposure Suit, depicts the tolerance time of survivors immersed in water while wearing either a one-fourth inch foamed neoprene wet suit or a survival dry suit. This graph provides the expected times for a person to become either unconscious or experience severe leg cramps, stomach cramps, and pain in the hands and feet which reduces endurance drastically. This very painful experience will continue until numbness sets in.

At this point many crew members are probably thinking that their flesh will freeze if they get out of the water, so let's check the facts. At an equivalent temperature of approximately −25°F exposed flesh may freeze within 60 seconds. At an equivalent temperature of about −75°F, exposed flesh may freeze within 30 seconds. However, exposed flesh will not freeze at temperatures above freezing no matter how high the wind velocity.

When water entry becomes inevitable, the following suggestions will buy you precious time and may save your life:

- Whatever happens, try to keep your head clear of the water. It is possible to lose as much as 75 percent of body heat through the head. Therefore, the use of drownproofing techniques is not advisable in frigid waters.

- If you can get out of the water and into a raft, do so. Sit on your seat kit or any available insulating material for protection from the cold water below. Remove as much water as possible from the antiexposure suit and flight clothing, and cover exposed flesh to minimize the effects of wind chill.

- Unless land is within easy reach, holding still is preferable to swimming or other vigorous movement. An open body position (i.e., swimming, drownproofing) does not guard against body heat loss and will cause the rapid onset of hypothermia. While holding still in cold water, cover the sides of the chest area and groin region to gain nearly a 50 percent increase in predicted survival time. When alone in the water, this behavior involves holding the inner side of the arms tight against the side of the chest and raising the thighs to close off the groin region. People in a group should huddle in a tight circle so that the sides of the chests of different persons are held close together and the thighs and hips are touching.

Wear an antiexposure suit when your flight plan carries you over frigid waters and lower the temperature of the aircraft heating system to compensate for the suit discomfort. Don't wait until the emergency is present and there's just not enough time.

Questions or comments concerning the information contained in the article should be addressed to Operations and Requirements Branch (DOTO), 3636 CCTW (ATC), Fairchild AFB WA 99011 or AUTOVON 352-5470. ★

Annually the Air Force recognizes a given number of individuals, units and commands for outstanding performance in safety. However, competition is keen and not all win major awards. To recognize all of those, AEROSPACE SAFETY is featuring one or more in each edition. In this way we can all share in recognizing their fine performance and, perhaps, learn some valuable lessons.

Nominated For The Colombian Trophy

55th Strategic Reconnaissance Wing

The 55th Strategic Reconnaissance Wing has a diverse mission operating worldwide, 365 days a year. During 1976, aircraft assigned to the 55 SRW logged more than 22,000 flying hours. This includes the EC/RC/KC-135 aircraft and the Air Force fleet of E-4 aircraft. These missions are predominantly directed by higher headquarters to support worldwide reconnaissance, SAC command and control and National Emergency Airborne Command Post requirements, in support of national security considerations.

Throughout 1976 the 55 SRW flew a demanding and diverse mission with no accidents. To accomplish that performance required an innovative approach to the wing's special problems.

A launch supervisor or mission monitor is assigned to all higher headquarters missions, which allows the Supervisor of Flying the freedom to oversee the overall operation of the airdrome.

Crews deploying overseas receive special simulator training covering such items as instrument approaches to destination locations.

Aircrews are surveyed at flying safety meetings for their opinions and recommendations on problem areas.

An accident-free year is a record of success in mission accomplishment and safety. The 55 SRW in achieving that record earned nomination for the Colombian Trophy.

51st Composite Wing (Tactical)

The 51st Composite Wing (Tactical) was officialy formed on 30 September 1974, when the 36th Tactical Fighter Squadron and the 19th Tactical Air Support Squadron were permanently assigned to the wing. During the period from 30 September 1974 to 31 December 1976, the wing flew 27,138.9 accident-free hours in F-4, OV-10, and T-33 aircraft.

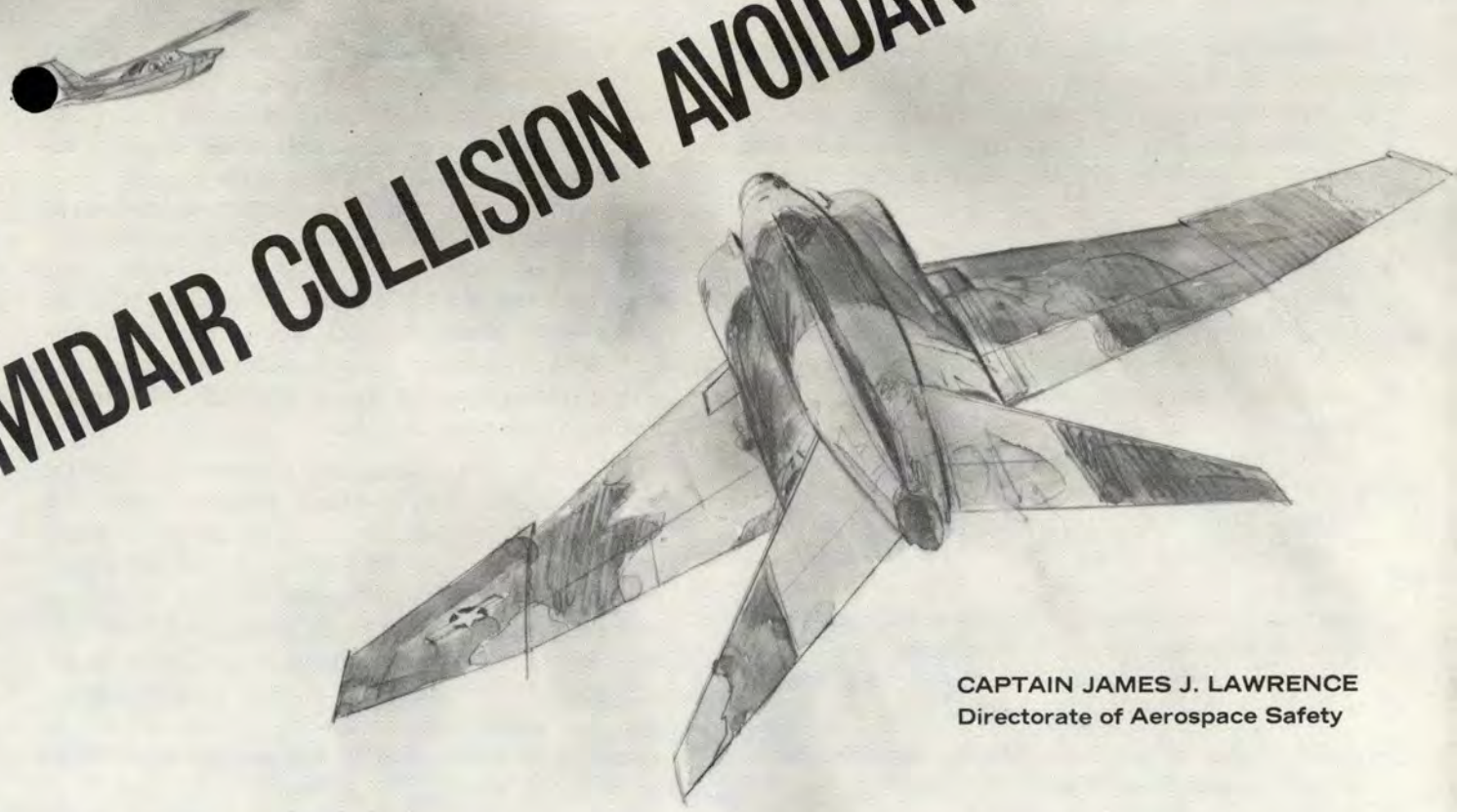
In 1976, the wing experienced a 7 percent reduction in its incident rate for F-4 and OV-10 aircraft while performing a great variety of operational tasks. The primary task of the F-4 squadron is air superiority, with a secondary task of close air support. The OV-10 squadron works closely with the US and ROK Armies in training Forward Air Controllers and in controlling both USAF and ROKAF fighters on close air support and search and rescue missions.

The mission of the 19th Tactical Air Support Squadron is to maintain equipment and a nucleus of personnel in a high state of preparedness as a theater resource to satisfy Tactical Air Support (TAS) requirements of the PACOM Tactical Air Control System (TACS). Additionally, it provides the Commander, 51st Composite Wing (Tactical), with equipment and personnel to meet peacetime TAS requirements of the Korean TACS in support of the US Army.

The mission of the 36th Tactical Fighter Squadron is to maintain a highly trained force of combat ready aircrews capable of accomplishing counter air, close air support, air interdiction, and strategic attack missions assigned or directed by the parent wing or higher authority.

Staff assistance visits and inspections found the wing Flight Safety and overall safety programs to be excellent and exceptionally well managed. ★

MIDAIR COLLISION AVOIDANCE



CAPTAIN JAMES J. LAWRENCE
Directorate of Aerospace Safety

AF 30479 initiated its descent from flight level 350. The crew is tired. Mission commitments required scheduling for the full 16-hour crew duty day. Alert time was 0200, with an 0300 show for the 0500 takeoff. It's now dusk. The crews' eyes are weary. The copilot is busy calling the command post, and the pilot is having a difficult time getting a lock on the next TACAN station. As they pass 7,000 for 5,000, Approach calls pop-up traffic at 10 to 11 o'clock, 1 mile, heading west, squawking VFR. The pilot acknowledges the call, glances outside, and when he doesn't sight the aircraft, returns to the TACAN set.

7513 Romeo departed his home field around sundown. The private pilot was stuck at work later than planned and had to rush to make his 1730 Fixed Base Operator aircraft reservation time. He had originally intended to file a VFR flight plan, but the lack of time available cancelled that idea. He was only going to do some sightseeing with his friend, so he pressed on. They just made it in time, too. By 1745 they were airborne. The sky was clear, but visibility ahead was restricted by the glare from the setting sun. He was leveling at 6,500' when he leaned over to point out the city layout to his friend.

People on the ground were intrigued by the bright orange flame that lit up the sky. A bit late in the year for fireworks, they thought, until the flaming debris began to fall. All souls on board both aircraft were killed as a result of the midair collision.

* * *

Fortunately, this wasn't an accident that actually occurred, but the scenario is one that contains the elements that make a midair collision most likely. Let's take these same events, only this time add in one very important difference, a Collision Avoidance System (CAS).

AF 30479 is in his descent passing 7,000 for 4'000'. The copilot is talking to the Command Post, and the pilot is busy trying to tune the next TACAN station. As he reaches over, he notices a blinking light on his cockpit Proximity Warning Indicator (PWI). The light indicates traffic at 10 o'clock and below him 500 to 2,000'. He also knows that the blinking light means there is a potential collision threat, whereas a steady light indicates traffic in a zone of interest but not on a collision course. This signal begins 75 seconds before the point of closest approach.

Fifteen seconds later, the PWI gives the pilot a DON'T descend signal and a DO make a right turn and a DO climb signal. This is accompanied by an audible

Midair Collision Avoidance continued

warning. The pilot presses his Wilco acknowledgement button. He levels off and starts a right turn. The controller confirms the conflict signal and approves the evasive action. The Air Force crew never sees the other aircraft as it passes well clear past their left wing.

* * *

Both the FAA and the Air Force have been busy working the midair collision problem. Statistically, it is a problem of air carriers or the military colliding with general aviation aircraft. The air carrier or military aircraft is normally under Instrument Flight Rules and the other is under Visual Flight Rules and not participating in the ATC system. It's been a long time since two aircraft under positive radar control have collided. However, the increasing number of IFR near misses reported and the human error factor for both pilots and controllers, coupled with the ever-increasing density of air traffic, make an across-the-board midair collision avoidance program mandatory. A midair between two jumbo jets today, could more than equal all midair collision fatalities accrued to date.

The collision avoidance system described in the above scenario is not only technically feasible, the equipment has been developed and operationally tested. Total implementation, however, is a long way off. Cost of ground based equipment is high, and full general aviation participation will take years. Even if development funds were appropriated today, the system would not be totally operational for some time.

The Air Force, today, is participating in two collision feedback systems designed to minimize collision hazards. These are the Hazardous Air Traffic Report (HATR) program and the Aviation Safety Reporting System (ASRS). The remainder of this article will first describe the CAS portrayed in the above events. That will be followed by a look at the use and benefits of HATR and ASRS.

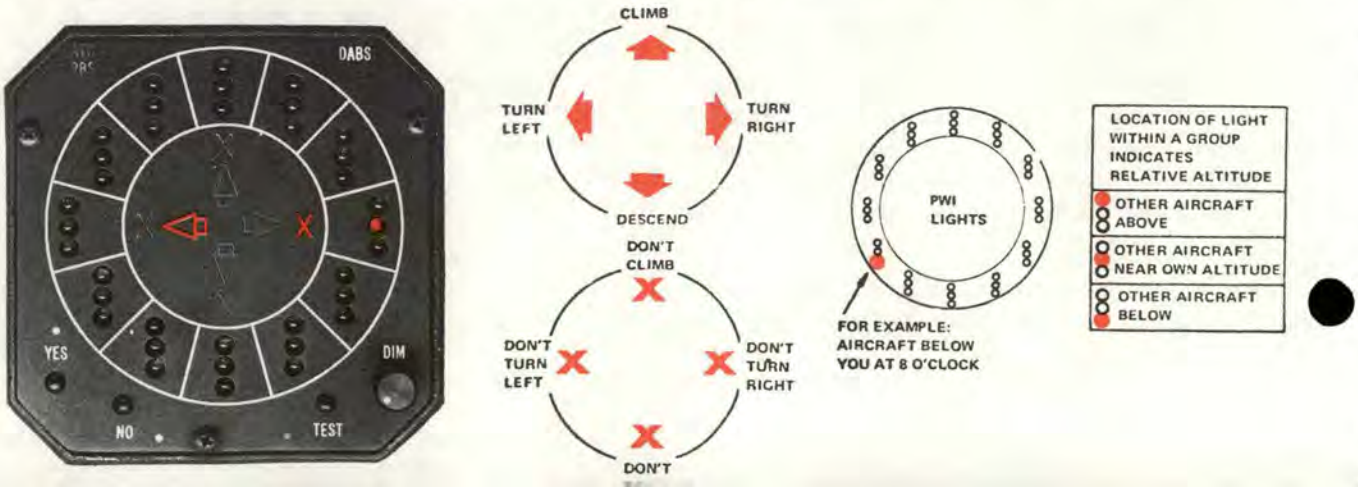
Originally, an ATC Collision Avoidance System was designated the DABS/IPC program. This translated to Discrete Address Beacon System/Intermittent Positive Control. The system was recently renamed ATARS —Automated Traffic Avoidance and Resolution System. What these acronyms really mean is a joint pilot/controller alert system to identify traffic conflicts before they become fatal. The human eye is often inadequate in identifying traffic conflicts, and modern jet speeds make identification/reaction capability questionable. The prospects for a doubling of present air traffic loads by 1990 demand a system even better than our present Air Traffic Control Radar Beacon System (ATCRBS). Cost and time considerations require a system that can use the present ATCRBS while transitioning to a proposed ATARS.

ATARS is not designed as a replacement for the controller's separation assurance role, but rather it is intended as a back-up for failure of the ATC system or a human error. ATARS withholds any actual collision avoidance commands until the last moment at which a collision can be safely avoided. ATARS obtains DABS position data for all targets in its service area and performs tracking in order to establish velocity data on each aircraft. To receive ATARS service, an aircraft must have a DABS transponder with altitude encoding capability, plus a Proximity Warning Indicator display. The equipment will be affordable to the general aviation industry because the display is simple and because all the collision avoidance computations are accomplished by ground based equipment.

The PWI described above consists of an outer ring of 36 lights in 12 groups of three, set in each position of the clock. By lighting any one of these lights, the system is able to tell the pilot the relative bearing and the relative altitude of any intruder. Light position indicates relative bearing of the bogie. The upper light indicates its altitude as 500 to 2,000' above; the center light is for an altitude at or near your own; the lower light is for an altitude 500 to 2,000' below.

This light indicator typically would come on 45 seconds before the closest approach. A blinking light in-

The cockpit Proximity Warning Indicator is simple in design and installation. The twelve groups of three lights indicate the position of the conflicting traffic and its altitude relative to your own. Arrows represent DO commands and X's DON'T commands.



dicates a potential collision threat while a steady light indicates traffic in a zone of interest but not currently on a collision course. There is also a set of arrows and crosses to tell the pilot whether or not to make a particular maneuver. Arrows tell the pilot to climb, descend, turn left or right, while crosses tell him not to take a particular action. Typically, the DO or DON'T command is first displayed 30 seconds before the closest predicted approach point.

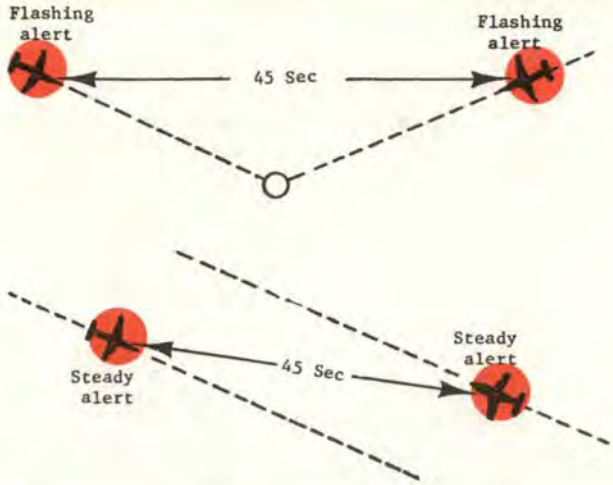
The DO or DON'T command is accompanied by an audible alarm system. The pilot is required to acknowledge receipt of the warning by pushing either a Wilco (yes) acknowledgement or an Unable (no) acknowledgement button. A DABS contact indicator light is always illuminated when the aircraft is in airspace in which ATARS service is being provided.

When both aircraft in a potential collision course are under Instrument Flight Rules, ATARS issues a pilot warning and a "Controller Alert" message to the responsible controller. If a VFR and IFR aircraft, both DABS equipped, are on a collision course, the ATARS solution strategy is to maneuver only the VFR traffic without disturbing the aircraft under IFR.

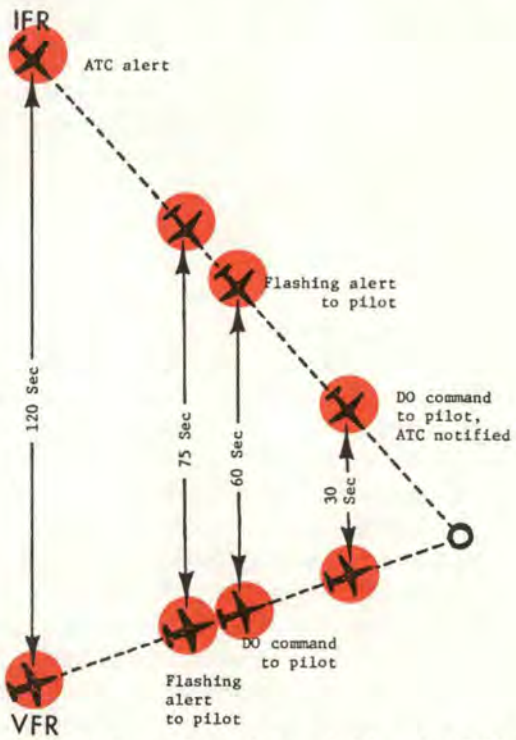
ATARS can also determine when one aircraft in an encounter is fully DABS equipped and one has only the present ATCRBS transponder with altitude encoding. In this case, the fully equipped aircraft gets an initial signal 75 seconds (instead of 45 seconds) prior to collision and an audible warning 60 seconds prior. Conflict resolution information and maneuvering instructions are transmitted to the ATARS equipped aircraft. During this type encounter, the air traffic controller responsible for the controlled aircraft is alerted to the conflict problem two minutes before the collision or near miss point. If the controller does not initiate a maneuver to resolve the conflict by the 75 second point, then the PWI message is sent to the pilot.

The ATARS is designed to back-up the basic ATC control loop with an independent, automatic loop. Its task is to provide last ditch separation assurance with minimum disturbance to the flow of air traffic under the control of the basic ATC system. Ample margin exists in setting detection thresholds so that ATARS will not intervene when an air traffic controller is maintaining normal separation standards. It is unlikely that a controlled aircraft would receive ATARS DO/DON'T commands or an audible warning when the ATC system is operating normally. If a human error occurs, however, the system will back up the control loop and tell the controller and then the pilot what to do to avoid the danger.

This CAS system or others much like it have been debated in Congress since early 1971. Hearings are

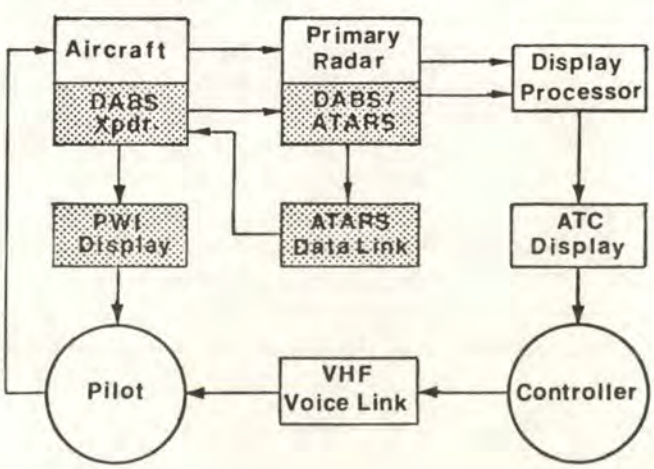


The PWI light will flash if you are on a collision course with the identified traffic. A steady light indicates an intruder in a zone of interest but not on a collision track.



This diagram explains the conflict resolution schedule under ATARS for an encounter between an IFR and a VFR aircraft.

This chart represents the control loop provided under ATARS. The clear area represents our present ATCRBS set-up.



Midair Collision Avoidance continued

still going on before a sub-committee of the Committee on Government Operations in the House of Representatives. Based on progress to date, a national CAS standard and a working CAS of some variety are not envisioned until well into the 1980's. That brings up the question of "What is the USAF doing now in this field of midair collision avoidance?" The first area to be discussed is the more familiar Hazardous Air Traffic Report program with which all pilots should be basically familiar.

The HATR program, as established in AFR 127-3, dated 11 June 1976, establishes the system for reporting all near midair collisions (NMACs) and air traffic conditions considered to be hazardous. The responsibility lies with the individual crew member to report, in his opinion, any in-flight instance of a potential hazard resulting from:

- Air Traffic Control or services.
- Airspace management.
- Rules for the air.
- Traffic control and landing systems.

The HATR program, by regulation, requires that the information received from these reports be used solely for accident prevention, and not for any disciplinary actions. In fact, the program authorizes the reporting aircrew immunity from disciplinary actions. These reports should not be confused with the USAF Hazard Reporting System, covered by other regulations. HATRs are designed to identify, communicate, and hopefully correct any unsafe aspect of air operations.

Specific reportable conditions include items such as near midair collisions where an aircrew either had to take abrupt evasive action or would have to avoid a midair collision had circumstances permitted. Also included is a hazardous situation due to less than required separation between aircraft. Any communications or air navigation aids that contribute to hazardous situations are reportable as is any publication, directive, or procedure that could or did contribute to a hazardous air traffic condition. Personnel, facilities, and any other conditions that may constitute a hazard should be reported as soon as possible to both the controlling agency and a USAF safety officer. Look around. The HATR, AF Form 651, should be available at any USAF Base Operations or perhaps even in your mission trip kit.

The beauty of this program does not lie in the form or in statistical gathering function the program generates. Its benefit is that it is a true feedback system because each and every HATR submitted is investigated by the safety officer at the installation closest to where the incident occurred. That safety officer will work closely with the local USAF Chief of Air Traffic Control Operations (CATCO). The situation or hazard is identified and discussed. The explanation and proposed solution is communicated by message to the Directorate of Aerospace Safety and the Air Force Communications Service, as well as the report originator's home unit.

The Air Force Inspection and Safety Center gathers and tracks all HATRs. They ensure that the reports are routed through proper channels and compile and maintain a quarterly HATR Summary which is reproduced in the *USAF Safety Officers' Study Kit*. Here they isolate and analyze cause factors as well as identify specific hazardous situations eliminated through HATR inputs and the resulting investigations.

The October 1977 HATR Quarterly Summary identifies environmental factors as the primary cause in HATRs filed. Environmental factor is usually associated with near midair collisions which comprise 67 percent of the HATRs received. The environments most susceptible to NMACs in order of greatest occurrence are:

1. Airport vicinities, where non-controlled general aviation conflicts with controlled approach and departure paths.

2. Military Low Altitude Training Routes, where high airspeeds are required in areas frequented by general aviation.

3. Overseas, where airspace and ATC procedures vary considerably from our US system.

Pilot factor was second among HATR causes with non-USAF pilot errors predominate. Air Traffic Control Factor came next, in many cases due to system overload and procedural or supervisory policies not providing adequate relief. Pilot/Controller misunderstanding also produced a significant number of HATRs. The trend away from standardized ATC language and the use of colloquial or ambiguous terms has contributed to the problem.

The HATR program is an active entity that continually keeps the channels of communication open between users and operators of the ATC system. Its non-punitive guarantee encourages reporting of incidents, even by the person in error. The follow-up investigation, accomplished jointly by the USAF safety officer and the CATCO, provides valuable feedback to both controllers and pilots, and significant changes have taken place, reducing the potential for midair collisions and other hazards to air safety. Finally, the HATR Summary advertises important lessons learned to all

units for the purpose of self-inspection of their present procedures and practices. The story is still not complete. In 1976, the FAA initiated another avenue for dissemination of air safety hazard information called the Aviation Safety Reporting System.

One significance of the ASRS is the concept of using a third party, the National Aeronautics and Space Administration (NASA), as the agency responsible for receiving and analyzing these Aviation Safety Reports (ASRs). The program invites all users of the airspace system to report to NASA actual or potential discrepancies involving safety of flight operations. Like the HATR program, ASRS can only be successful with a free, unrestricted flow of information from the users of the aviation system to NASA. For that reason, it is also non-punitive and in most cases, offers immunity to participants. The third party concept was adopted to ensure anonymity of the reporter and all persons involved in the incident, so as to encourage the free flow of information necessary for the evaluation of the efficiency and safety of the National Aviation System.

An ASRS advisory committee has been established by NASA. It is comprised of representatives from the aviation industry, consumers, the Department of Defense, NASA and the FAA. The committee advises NASA on the conduct of the Aviation Safety Reporting System. The reports received by NASA are promptly screened. Those containing time critical information on hazards are forwarded to FAA, USAF or other interested parties for their immediate attention.

Returning to the FAA waiver of disciplinary action, this provision is least understood and rarely utilized by military pilots, but one form of protection airline carriers and controllers use regularly. Let's say a pilot misses an altitude restriction due to confusion or misunderstanding and this error results in less than standard separation between himself and another aircraft. If he files an ASRS report within 5 days (preferably immediately after the mission), he can gain immunity from violation by the FAA for not adhering to the restriction.*

FAA disciplinary action, however, is not waived for any case involving accidents or criminal offenses. Additionally, reports involving reckless operation, gross negligence or willful misconduct may result in disciplinary action but only on the basis of information obtained independently of the Aviation Safety Report. This waiver of disciplinary action, where applicable, covers all persons involved in a reported incident, not only the persons making, or named in an ASR.

The ASR contains a tear-off portion which includes information that identifies the individual submitting the report. This portion is removed by NASA, time stamped, and returned to the reporter as his receipt. This receipt provides the reporter with proof that he filed the report for a specific occurrence. NASA takes appropriate information dissemination action for the involved agency and then maintains a separate record of each report for 45 days following the incident. This data is retained in order to ensure the reporting individual receives the protection he is guaranteed under ASRS. When the FAA investigates an incident, it requests NASA to advise whether or not that incident has been reported. After a 45-day period, FAA can no longer initiate disciplinary action for an incident or an error.

The immunity aspect of the ASRS is one that all Air Force pilots should be conscious of. Don't lose sight, however, of the fact that ASRS was created to serve as a vehicle for the identification of hazards or potential hazards in all aerospace operations. It should be noted that the Air Force HATR program serves as an input to the ASRS, so duplication of HATRs and ASRs is not necessary. The filing of a HATR has the same effect as the filing of an ASR.

* * *

Midair collision avoidance is a multifaceted, important problem, yet the approval and acceptance of an automated collision avoidance system is not a certainty. Our purpose here has been to bring you up-to-date on the state-of-the-art developments in the hardware available to implement a functioning CAS. Just as important is the participation of Air Force people in both the HATR and ASRS programs. Significant achievements in midair collision avoidance have come about from these informative reports. CAS may be a solution of the future, but until such time as it is functional, aircrews must be especially alert to traffic conflicts and hazards. See-and-avoid is still the name of the game, and where errors or dangers occur, report them so that others can benefit from your experience.

Aerospace Safety magazine wishes to thank the editorial staff of *The Journal of Air Traffic Control* for permission to reproduce portions of their July-September 1977 article on ATARS. ★

*Filing of an ASR does not provide immunity from disciplinary action by the USAF for violation of USAF or DOD directives.

Crew Coordination...
in the heavies

MAJOR JOHN D. WOODRUFF
Directorate of Aerospace Safety

Coordination or cooperation, what difference does it make what we call it as long as we're communicating. However, there's a human tendency for people to try to run a one-man band. This is not what we want in crew coordination. Look at it this way. If the designers of a "heavy" had meant for the pilot to single-handedly fly the aircraft, they wouldn't have designed it with other crew positions. Or, the chief pilot in the sky would have made pilots with numerous sets of brains, heads, arms, hands, and fingers. Whether you're the pilot, copilot, navigator, flight engineer, bombardier, electronic warfare officer, loadmaster, or boomer, you all have a responsibility for crew coordination. There's just too much airplane in a "heavy" for one man to handle.

Look for ways you can help the other crew members. It's everyone's job to be involved. Of course, most of the big things get coordinated. But, the little ones can kill you too. Get involved in crew coordination!

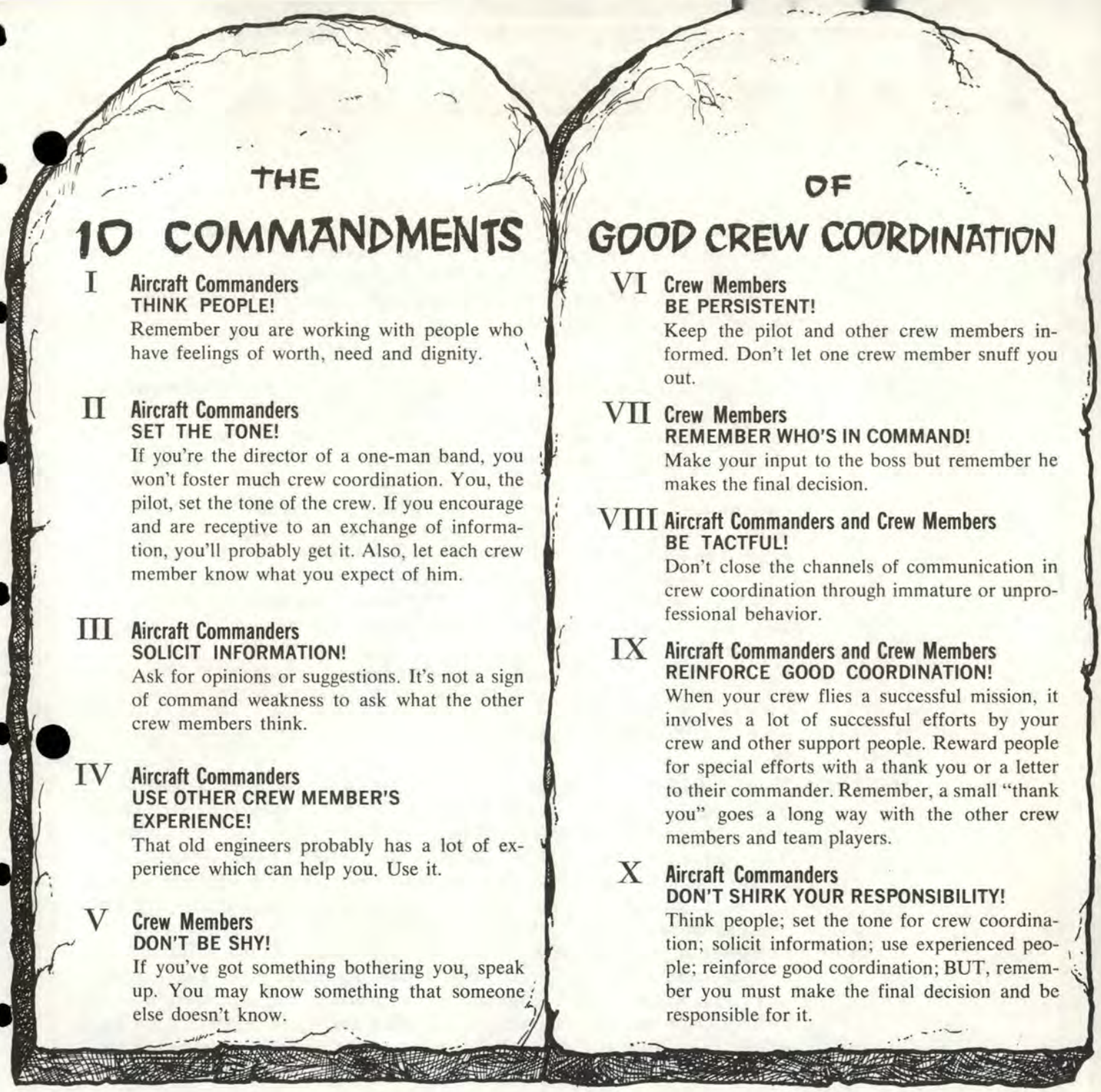
MISSION BRIEFING TO DEBRIEFING

Crew coordination starts when we first report for the flight. If we don't start coordinating from the very start, we're asking for trouble. The crew briefing presents the first opportunity for crew coordination. Let's examine one particular phase of a mission to see how crew coordination is involved. Flight planning is definitely a place where two or more heads are better than one. The flight planning documents cover numerous details which might easily be overlooked by one person but spotted and planned for by several. Remember, AFM 60-16 says that, when the pilot puts his signature to the flight plan, it signifies that:

- The flight has been properly ordered and released.
- Adequate flight planning data were available for complete and accurate planning.
- The flight will be conducted according to governing directives.
- The flight plan has been reviewed for completeness and accuracy.
- Foreign clearance briefings, when required, included the minimum requirements of the Foreign Clearance Guide (FCG).
- Each member of a crew or formation flight was briefed on all aspects of the planned flight and each pilot member of the formation possesses an instrument rating if any portion of the flight is to be conducted under IFR conditions.
- He is aware of his responsibility for the safety of the aircraft/formation of aircraft and its occupants.

As a "heavy" driver, if you haven't consulted numerous other crew members, as an AC, you have probably violated several of the items listed above. This process of crew coordination carries on throughout the flight: preflight, ground operations, takeoff, departure, in-flight operations, before landing checklist, approach, landing, taxi and engine shutdown. Oh yes, let's not forget the paperwork. "No flight is complete until the pa-

We do not have additional copies of these "Commandments," so those who wish to have their own should reproduce them.



perwork is finished." The aircraft forms, maintenance debriefing and operations forms all require a coordinated effort.

TEN COMMANDMENTS OF GOOD CREW COORDINATION

There is no single piece of advice to foster and maintain crew coordination. But, here's a healthy stab at ten of the more important ones. Let's call them the Ten Commandments of good crew coordination.

IT'S A CREW EFFORT

We've seen how everyone is involved in crew coordination. Furthermore, we've clearly identified that crew coordination starts when we first report for the flight and doesn't end until the paperwork is complete. Lastly, we've discussed some useful tips (through the vehicle of the Ten Commandments of good crew coordination) to facilitate crew coordination. It's a crew effort, not just the pilot's responsibility.

All those folks on board are there for a reason—to help each other, perform a specific duty, and get the mission accomplished safely. Good crew coordination may make your next checkride a lot easier. I know it will help you perform better as a crew. Better yet, it may save your life! ★

OPS TOPICS

MILITARY TRAINING ROUTES

Beginning in early 1978, military flight training routes will start to appear on civil aeronautical charts. This change is part of a safety enhancement program aimed at keeping civil pilots better informed of military flight training activities. The charts will give civil pilots a greater understanding of military operations and enable them to plan and conduct their flights with increased safety.

BASE, GEAR CHECK . . . BEEP, BEEP, BEEP

An O-2A prepared for a no-flap stop and go. Upon reaching downwind altitude, the pilot hurriedly slapped the gear handle down. The handle, unfortunately, did not go to the full down position, leaving the gear up and the gear doors closed. Tapes from RAPCON indicate the gear warning horn was blowing when the pilot called, "Turning Base, gear checked." Meanwhile, back at the RSU, the observer recognized the gear-up approach and transmitted "Go around! Go around! Go around!" on guard. The O-2 pilot, however, had switched off guard earlier when guard transmissions had interfered with his primary radio communications. The RSU controller did not fire a flare because after his go-around call, the nose of the aircraft came up, and he thought the go-around was initiated. In actuality, the pilot was beginning his flare.

Checklist error + distraction + communication breakdown = accident. That's one lesson we still haven't learned. Break just one link in the chain and it no longer equals accident.

$10,000 CHAPEAU

Even at today's inflated prices, $10,000 is a lot of money for a flight cap. That's what a cap costs when it is recycled through a B-52 engine. The victim was engine number 8, immediately after termination of an alert exercise. The gunner completed his checklist items and received permission from the AC to depart the aircraft to help the crew chief exchange start cartridges. He positioned himself at the right forward side of the engine as the pilot was shutting it down. The flight cap was sucked in, damaging the first and second stage rotors. This crew member was keenly aware of the MAJCOM requirement to wear hats on the flight line but ignorant of the requirement that states hats or caps will not be worn in the immediate frontal vicinity of an aircraft while engines are operating. Commanders, operations officers, and aircraft commanders must ensure that the people realize the high cost and loss of combat capability associated with FOD incidents.

A FISH STORY

While trying to salvage a long, hot approach, the FAC pilot lowered the nose of his recip aircraft to counteract the ballooning effect. The nose wheel hit first resulting in a porpoise. On one of the forward bounces, the nose wheel tire failed, the propeller blades contacted the runway, and the nose gear fork assembly was bent. The pilot went around and recovered the aircraft safely. The moral is an old and tired one: The smart money does not try to salvage a bad approach—go around before the damage occurs and do it again; right this time.

OPS TOPICS

NEW PACIFIC AIR ROUTES

An experimental air route system which has increased both safety and capacity and also reduced fuel consumption on flights between Hawaii and the US mainland became permanent on December 1.

In essence, the new system increases the number of routes between the west coast and Hawaii from four to six by reducing the lateral spacing between routes from 100 to 50 miles. But, at the same time, it also requires a vertical separation of at least 1,000 ft between aircraft on adjacent routes.

FAA said this combination of vertical and lateral separation—called composite separation—is safer and more economical than the former four-route system which provided wider lateral spacing between routes but did not require vertical separation between aircraft on adjacent routes. The composite form of separation has been used successfully for years on flights over the North Atlantic.

Greater fuel economy is achieved under composite separation because it provides more direct routes and because pilots have a better chance of being assigned altitudes that permit the maximum jet aircraft performance.

FAA said it will continue to monitor flights after the new system becomes permanent. Major lateral deviations observed by radar will be recorded and investigated to determine their causes. These findings then will be used to make any adjustments to the system that may be required.

TERMINAL LOW ALTITUDE WARNING

The new low altitude warning equipment is now operating at all 63 major civilian airports, according to the Department of Transportation. All airports with automated radar terminal systems now have the low altitude warning feature to tell air traffic controllers when planes are closer to the ground than they should be. The equipment, called the Minimum Safe Altitude Warning (MSAW) system, alerts controllers when aircraft equipped with automatic identity and altitude reporting equipment are detected at a potentially unsafe altitude in the airport terminal area. The alert comes in the form of a 5 second aural alarm and the letters "LOW ALT" flashed on the controller's radar scope. MSAW compares transponder altitude read-out to an altitude table programmed into the ARTS III computer.

"THE TAIL DRAGGIN"

First a C-130, then an F-15 and finally a KC-135, all were bitten by that monster the "tail draggin." Every year a number of Air Force aircraft are involved in mishaps in which exhaust nozzles, tail skids, refueling booms, etc., are damaged by contact with the runway. In most cases the cause is over-rotation. But there can be contributing factors. One mishap occurred because of the extreme runway slope. The pilot rotated to a normal pitch attitude and the tail hit. In another, the pilot flying the aircraft was set up for an over-rotation by the IP. He was simulating a nose gear failure landing and got the nose too high. Be alert and don't let the "tail draggin" get you. ★

The Fighter Pilot's Breakfast*

LT G. R. BANTA, MSC, USN, Naval Regional Medical Center, Meridian, MS

We in . . . aviation are concerned with many aspects of human factors, i.e., fatigue, smoking, drinking, insufficient sleep, psychological areas, etc. All these things clearly affect our performance. One area often overlooked, however, is nutrition. And proper nutrition and diet are critical in a demanding occupation such as aviation. To a great extent, we are what we eat.

But how many of us give much attention to nutrition? How many times have you rolled out of bed before the cock crows, looked at your sleeping wife (beautiful in her curlers and cold cream), dressed, and headed for the base with great anticipation of a succulent ready-room breakfast of coffee and doughnuts. Ah, yes, many times. In fact, if you were to reflect back on your typical day's diet, you would probably not see a gourmet's delight: coffee and doughnuts for breakfast; a bologna sandwich or chili dog for lunch (if time permits, that is). Too often, even this modest lunch is supplanted by a nearby candy machine. At dinner, we usually try to make up for the day's shortage by consuming a week's worth of fried chicken, mashed potatoes, and a dozen beers or the like. What contempt we must have for our bodies to give it this for energy!

Nutrition oversees all our basic functions: heartbeat, nerve sensation, muscle contraction, etc. To obtain our maximum daily performance, we should have a working knowledge of the daily inputs and outputs of energy. An additional benefit of this knowledge is the food money which can be saved.

When selecting food, it is easier to classify the basic food groups according to their equivalent nutritional values. This allows us to interchange these foods within each group to add variety in our diet planning.

ESSENTIAL FOOD GROUPS:

1. Breads: enriched or whole grain, cereal, or potatoes.
2. Citrus fruits, other fruits and vegetables.
3. Dark green or deep yellow vegetables.
4. Fats: butter, margarine, and other fat spreads.
5. Meat: fish, poultry, cheese, or eggs.
6. Milk.

The nutrient requirements for any given individual vary with his age and sex. Therefore, each individual's diet should be tailormade to that person's energy/output ratio, medical and physical condition, and it should be monitored continually.

When we think about diet and nutrition, the term "calorie" is used. The calories liberated after eating certain foods represent the amount of energy released into the body as the food is broken down into various products. The average individual receives approximately 15 percent of his energy from proteins, 40

*Coke, candy bar, and a cigar

percent from fats, and 45 percent from carbohydrates, even though more energy per gram is available in fats. As described in "Blood Fat and the Fighter Pilot" (Sep '76 *Approach*), when a greater quantity of food (energy) is introduced into the body than is expended, body weight increases. In fact, for every 9.3 calories in excess of what is used, about one gram of fat is stored. The excess of energy storing occurs only when we are gaining weight.

To maintain a given weight, one only matches his energy output with his input. So, if you are one of those individuals who says, "I hardly eat a thing, and still I can't lose weight," your energy output is less than your input. You need to exercise more. BUPERS Instruction 6110.2B has established standard height and weight statistics for the Navy, but the instruction also states that such standards cannot be viewed as absolute for every individual. For example, an athlete may weigh more than allowable according to the table due to his high proportion of muscle tissue. Another individual may meet the standard weight, look trim, but still be in poor shape because of a high blood fat level and susceptibility to cardiovascular insufficiency.

If these exceptions do not apply to you, and your doctor decides you need to lose weight, what kind of diet should you go on? Many and varied diets exist—some with merit, some without. Whatever diet you decide on, it should meet the following guidelines:

- A diet must produce a negative caloric balance.
- A diet must contain a balance of required nutrients.
- The reducing program should produce a gradual weight loss (no more than 1 to 2 pounds a week). Medical monitoring is necessary for anything greater. Much of the weight loss on a semistarvation diet is quickly regained because it is not fatty tissue that is lost but muscle tissue or water.
- An exercise program should be a part of the reducing plan. Exercise helps build muscles at the expense of excess body fats.

One of the main problems of many fad diets that exist today is that they do not provide all the nutrients your body needs. *All* the food groups should be represented in a diet. A summary of the basic food groups and vitamins reveals why it is important that they be included in any diet.

Fats. Everyone needs some fats, but obesity and high blood fat levels are indicative of too much. In a daily diet, the amount of fat may hide itself. Fat doesn't dilute very easily, making it easy to store in the body, while carbohydrates and proteins mix readily into water substances that can be metabolized quickly. A single pat of butter may contain more fat-storing potential than anything else on your plate.

Table 1

Below is a table of vitamins and minerals that should be included in everyone's diet. Eating a well balanced diet should provide all these elements.

VITAMIN/MINERAL	FUNCTION	SOURCE
Calcium	Builds and repairs bones/teeth; muscle and nerve functioning; blood coagulation.	Milk, milk products, dark green and leafy vegetables.
Iron	Forms cellular substance that carries oxygen to the body.	Liver, meats, egg yolks, peas, whole grain and enriched breads.
Vitamin A	Night and color vision.	Liver, eggs*, vegetables, milk, butter.
Vitamin C	Cellular function; wound healing; blood vessel strength; formation of bones and tissue.	Citrus fruits, tomatoes, strawberries, broccoli, green, leafy vegetables, potatoes.
Iodine	Formation of thyroid hormone for metabolism of food and oxygen.	Saltwater fish, iodized salt.
Vitamin K	Blood coagulation.	Bacteria in large intestine.
Vitamin E	Protection of needed fat stores.	Balanced diet.

THE FIGHTER PILOT'S BREAKFAST continued

Carbohydrates. This category of food provides an essential energy source for the nervous system (brain). Foods of this category include cereals, fruit, pastries, and other sweets. Choose carbohydrates in your nutritional plan wisely because they convert to stored fat very easily. Because of carbohydrates' high energy content, they are essential in preventing fatigue, especially when the body is under a considerable workload.

Proteins. Every cell in your body depends greatly on protein because protein plays an important role in the structure of the cells and enzymes that regulate body processes. Just as fats and carbohydrates, proteins are used for energy; therefore, you must constantly replace these proteins to maintain their functions in the cell. We normally acquire proteins from grain foods, milk, milk products, meat, poultry, fish, eggs, dried beans, peas, and nuts.

There are two types of proteins. *Complete,* which are found in animal fodstuffs, that can be broken down and used by our body properly, and *partial* proteins, which are normally found in vegetables and grain foods and cannot be completely used by our body. Therefore, to maintain a proper protein balance when partial proteins are the main source, the quantity must be increased. If you have the ambition to be a vegetarian, you may wish to bear this in mind. If you fail to maintain your proper protein diet, you may notice lethargy, depressed mentality, and in severe cases, swelling, especially of the abdomen.

The vitamins discussed in Table 1 are also needed in a diet. However, it is possible to get too much of a nutrient. Large amounts of vitamins A and D, for example, can be toxic, as can an excess of many minerals, such as iron. Higher amounts of other nutrients, though not toxic, may result in "condition deficiency." In other words, the body may adapt to increased amounts of the nutrient and experience deficiency symptoms when only normal amounts are consumed. A balanced diet will supply the proper amount of nutrients without supplements. Table 2 presents a sample diet that provides balance without excess calories.

Here's a balanced menu representing the six food groups: vegetables, fats, fruits, breads, meats, and milk. It is designed for an average-healthy aviator weighing 150-165 pounds.

Breakfast		**Calories**
Orange juice	1 cup	80
Cornflakes	¾ cup	68
Toast	2½ slices	170
Eggs*	2	146
Butter	1 tsp	45
Cream	1 oz	77
Milk	1 cup	170
Lunch		**Calories**
Cheese	1 oz	73
Butter	1 tsp	45
Roast beef	1 slice (3" x 2" x⅛")	73
Bread	2 slices	136
Mayonnaise	1 tsp	
Celery and radishes	As desired	
Apple	1 small	40
Milk	1 cup	170
Dinner		**Calories**
Hamburger	2 patties (" diameter, ¼" thick)	146
Whole kernel corn	⅓ cup	68
Tomatoes	As desired	
Carrots	½ cup	36
Bread	2 slices	136
Butter	2 tsp	90
Plums	4 medium	80
Milk	1 cup	170

*NOTE: Recommended allowance of eggs is 3 per week due to high cholesterol.

Table 2

The fallacy that everyone needs vitamin supplements (pills) to obtain sufficient vitamin intake is but one common misconception of the public. Other misconceptions abound. A discussion of nutrition would not be complete without shedding some light on these popular but erroneous beliefs.

- *The primary source of muscle energy is protein.*

If an individual is well nourished, protein is not the major source of energy. The amount of protein needed is determined by the individual's growth and increased muscle development.

- *Fats, fried foods, and oily dressings should never be eaten.*

The human body needs a certain amount of fat. The average American eats a diet that yields 40 percent of the calories from fat. In addition to the fat-soluble vitamins obtained from fats and the added taste they give to meals, fats keep you from feeling as hungry. On en-

tering the intestinal tract, fat causes the release of a hormone "entergastrone," which slows down the emptying of the stomach to the digestive area of the intestine. Therefore, fat should not be eliminated from your diet, but it should be restricted as a preventive measure against obesity and coronary disease.

• *Since eggs are a good source of protein, you should eat a few each day.*

One quality protein food need not be emphasized over another. Eggs are digested well in any form, but because of current concern with cholesterol and coronary insufficiency, you probably shouldn't eat more than three a week.

• *Combinations of some foods have special chemicals that burn calories faster.*

The grapefruit and egg diet does not burn off fat. No combination in food supplements assists the burning of calories.

• *Save your liquids until the meal is completed.*

It is not harmful to consume liquids during the meal. It *is* harmful to drink excessive amounts to wash down food without chewing it. Iced liquids should be drunk slowly to prevent interference with normal stomach and bowel functions during food consumption.

• *Crash dieting is quick and effective in reducing.*

You may lose weight with this diet, but you don't get the productive nutritive supplements necessary for proper health. Loss will occur not only in fat tissue but will include needed proteins and muscle tissue. In addition, the body, due to its slow adaptive methods, is apt to quickly regain the lost weight once the diet is removed. Sometimes, the dieter ends up with even more weight than when he started!

• *Snacks should never be eaten.*

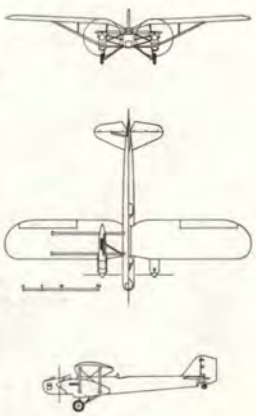
Eating between meals is not necessarily bad if extra calories are needed to achieve daily caloric totals. In addition to providing energy, some snacks provide calcium, proteins, vitamins, and minerals which may be needed. But most snacks cannot be substituted for the six basic food groups needed in daily meals.

No article on nutrition would be complete without a discussion of that much debated question: Will you crash your airplane if you don't eat breakfast? Ever since flight school, aviators have had flight surgeons telling them the importance of eating breakfast. Several attempts have been made to correlate lack of breakfast with actual aircraft accidents.

While no conclusive evidence has been found to prove that lack of *Wheaties* causes accidents, a strong case can be built for eating breakfast. When you skip breakfast, fatigue and laxness hit late in the morning. The body tends to increase its fat stores after other meals to help compensate for the lack of energy during the hours of no food input. To be mentally and physically alert, you do need to eat some food early in the day to meet the body's caloric requirements. This doesn't mean you have to prepare a fancy breakfast with everything from juice to pancakes. A glass of orange juice, some milk, and an English muffin or toast with butter and jam will provide many of the food groups you need. In summary, something is better than nothing. But be careful of acquiring that dreaded aviator's habit—the "coffee — doughnut — readyroom" syndrome.

The benefits of good nutrition, along with proper body weight and cardiovascular conditioning, are a healthier, happier, and longer life. It can also make you a better and safer pilot. Your body is a precision, high-powered machine. Don't abuse it by giving it low octane food.—Courtesy *Approach*, USN. ★

Name That Plane

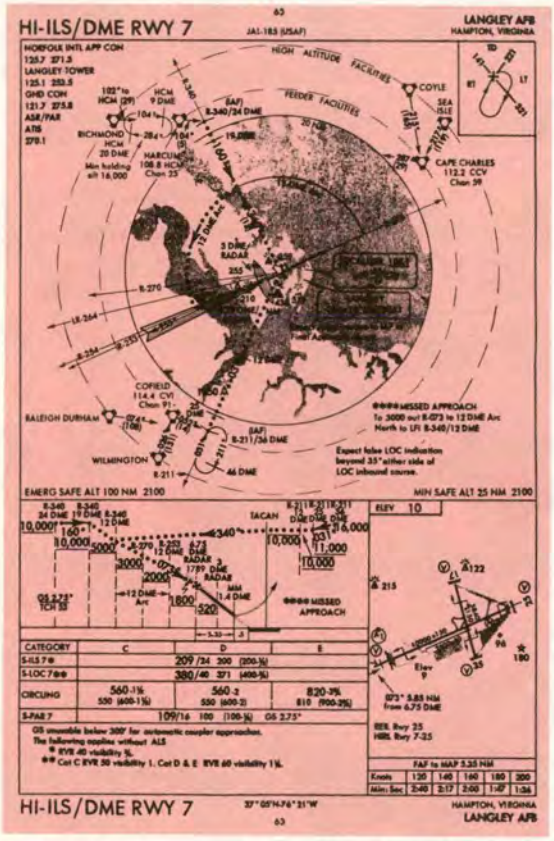


This early monoplane was a transitional product in the era of changing theories in aircraft design. The strength giving struts under the high gull wing make the aircraft look like a biplane with one wing missing. For the answer see Page 24.

INSTRUMENT LANDING SYSTEM (ILS)

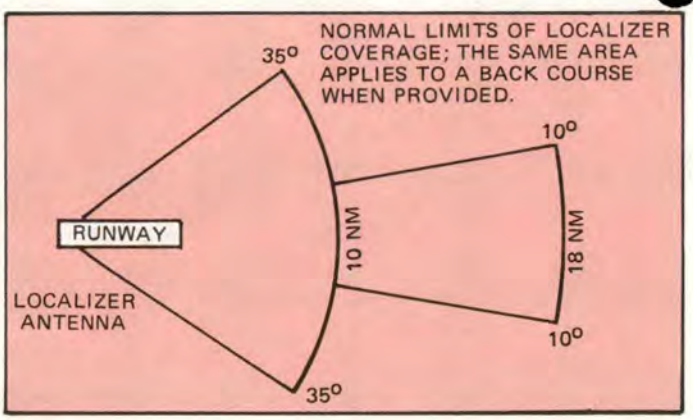
Have you ever flown an ILS and noticed an "on course" indication when you were no where near the localizer? It can happen. Various types of antennas are used to obtain a directional signal for the front course. Beyond 35° either side of the front approach course, several false courses are possible due to lobing of the antenna signals. Let's look at an example. During the HI-ILS/DME RWY 7 approach into Langley AFB (figure 1), the aircraft is on the 12 DME arc to the localizer final approach course or on a radar base leg to the ILS final and is not within 35° of the final approach course. If false courses are present, with ILS selected, the Course Deviation Indicator will move back and forth across the case as the "false" courses are crossed (this phenomenon is similar to the false glide slopes which cause the Glide Slope Indicator to move from the top to the bottom of the case when going missed approach as each of these false glide slopes are crossed).

FIG 1



The Airman's Information Manual (AIM), paragraph 2e, under Instrument Landing System (ILS) provides the following guidance on proper localizer signal coverage area: "e. The localizer provides course guidance throughout the descent path to the runway threshold from a distance of 18NM from the antenna between an altitude of 1000' above the highest terrain along the course line and 4500' above the elevation of the antenna site. Proper off-course indications are provided throughout the following angular area of the operational service volume." "1. To 10° either side of the course along a radius of 18 NM from the antenna, and 2. From 10°-35° either side of the course along a radius of 10 NM." "f. Proper off-course indications are generally not provided between 35°-90° either side of the localizer course. Therefore, instrument indications of possible courses in the area from 35°-90° off-course should key you to the existing false localizer courses and should be disregarded." (figure 2) Many pilots may have noticed recently that some ILS localizer final approach courses seem more sensitive than others. If the approach course is formed by a new Solid State ILS and the equipment serves a long runway, the course width will be narrower and therefore more sensitive than what we have been accustomed to in the past.

FIG 2



Prior to solid state ILS equipment, military ILS localizer antennas normally formed a course with a total width of 5°. Solid state ILSs are currently being installed and use antennas which form a total course

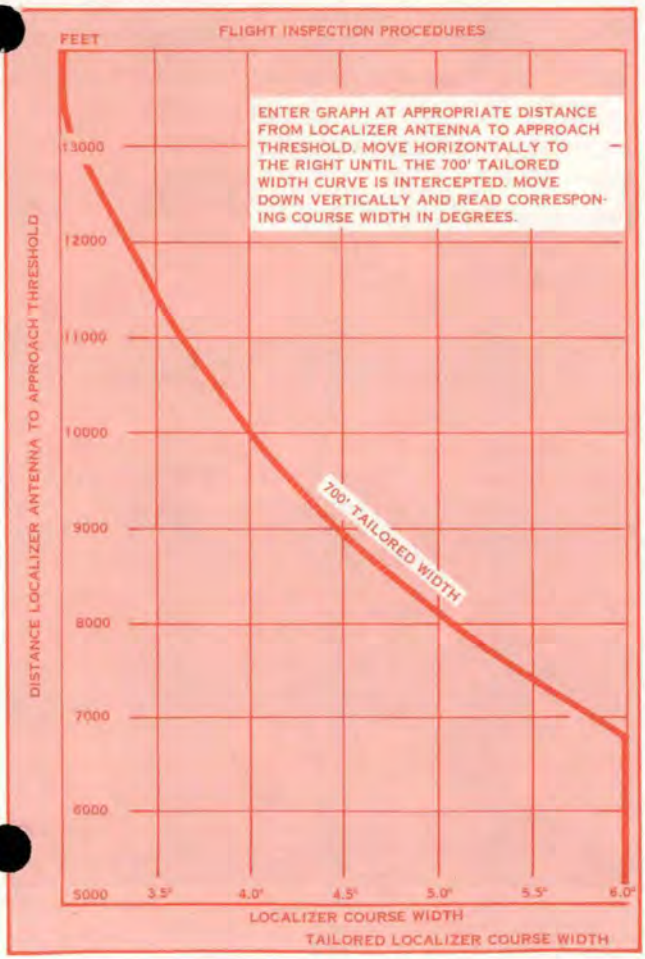
By the USAF Instrument Flight Center
Randolph AFB, Texas 78148

width of from 3°-6° depending on the length of the runway (the longer the runway, the narrower the course width).

What determines the tailored width of the new ILSs? According to Air Force Manual 55-8, **United States Standard Flight Inspection Manual,** "The optimum course sector width of a localizer front course shall be such that, at the threshold, the width of the sector is 700', except that if compliance with this specification would require either (1) a course sector width exceeding 6°, in which case the course sector width shall be adjusted to 6° or (2) a course sector width of less than 3° in which case the course sector width shall be adjusted to 3°."

For example, if we borrow the Tailored Localizer Course Width Chart from AFM 55-8 (figure 3) we find that if the localizer antenna is 1000 feet past the departure end of the runway, a 7100 foot runway will yield a total localizer course width of 5° (1000' + 7100 = 8100'. Enter the chart with 8100', and carry across to the 700' tailored width baseline to yield 5° total width). Let's take an example with a long runway. An 11,000' runway with an antenna 1000' past the departure end, yields a total course width of 3.33°. This localizer course would be significantly more sensitive than a normal 5° course width. How does this affect the pilot? When intercepting the final approach course, if you have been using CDI "case break" as part of your intercept technique you may find yourself overshooting final unless you adjust to the faster than normal movement of the CDI. Also, when on final approach, deviations from centerline will be more readily apparent due to the increased localizer sensitivity and it may be more difficult to maintain CDI centered.

FIG 3



In summary, be aware of possible false localizer courses which are more common with solid state ILS systems, and be prepared to cope with more sensitive localizer final approach information, especially when flying into an airpatch with a long runway. As we have continually stressed in the past, and is now more important than ever, use whatever NAVAIDS are available to compute an accurate leadpoint to final, when possible, to ensure that each ILS approach will be successful.

REVISION OF PAST "IFC APPROACH" ARTICLES

One of the primary goals of the USAF Instrument Flight Center is to provide Air Force pilots with the most current information available concerning instrument flying and we use the "IFC Approach" articles extensively to accomplish this function.

Each year the Instrument Flight Center reviews past "IFC Approach" articles for currency. Articles considered current are those published after December 1974. Since many of our readers keep copies of our articles and use them as a review for instrument checks and also as teaching aids for annual instrument refresher courses, we publish this revision each January. A limited number of booklets of reproduced articles is available for distribution to those who wish to start an "IFC Approach" article file. A set of the articles will be mailed to you upon request. If additional copies are needed, they may be reproduced locally. Your request should be addressed

IFC APPROACH continued

to: USAF Instrument Flight Center/FSD, Randolph AFB, Texas 78148.

The following changes and deletions to previous "IFC Approach" articles should be made as indicated:

January 1975—Under the answer to the 1st question, delete COPTER VORTAC ARC 1.

February 1975—Delete 2nd, 3rd and 4th question and answer.

March 1975—Delete 1st, 3rd and 5th question and answer. Under REMEMBER, delete 2nd and 3rd paragraphs.

April 1975—Delete 1st question and answer. Delete 2nd sentence of the 2nd answer.

June 1975—Under answer to the 4th question, change (1000 feet ceiling and 3 miles visibility) to (1500 feet ceiling and 3 miles visibility). The answer to the 6th question should be changed to read: "A. Special VFR clearance should never be expected and an alternate course of action should be planned in case the special VFR clearance is not approved."

October 1975—Delete the entire article.

January 1976—Delete the 1st three paragraphs.

April 1976—Delete the 2nd question and answer.

July 1976—After the 3rd sentence of the 4th paragraph of the answer to the 1st question, add: "In congested areas, the bearing relationship may be altered for better portrayal."

August 1976—Delete question 10.

November 1976—Delete the 6th and 7th question and answer.

February 1977—Delete the 3rd item under significant changes to AFM 51-37.

September 1977—Under the answer to the 1st question, change, "1. The reported weather is below basic VFR minima (1000 feet and 3 miles)," to "1. The reported weather is below basic VFR minima (1500 feet and 3 miles). (NOTE: Controller training can be conducted as long as weather is at or above 1000 feet and 3 miles)." ★

NAME THAT PLANE ANSWER

Douglas B-7
Length: 46'6"
Span: 65'3"
Gross Wt: 9,953
Crew: 4
Max speed: 182
Max range: 632 miles
Service ceiling: 20,400
Bomb load: 1,200
Armament: two .30 cal Browning guns

WHICH ONE IS THE RUNWAY?

CAPTAIN PETER CONFORTI
San Antonio Air Logistics Center
Kelly Air Force Base, Texas

If you chose the lighter colored, longer piece of concrete, you are wrong! Look to its left for the real runway.

In the past 16 months at Kelly AFB, three aircraft have landed on the parallel taxiway to runway 15-33. All three occurrences involved experienced pilots. All occurrences were on days in which the ceiling and visibility were unlimited with the pilots visually acquiring what they thought was the runway 15 to 20 miles out.

These landings occurred in spite of: (1) large block letters with the word "Taxiway" painted on both ends of the taxiway, (2) cautions depicted on approach plates and in the IFR Supplement and (3) a statement on the ATIS pointing out the hazard.

With all these warnings it is obvious that the pilots were complacent and either didn't get the message or ignored it. The next time you're cross-country, landing at a strange field, take advantage of all the flight planning aids available to you. They could save you embarrassment and an unwelcomed meeting with the base commander. ★

NEWS FOR CREWS

Information and tips to help your career from the folks at Air Force Military Personnel Center, Randolph AFB, TX.

CAPTAIN ROGER ROSENBERG
Fighter/Recce Career Management Branch
Air Force Military Personnel Center

"FIGHTERGATOR" CAREER MANAGEMENT

If there were space to use only one word to describe the environment the fighter weapon systems officer (WSO) faces in tactical fighter and reconnaissance worlds over the next few years, the word would be "dynamic." This dynamism in the Tactical Air Force (TAF) has been characterized in the recent past by the SEA drawdown, F-4 wings deployed into Nellis and Hill Air Force Bases, and the move of an F-111 wing to the United Kingdom. To these actions must be added the onset of the F-4G and the impending conversions of many F-4 units to new and often single-place aircraft. In spite of these conversions, however, there is today a shortage of WSOs to meet force requirements.

THE TAF WSO SHORTFALL—PAST, PRESENT, AND PROJECTED

In the late 60's the decision to place navigators in two-place fighters resulted in an increased requirement for WSOs. Since the requirement could not be met immediately, the force faced a shortage at the outset. Building an inventory of WSOs as well as meeting other navigator requirements necessitated a large undergraduate navigator training output, and Air Training Command produced new lieutenant navigators at high rates during the build-up. By 1973, the last pilot systems operators had departed the rear cockpit of the F and RF-4.

Although two-place fighter requirements have begun to decline, the impact is different than most WSOs expect. As noted above, the force remains in a shortage position. The five year defense planning. programming and budgeting cycle is geared on the personnel side to procuring and training sufficient WSOs to meet requirements at the end of the five year defense program (FYDP), in this case FY 1983. The present shortage will reduce slightly each year, but will continue through 1983, eliminating any need to flow large numbers of WSOs into other weapon systems.

Additionally, transfer of some F-4s out of the active inventory has not taken place as planned, and as a result, the shortage that was expected to decline each year may actually grow slightly in some years of the FYDP.

WEAPON SYSTEMS

Within the WSO world, several systems should be discussed. The declining requirements we have been discussing so far represent the F-4. In its various models and modifications, the Phantom II has been the backbone of the tactical fighter and reconnaissance forces, and will be so a bit longer. As the only major multi-purpose fighter, it is projected to remain a part of the active inventory well into the 1980's.

The F-4G WILD WEASEL begins coming on board late this year, but will not replace the F-105 or F-4C WEASELS for several years (the fighter electronic warfare officer will be the subject of a future article).

The F-111 requirement is not declining, and is expected to remain a major part of the fighter force for the forseeable future. Some flow from the F-4 force to the F-111 has existed, permitting a healthy infusion of tactical high performance experience into this critical system. The cross flow may increase as the EF-111 comes into the inventory.

REQUIREMENTS, PRIORITIZATION, AND OPPORTUNITY

It has been clear to this point that there are insufficient fighter WSOs to meet all fighter requirements. Since there is a shortage, these requirements must be prioritized, and this prioritization will be important in viewing career opportunities.

The flying force, logically, must have top priority, and it is important to note that since this includes training the flying force, RTU IWSOs are part of this top priority. Just below the flying force is the specific fighter staff arena—those positions usually identified by AFSC 2255X that require experience in tactical fighter or reconnaissance aircraft. One level below this is the rated supplement surge consisting of a small number of WSOs in support duties who could be returned quickly to operational duties in the event

of a contingency. Other areas include ATC Instructor duty, general ops staff, and the supplement drawdown. It should be noted that the staff positions include wing, numbered Air Force, and major command, as well as Air Staff/joint staff billets, which provide significant broadening and management opportunities while meeting core fighter requirements. It is also important to remember that WSOs are serving as flight commanders, operations officers, and squadron commanders in the tactical environment.

Other areas often associated with broadening for the individual Air Force officer must be manned at lower levels in view of the overall shortage. The rated supplement represents, in terms of quantity, a relatively small area. While it is certainly a part of the fighter requirement, not all officers can serve in this area. WSOs can compete for in-residence professional military education and to a lesser degree, AFIT.

In summary, then, what has been presented is designed to give you a basic idea of where the "fighter-gator" force is and where it's headed. This is not a catalog of what's available or a "how to" primer on career development. What we have done is to present a context or framework into which you may weave your own personal desires, situation, and goals. The single major point is—that due to the shortage and the general trend of rated authorizations, the fighter WSO, as all rated officers, should prepare to compete in the operations arena. ★

ABOUT THE AUTHOR

Captain Rosenberg is a graduate of George Washington University. He is a former F-4 WSO who has been assigned to the Fighter Assignments Section of the Rated Career Management Branch, AFMPC, for the past 2 years.

EUROPEAN WEATH

LT COL HELMUT OBERBRINKMANN, GAF, Directorate of Aerospace Safety

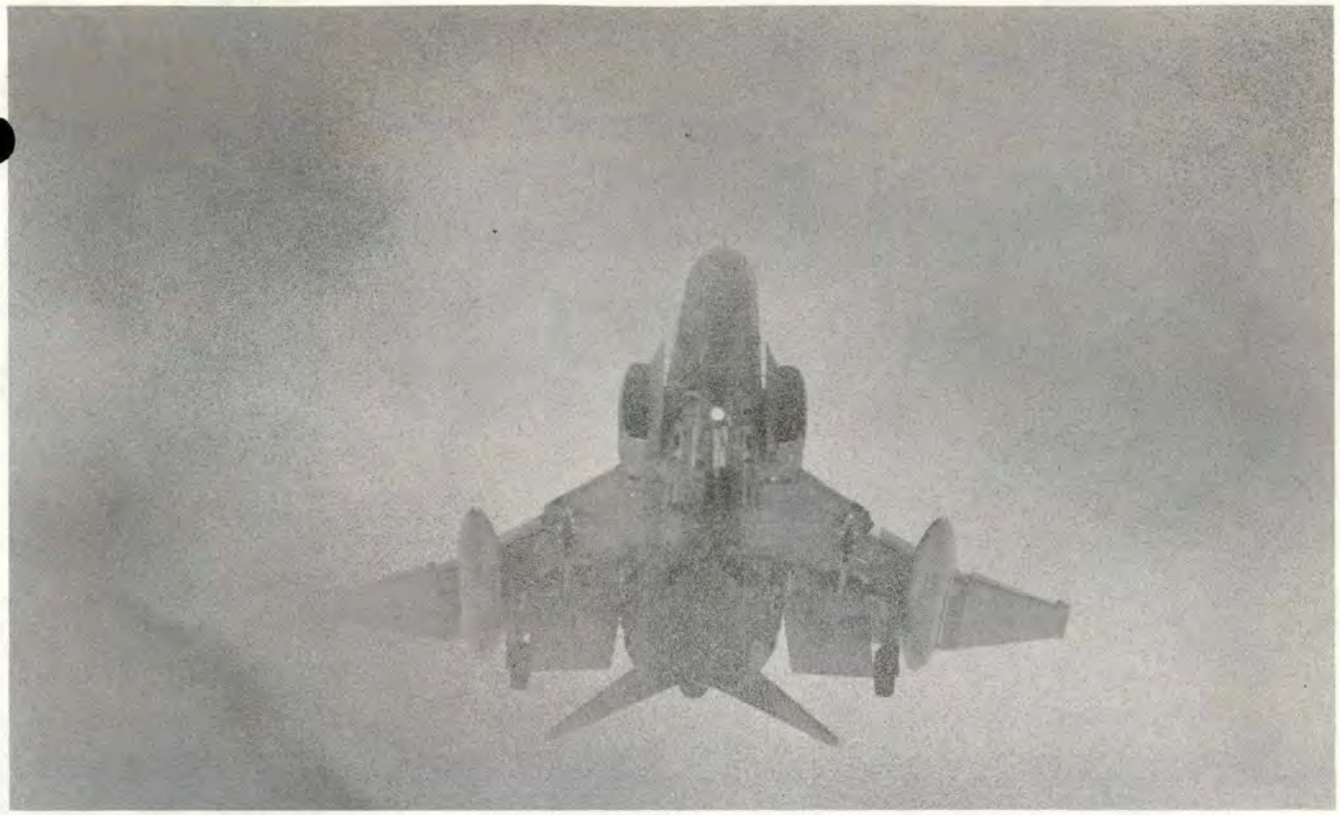
One of the biggest question marks in a pilot's job is the weather. He never knows when it will be his "friend" or his "foe." Some fighter crews, particularly those from Southwestern US bases operating for the first time in the European area, must feel like gamblers with the odds stacked against them, i.e., strange environment and bad weather as well. In this article, bad weather means low clouds, heavy rain, snow or gusty crosswinds on wet runways.

In the European theater, particularly between October and April, you will find as "normal" a combination of bad weather and darkness nearly 80 percent of the time. This is the condition that NATO Forces face when they participate in exercises and in which they may have to fight some day should NATO deterrence break down. Therefore, peacetime training for weapons delivery such as that provided by "Red Flag" exercises, instrument training, and weather flying, become critically important. Based on my experience, I can promise a big surprise is in store for many pilots from the US when they find themselves transferred to a European base either for deployment or PCS. Clear skies and unlimited visibilities become a rare event.

The German Air Force (GAF) has a lot of experience in this weather and has identified it as a "problem area" for young fighter pilots returning home after receiving their training in Texas, Arizona or California. The problem is, they arrive home without enough experience in bad weather and cannot be transferred directly to an operational German tactical fighter wing. The GAF has developed a color coding system (see Chart) to ensure pilots are not put into weather situations beyond their capabilities. Each color code indicates a level of proficiency and currency in instrument flying. It also shows the appropriate weather minimums for approaches and landings. The code values correspond to the field weather conditions.

CHART

Blue: Visibility not less than 4.3 NM and ceiling not lower than 2,500 ft/AGL.



ER CAN BITE YOU

Green: Visibility not less than 2 NM and ceiling not lower than 700 ft/AGL.

Yellow: Visibility not less than 1 NM and ceiling not lower than 300 ft/AGL.

Amber: Visibility not less than 0.5 NM and ceiling not lower than 200 ft/AGL which is in general also PAR-minimum.

A pilot not proficient in instrument flying or who hasn't flown for a period of 3 months or more, carries the individual color code "blue." After some supervised training with an instructor pilot, and instructions in instrument approaches, he will be upgraded step-by-step. If a pilot does not have at least one practice instrument approach in any one month, he drops back to the next higher minimum color code.

GAF fighter pilots not current in the European environment and European air traffic rules and regulations must take a special familiarization course with at least 45 flying hours (instrument, bad weather operations, day and night flights) before they can join a tactical fighter wing.

After having passed this course, the requirements for the individual color code "green" are fulfilled. Further upgrading will then be done within the tactical fighter wing.

As I mentioned before, European weather conditions become a serious problem to USAF pilots as well particularly those from US bases with generally good weather. We don't want to lose a pilot or an aircraft just because his proficiency in low visibility or low ceiling approaches was not quite good enough.

If it is true that about 60 percent of all tactical aircraft assigned to AAFCE are US Air Force aircraft, then the proportion should increase to 80 percent when US-based reinforcement aircraft arrive. Thus it is essential that commanders place strong emphasis on realistic training and attention to their units' instrument proficiency. The risk has to be carefully calculated if those combat-ready crews with little weather experience are to successfully merge into other NATO units and immediately begin to operate under WX minimums of the European hosting air force. Should that become necessary, good instrument pilots will have taken the bite out of European weather, especially at night. ★

WHO SAYS I CAN'T KILL YOU

AVOID MY ENVIRONMENT

CAPTAIN WILLIAM J. ELY, JR.
Area Commander, Recruiting Force, Eugene, Oregon

I feel that I should warn you before it is too late. This article represents a betrayal on my part and seemingly classifies me as a traitor to my own kind, but I still question whether or not it truly represents a substantial reduction in odds, giving you the distinct advantage. This depends on your attitude and how seriously you interpret what I am about to say.

My skin is colored. As an individual, I alone possess the potential strength of inflicting serious injuries or—more than likely—killing you. Associated with others like me, our combined strength is unbreakable. Our growth during the past decade has been phenomenal. We have literally spanned almost every portion of the globe. As we continue to grow in both size and number so, proportionately, does the power that surges through us. We are too well established. We have existed too long already and will be around for centuries to come, so it is inconceivable that we will ever be eliminated. But, our growth and strength are only two of the advantages we possess.

We are inconspicuous. Our camouflage is natural. We have the peculiar advantage of being able to blend with almost any type of background. At night, we are invisible to the eye. Be it as it may, however, most of our victims are snared during the daylight hours. We rely on the element of surprise, our encounters being sudden, violent and devastating. Hardly aggressive, we prefer to wait in ambush, striking when you least expect it.

Finally, we possess a unique characteristic of reproduction. Any time one of us is torn down or destroyed—within days our damages have been repaired and we are generally much stronger than before. Fortunately for you, however, our replacements are much more recognizable.

As a rule, I and others like me prey on the naive—the uneducated. If you feel that you fall into this category, then you will probably literally run into me sometime. It is unfortunate, for I and other strands of wire too often are writing obituaries.—Courtesy US Army Aviation Digest ★

UNITED STATES AIR FORCE

Well Done Award

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

☆U.S. GOVERNMENT PRINTING OFFICE 1978 789/855/53

Captain James F. Kendrick

Captain Raymond G. Henley

3d Tactical Fighter Wing (PACAF)

On 27 January 1977, Captain James F. Kendrick and Captain Raymond G. Henley were flying a night air refueling and air defense intercept mission in an F-4E as number two in a flight of four. On climb out, Captain Kendrick noticed a slight problem with pitch sensitivity. As the climb continued, pitch responsiveness decreased, and by level off at FL 200 it was apparent that the flight would have to be aborted. The lead element turned toward home declaring an emergency.

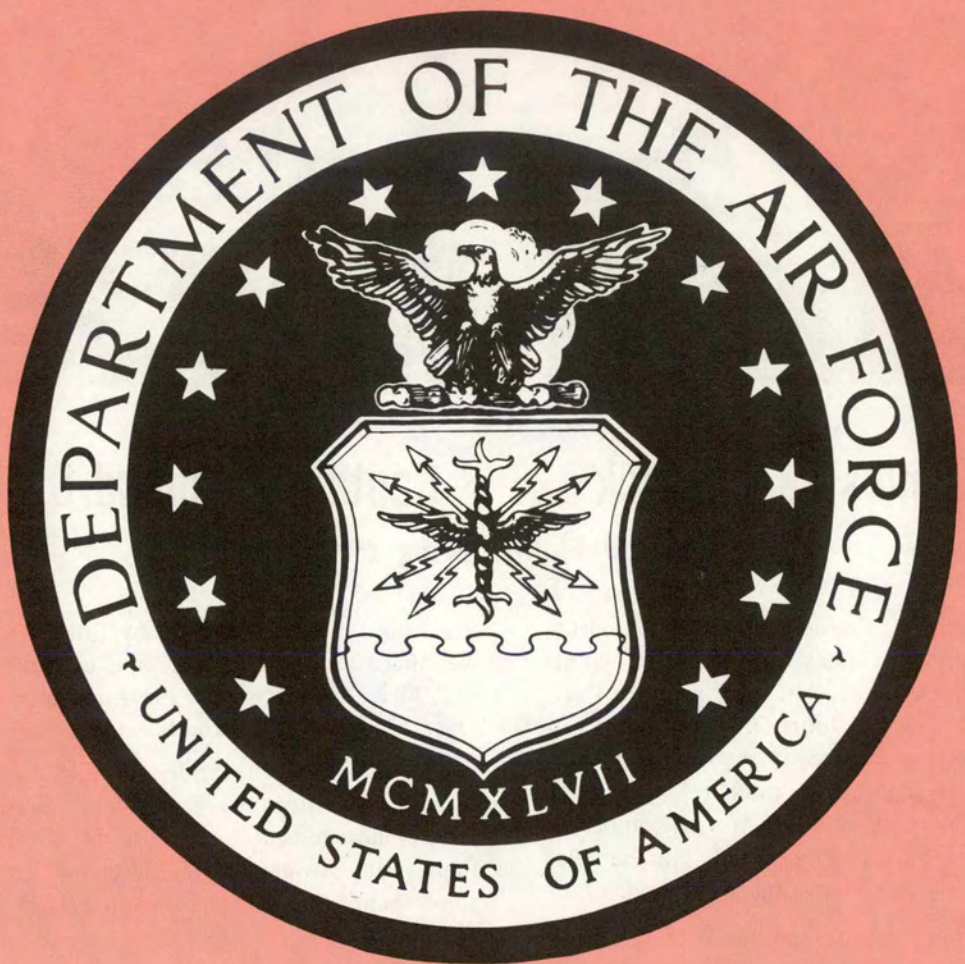
The emergency quick release paddle switch and stab-aug switches were cycled to attempt to isolate a possible stability augmentation malfunction. Increased back stick pressure was required to maintain straight and level flight, and full nose up trim was not adequate to relieve the back stick pressure at 300 KIAS. All circuit breakers were verified in, and the pitot heat was rechecked on. Several checks were made to verify that the hydraulic systems were operating normally.

Prior to descent through an undercast, a controllability check was performed, and gear and flaps were lowered. As the flaps came down, needed back stick pressure lessened, but pitch responsiveness continued to deteriorate and the stick became difficult to move. When the aircraft slowed below 185 KIAS, the nose began to pitch down and the aircraft began a descent that could not be corrected by full aft stick. Airspeed was increased using power, and an absolute minimum of 190 KIAS was set as the final approach airspeed. Over 200 KIAS, the aircraft would climb.

As the aircraft descended, control stick stiffness increased. The flaps were raised to increase stabilator effectiveness but pitch response did not improve, so the flaps were lowered again. Meanwhile, preparations were completed for a controlled back seat initiated ejection.

Turns to final were made with rudder, as Captain Kendrick could no longer move the stick with one hand. A departure end cable engagement was planned because of the uncertainty of the touchdown point. A PAR was flown controlling the aircraft exclusively with thrust and rudder. A successful night landing was accomplished, and the aircraft stopped prior to the departure end cable.

Captain Kendrick and Captain Henley demonstrated superior airmanship and exceptional skill in recovering a valuable Air Force aircraft. Their quick assessment of a rapidly deteriorating situation, decisive plan of action, and excellent crew cordination led to a well flown night approach and landing using only thrust and rudder. WELL DONE! ★


DEPARTMENT OF THE AIR FORCE
UNITED STATES OF AMERICA
MCMXLVII