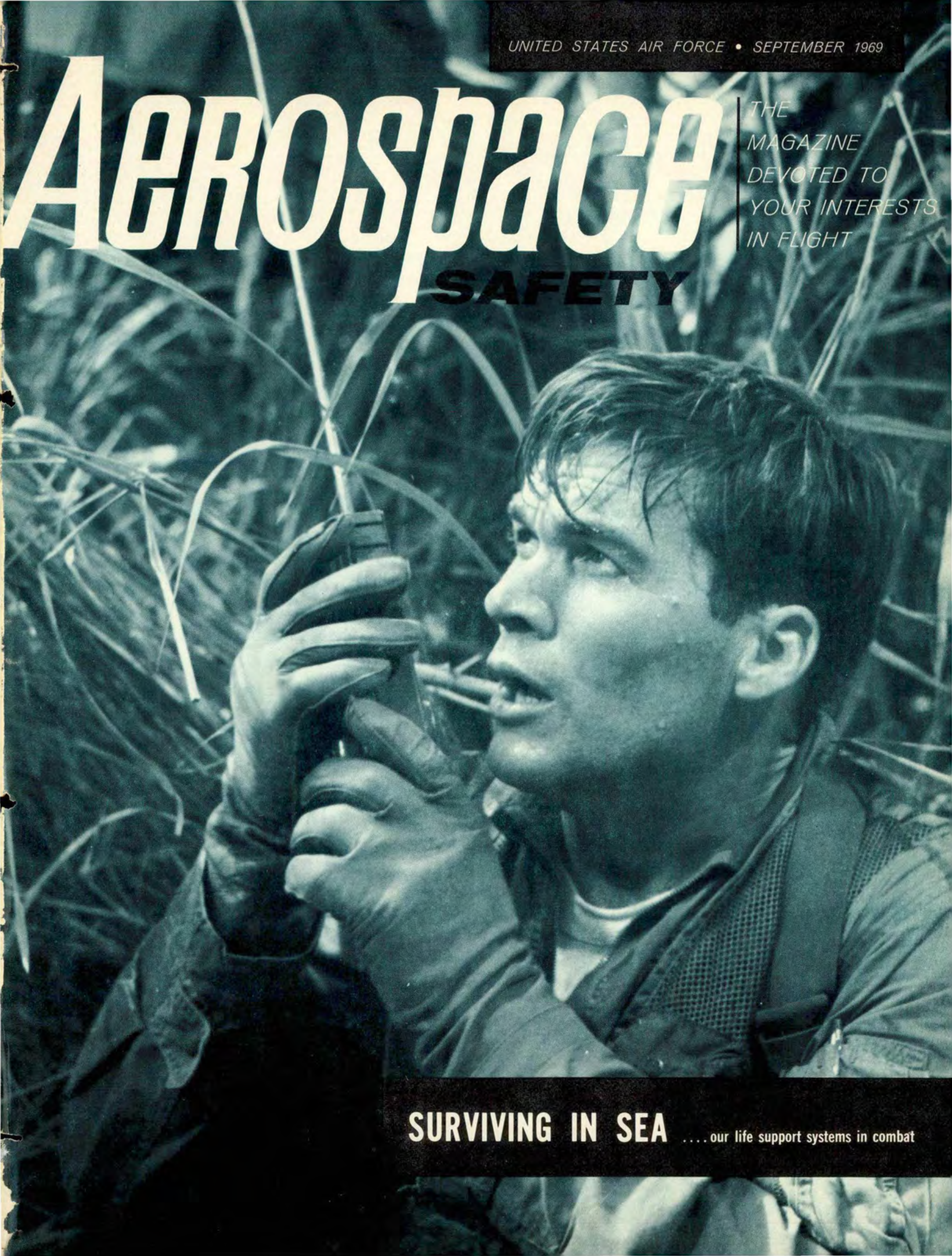
UNITED STATES AIR FORCE • SEPTEMBER 1969
Aerospace
SAFETY
THE MAGAZINE DEVOTED TO YOUR INTERESTS IN FLIGHT
SURVIVING IN SEA ....our life support systems in combat

Aerospace SAFETY

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September 1969 AFRP 62-1 Volume 25 Number 9

SPECIAL FEATURES

REGULAR FEATURES

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PREFLIGHT

With this issue a new chief of the Safety Education Group and a new editor take over. They are Col James A. Talbot and Maj John Shacklock. Both have just returned from SEA assignments and both have had extensive experience in publishing safety magazines. Departing editor Lt Col Compton is headed for a SEA assignment after three years at the helm of AEROSPACE SAFETY.

IPIS APPROACH

Correction: Some lines were garbled and a couple completely left out of two sections of the IPIS Approach for August. The correct text should have been as follows:

FLIGHT PROCEDURE CLARIFICATION

The procedure for inbound course interception using a course indicator and RMI is often misinterpreted. The misinterpretation is caused by the wording of a sentence in AFM 51-37, INSTRUMENT FLYING, page 11-6, line 5—"Turn the aircraft in the shorter direction to place the heading pointer toward the course deviation indicator (CDI) in the upper half of the instrument case." Many pilots interpret this to mean that the initial turn should be in the shorter direction to FIRST place the heading pointer in the upper half of the instrument case. This is incorrect. The objective is to turn in the shorter direction TOWARD THE CDI. The shorter direction would cause the aircraft to turn the least number of degrees to be headed perpendicular to the desired course. The turn should be continued to place the heading pointer in the upper half of the instrument case, which precludes an intercept angle in excess of 90 degrees.

If the initial turn is made away from the CDI, it will not always be possible to intercept the desired course prior to station passage. This situation could easily occur when the interception was attempted close to the station. The procedure will work in all situations if the initial turn is made toward the CDI and continued to place the heading pointer in the upper half of the instrument case.

FLIP PROCEDURE CHANGE

The May 1968 IPIS Approach article answered a question concerning Automatic Terminal Information Service (ATIS). In November, the ATIS procedure was changed. Prior to November, the pilot was required, upon initial contact with the controller, to state that the ATIS message had been received and to identify the current code word (letter). The procedure change specified that pilots should discontinue advising controllers that the ATIS message had been received. Controllers will automatically consider that pilots have listened to the ATIS broadcast and received all the information the message contains, UNLESS THE PILOT MAKES A SPECIFIC REQUEST.

The ATIS frequencies may now be found in the FLIP IFR Supplement as well as on FLIP Enroute High/Low Altitude charts. It would also be very convenient if they were listed with the other voice frequencies in the top left corner of the terminal approach charts.

DON'T DESTROY THE EVIDENCE

Sometimes a pesky problem goes unsolved for weeks, even months on end because investigators are unable to get their hands on a piece of the hardware concerned while it is malfunctioning. And other times, a problem becomes almost unsolvable because it never occurs below 20,000 feet—and the pilot can't reach it from the cockpit. Simulate, hypothesize, and reconstruct all day long, but the experts can't determine just what made this little gadget or that little black box go wrong.

In situations of this nature, it really hurts to learn, after all the brow-furrowing and head-shaking, that a piece of solid evidence (or even a piece of possible evidence) was available but got away. What I'm specifically referring to is the part or component that was removed from an aircraft after something went wrong with it and then got lost in reparable processing. Or the one that was disposed of because it was beyond repair and can't be located.

A couple of recent incidents illustrate the problem. They concern the Crash Position Indicator (CPI) that has been unpredictably popping out of C-130 aircraft, but the lesson could apply to many other systems, parts and aircraft. In the first case, a CPI deployed during the turn out of traffic, was located by its guard channel beacon, and recovered by base personnel. Nothing in the cockpit of the C-130, or the wiring and aircraft system, gave a hint as to why the CPI deployed. Next natural step was to take a look at the recovered instrument itself. But when they went to track it down, investigators found it had already been repaired by specialists on the base. Whatever evidence it might have contained as to the cause of deployment was gone forever.

Case number two was a bit more spectacular: CPI deployed during takeoff roll. The aircrew was unaware that it had deployed until they arrived at destination and were preflighting for their next leg. True to the pattern that has evolved, the aircraft and its systems revealed nothing to indicate the reason for the premature functioning. A message to the departure base alerted the safety officer there and he went about determining location and condition of the CPI.

Yes, the CPI was found on the runway. As a matter of fact, it was not only found, it was heard. The beeper was functioning loud and clear. It was blocking guard channel and the folks there were eager to have it silenced. They followed the instructions on the outside of the CPI but the locator beacon refused to shut off. In desperation they finally went after the poor, inanimate thing with heavy tools and bludgeoned it to death. It was silenced. And any information it might have revealed concerning its unexpected and unprogrammed ejection from the C-130 was destroyed.

Admittedly, that is an unusual case. But too many times we've found valuable evidence that could lead to the solution of a nagging problem destroyed or disposed of before investigators could get at it.

So when you're handling an aircraft part that malfunctioned or failed, or when you come across something on the airfield that you suspect of having fallen off an aircraft, take a second to consider that it could be a valuable UR exhibit. Get in touch with the safety office before you throw it away—or batter it to death. ★

SURVIVING IN SEA

Downed in a combat zone . . . what are your chances? Here are the facts based upon USAF pilots' experiences in Vietnam.

In the December 1968 issue of *Aerospace Safety* an article titled "Ejection Success in Combat" discussed some aspects of the hazards, problems and successes of USAF ejection systems in a hostile environment. The article was based on 101 combat ejections reported during an 18-month period. Two significant findings were that great differences exist between combat and non-combat ejections, and the success rate for combat ejections was between 90 and 95 per cent compared to an average of 85 per cent for non-combat ejections. The authors, Lt Col Victor J. Ferrari, USAF, MC, and Mr Robert H. Shannon, Life Support Systems Specialist, of the Life Sciences Group in the Directorate of Aerospace Safety, attribute this high success rate primarily to the lack of delay in executing the ejection decision.

The following article is based on a study by Mr Shannon and Major Arthur N. Till, Air Operations Officer, Life Support, that included more information and concentrated on the use of life support systems in Southeast Asia from Jan 1, 1967, through December 31, 1968. Of the 131 cases studied three resulted in fatalities. In the 128 successful ejections, 22 crewmembers received major injuries, 50 suffered minor injuries and 50 were unhurt.

Significantly, no ejections were initiated below 500 feet, whereas in total Air Force ejections, about 15 per cent are attempted below this level, and 60 per cent of the fatalities occurs in this group.

The findings in this part of the study were generally the same as previously reported in the referenced article. But what about the combat survival experience of those recovered after their successful ejection?

Survival begins after the man is stabilized on the earth's surface, includes the evasion phase, and is completed when the survivor is safely aboard a rescue/recovery vehicle. This concerns the more interesting aspects of parachute landing environs, duration of survival, primary and secondary rescue aids, helmet retention data, life support equipment malfunctions, and miscellaneous information.

Of the 128 survivors, 69 ended up in the jungles, rice paddies, or mountainous karst. Thirty found themselves hung up in the tall trees of Southeast Asia. Seven of these survivors elected to remain in the trees and five were successfully recovered from the trees by the hovering helicopter. The other two were knocked out of the trees by the helicopter rotor wash. Neither was seriously injured, but both relayed some extensive comment, including a few well chosen words, to the helicopter pilot over their RT-10 survival radios. Seven individuals used the personnel lowering device to free themselves from tall trees.

In 29 cases the ejectees were exposed to water survival situations. This is, by definition, the most critical survival situation since man is by nature a nonaquatic being. For the 29 survivors involved, the tasks of releasing the canopy, raft entry, and resultant overwater recovery went fairly well. The major difficulty encountered was entanglement with the parachute suspension lines and survival kit lanyards.

The duration of exposure was reported by 122 survivors and ranged from five minutes to 22 hours and 15 minutes under circumstances too varied to enumerate. Survival times were relatively short when compared to the Korean conflict statistics or data compiled on non-combat ejections. Forty-three were recovered within the first 30 minutes, and an additional 35 within an hour.

Of the total cases in which exposure time was reported, 108 or 88 per cent were successfully retrieved in the first six hours. In most of these situations, rescue forces had already been alerted. Notwithstanding this factor, it was quite evident that the survival times in most instances were greatly reduced by the crewmembers' familiarity with the distress locator devices. Further, all survivors had attended a jungle environment school which reduced the amount of fear, shock, and concern, enabling them to think clearly, plan their action, and help effect a successful and safe rescue. An excellent example was a downed pilot whose survival was severely compromised by a femoral fracture. A splint made from jungle brush, secured by the tourniquet, and the pilot's superb physical and mental conditioning resulted in his evading to a hill crest over a mile from his landing site, from where he was rescued.

The need for capability to rescue injured personnel during the hours of darkness was evidenced by the finding that survival times exceeding six hours for downed crewmembers was due to nightfall, which necessitated continued survival effort until first light.

Visual observation of the ejection by another member of the flight or sighting/pinpointing by other aircraft or vessels accounted for 34 of the recoveries. Discounting this number and those wherein rescue aids were not reported, the RT-10 survival radio was indicated as the primary factor in recovery in 81 per cent of the cases. The availability of the day/night flare was significant in recovery of ten crewmembers. Other

Survival success has reached a new high in SEA, due to improvements in life support equipment, training and tremendous job by rescue people.

distress locator devices that were reported as the primary rescue aid included the signal mirror in two instances, and the personal locator beacon, the strobe light, the foliage penetrating flare, and a locally procured rechargeable flashlight one time each.

In 70 cases, a secondary rescue aid was required to effect recovery. This was primarily for pinpointing locations. The day/night flare was used by 27 survivors. In many instances more than one flare was required due to the relatively short burning time of the flare. Thirteen others were located by visual sighting of the multicolored parachute canopies that were either spread out by the survivor or hung up in the trees. The lensatic compass, although not procured as a distress locator device, was used nine times to direct the rescue vehicle via the RT-10 to the exact location. In all instances, circumstances precluded the survivor from being visually observed, due to the necessity to remain concealed or because of visual obstruction from the dense jungle canopy. Other distress locator devices that proved invaluable as a secondary rescue aid included the foliage penetrating flare, the RT-10 radio, personal locator beacon, strobe light, and the sea marker dye.

A review of helmet retention/loss in the combat environment was accomplished to provide a comparison with helmet retention/loss in noncombat open seat USAF ejections during the five-year period 1963 through 1967. During this five-year period, the loss rate was 14.7 per cent. Although the helmet loss rate was significantly higher in the combat environment—25.6 per cent—analysis of losses substantiated the findings of the five-year study; namely,

• The most frequently reported and observed direction of helmet loss was from the back to the front of the head.

• Within the ejection envelope, airspeed at time of ejection has little relation to the frequency of helmet loss.

• Unacceptable helmet loss due to angular motions will continue to occur unless positive posterior fixation is provided.

Equipment failures were noted on survival kits, the survival radio, and the personal locator beacon. In those cases involving failure of the survival radio, the backup radio was utilized, resulting in a successful recovery. Failures were not as prevalent on other life support equipment. Only one underarm life preserver malfunctioned and then only one bladder. Only one inflation problem was reported for the one-man life raft in the 63 times that survival kits were manually deployed. Two duds were reported on the foliage penetrating flare; however, both fired on second attempt.

This evaluation disclosed some additional interesting findings, the most important of which were:

• None of the medication in the Tropical First Aid Kit was used; however, the mosquito net was used three times to great advantage.

• Water was consumed in all but one instance on overland ejections when survival time exceeded 30 minutes.

• No fires were made.

• No foraging for food was attempted.

• No shelters were constructed.

• With exception of the life raft, 98 per cent of the crewmembers utilized only the survival vest components.

• The survival kit, survival kit components, and parachute were left behind in all tree-overland ejections.

• Survival kits were not deployed when tree landing appeared imminent.

• Thirteen per cent of the survivors said severe oscillation occurred after survival kit deployment. ★

the I.P.I.S. *approach*

By the USAF Instrument Pilot Instructor School, (ATC)) Randolph AFB, Texas

Q Assume that an aircraft is inbound to a VORTAC on the 040 radial. The air traffic controller instructs the aircraft to "orbit left on the 10 DME arc." Is the aircraft supposed to make a left 360-degree turn when reaching the 10 DME arc, or should the aircraft turn left and proceed on the 10 DME arc?

A Only the controller is certain what he means by "orbit left," and the pilot should ask the controller for more specific instruction. The controller probably wants the aircraft to intercept the arc from the 040 radial and proceed clockwise on the 10 DME arc. If this is the case, the controller should have cleared the aircraft "via the 10 mile arc southeast of Podunk VORTAC." The controller is required to use the eight cardinal points of the compass card to specify direction when giving arc interception instructions. Southeast and northwest are the only two cardinal points which could be used when the arc interception occurs from the 040 radial. The southeast direction given in the clearance means that the aircraft, upon reaching the 10 DME arc, should turn toward a southeasterly heading to place the bearing pointer on or near the 90-degree index (wing tip position). The use of a compass direction instead of terms such as left, right, clockwise and counterclockwise should prevent the pilot from misinterpreting arc interception instructions.

Q Many terminal approach procedures which use VORTAC navigational facilities are titled VORTAC instead of VOR or TACAN. What equipment must an aircraft have to fly these approaches?

A The equipment required will depend upon the individual approach procedure. The VORTAC designation means that radials of the VORTAC station depicted on the approach chart can be flown using TACAN or VOR aircraft equipment. If DME fixes or arcs form a portion of the approach, VOR equipped aircraft must also have DME. A VORTAC/ILS approach that does not depict TACAN minima would require a TACAN equipped aircraft to have an ILS receiver.

Q When the transition routes on the high altitude terminal charts are to the published holding fix instead of the initial approach (IAF), should the holding fix be the designated clearance limit fix on the DD Form 175, Military Flight Plan?

A No. Always file to the IAF. The transition routes are supposed to go to the IAF. Where the transition routes are not published to the IAF, the approach chart is in error. Report this error to the Base Operations Officer and to ACIC. The ACIC address and phone number are found under General Information in the front of the FLIP Terminal Instrument Approach Procedures books.

Q AFM 51-37, *Instrument Flying,* states: "The teardrop entry may be used at the pilot's discretion when entering the holding pattern from a heading conveniently aligned with a teardrop course." What is "conveniently aligned"?

A Whether the aircraft is conveniently aligned or not will depend upon the individual situation and is influenced by such factors as wind and TAS. In all instances, the aircraft may be considered conveniently aligned when the aircraft heading is within 45 degrees of the teardrop course at the holding fix.

Confusion may have arisen from the third question in the July 1969 IPIS Approach article. The question concerned radio failure in IFR conditions. For clarification, change the second paragraph in the answer to read: "One final note—if ATC has advised that a *higher* altitude may be expected in a further clearance, the expected altitude becomes the assigned altitude at the time or place included in the expected further clearance for the remainder of the flight." *See Preflight, inside front cover for corrections to IPIS Approach, August issue.* ★

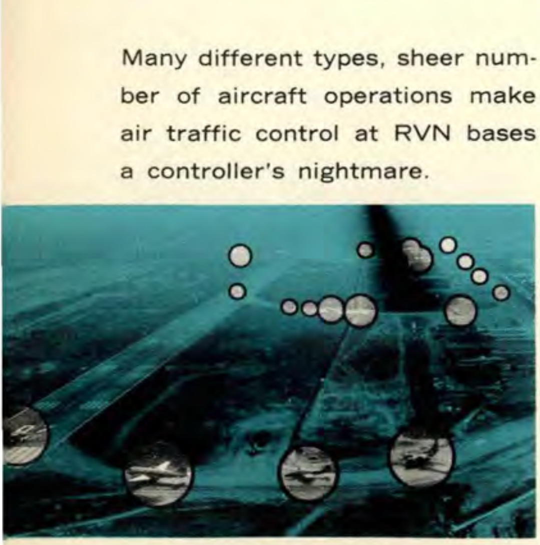
the air traffic control dilemma

CMSgt D. R. Tindell, ATC Superintendent, PACAF/DEF

This article by a senior air traffic controller deals with the delicate subject of pilot-controller relationship. The author presents the controller's view of this relation and offers suggestions for promoting flying safety through understanding and cooperation. Pilots surely won't agree with everything he says, but the article will provide pilots with insight into some of the controllers' problems.

At high-density traffic terminal areas in the United States, the air traffic control system is well organized and manned with professional FAA controllers who often remain at the same location for many years. The controller knows all the short cuts and peculiarities of the system and, most important, he knows when every aircraft will come under his control. This allows him time to adjust flight patterns, establish proper sequencing and inform each pilot of exactly what to expect. The pilot is then knowledgeable of existing conditions and can make realistic decisions concerning a course of action. Yet, despite the organized system and controller qualifications, large delays are encountered and constant efforts are required to improve the system's capability.

Many different types, sheer number of aircraft operations make air traffic control at RVN bases a controller's nightmare.



A comparison between the stateside air traffic control system and that of Southeast Asia (SEA) is a near impossibility. The number of aircraft controlled at busy airports in Southeast Asia equals or often exceeds that of the busiest stateside airports. The same rules apply. There, the similarity ends. Controllers arrive from well organized ATC facilities and are given only 60 to 90 days to learn the local area and procedures. They leave again just when they have really learned the system, nine to ten months later.

Tactical and airlift requirements dictate that missions depart and arrive from all directions without regard to a predetermined schedule or route. Fuel and mission considerations prohibit extensive holding on the ground or in the air. Environmental conditions are such that emergency recoveries are the rule rather than the exception. When a radar controller is already controlling what he thinks is the maximum number of aircraft he can safely handle, it is not unusual to hear phrases such as: "Approach Control, this is Podunk 3, a flight of four F-4s, 20 miles east, flight level 200, emergency fuel for landing. Request we be split into single-ship elements for recovery." By necessity, the controller is then subjected to overextending his individual capacity to satisfy mission requirements.

Other problems in Southeast Asia are overly congested frequencies, artillery fire areas, air strikes, monsoon weather conditions, and language difficulties which further complicate the system. Despite these problems, the controller is still expected to provide the same quality and degree of service expected from a stateside ATC facility—and rightly so. However, a controller working in this environment cannot be expected to perform functions not normally required of an ATC facility or coddle a pilot who does not understand basic ATC procedures and terminology or follow published procedures.

Examples of pilot expectations and complaints concerning ATC facility operation are highlighted in the Operational Hazard Reporting program. During 1968, pilots in the Western Pacific Area filed 148 operational hazard reports (OHRs) that were directed toward air traffic control procedures, controller actions or equipment performance. On the surface, this implies that a completely inadequate system exists; however, close analysis of these OHRs determined that only one-third were attributable to shortcom-

Control tower at Nha Trang. USAF and Vietnamese controllers share duties.

ings of ATC facilities. The remaining two-thirds were chargeable to items such as lack of pilot discipline, pilot unfamiliarity with standard ATC procedures and lack of pilot understanding concerning just what services are to be expected from the ATC facility. This OHR analysis emphatically indicates the most predominant ATC problem in Southeast Asia traffic control is a lack of pilot knowledge of basic air traffic control procedures and capabilities of the local ATC system. This has been recognized, and each newly assigned aircrew member is required to complete an indoctrination of the local environment prior to being assigned flying duties. This has not solved the problem; however, it has proved to be a step in the right direction.

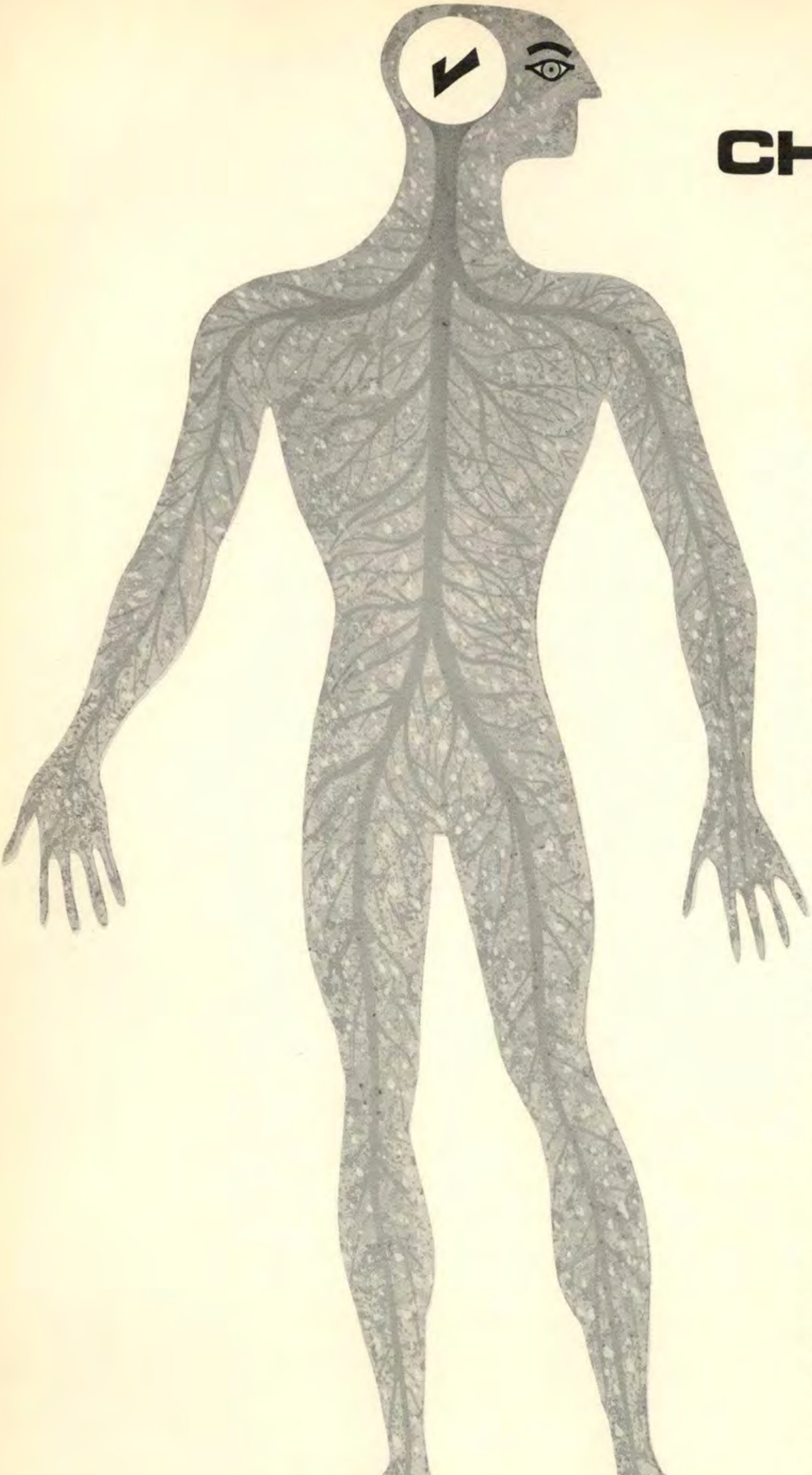
Air traffic control in Southeast Asia is still relatively young when compared to other systems operated by FAA and USAF throughout the United States and other overseas areas. Being young, it still has numerous problems that cannot be solved over night. Primarily, the approach control facilities are being operated with mobile equipment that simply was not designed to handle the volume of traffic experienced at some Southeast Asia locations. Headway is being made with fixed facilities and communications; however, considerable improvement is still required and has been programmed. The disorganized flow of tactical traffic arriving at high density terminals has been and is being relieved by the placement of air traffic controllers in GCI sites to insure that traffic organization is established prior to entry into the terminal area. This function is known as the Air Traffic Regulatory Center (ATRC) concept. Additional controllers have been placed in the busier facilities to activate more control positions and reduce the number of aircraft required to be handled by a single controller position.

Numerous other major projects, such as intensified controller training programs and selective placement of controllers based on previous experience have been initiated and are expected to improve future ATC facility effectiveness. Many more improvements are in the planning and implementation phases. However, no matter how modern and sophisticated the system becomes, until a satisfactory pilot-controller relationship can be achieved, with each trying to make the system work, a completely satisfactory operation cannot be realized. Each controller must thoroughly understand the pilot's requirements and needs and make every effort to satisfy them. By the same token, the pilot must be made intimately familiar with the system and facility capability. No matter how qualified the pilot or controller, either can cause the entire operation to fall apart.

Automation is a way of life these days; unfortunately, it hasn't permeated the air traffic control system to any degree as yet. We are still moving airplanes by a system that is based primarily on the reflexes of the human being; it is, as such, subject to human frailties. If humans are involved, mistakes will be made which, unfortunately, are sometimes deadly. Our only recourse is to constantly strive toward a professionalism that holds the human errors to a minimum. However, it is a two-way street. The pilot/controller team can function only if the flow of information between the two is thoroughly understood. To elaborate on this understanding: The pilot understands that the controller knows proper procedures for safely controlling aircraft; the controller understands that the pilot knows how to safely maneuver an aircraft; the pilot understands his responsibilities; the controller understands his responsibilities.

If there is a breakdown in these understandings, then hazards, incidents and accidents are highly probable. More than 20 years' experience is behind the regulations and directives published to promote safe air travel; yet this wealth of information is worthless unless it is in the brains of the pilot/controller team. Thus, the two-way street of pilot/controller understanding and trust must prevail for optimum performance of the air traffic control system. ★

(From PACAF Safety Bulletin, AFCS Flight Facilities Digest)



CHECKLIST

Col George E. Schafer, Surgeon, 7th Air Force

Good health is as much a part of a flight safety program as proper supervision, sound flight discipline and the avoidance of unnecessary risks. We *do* use prepared checklists for all critical phases of flight and we *do not* fly with certain systems malfunctions, but are we this careful when it concerns our own body systems functions? In many instances we are not. Yet the MAN is the most important part of the man-machine complex.

There is a tendency to avoid the services of the flight surgeon—particularly in regard to minor aches and pains. In many instances, this is acceptable but there comes a point in time when corrective action must be taken and the flight surgeon consulted. There is no clear cut answer; however, if we would standardize our thoughts concerning body functions as accurately and as detailed as we do aircraft systems we might get some clues. I am not talking of obvious diseases, but rather, the minor small complaints that might, in a cumulative sense, be of major concern.

How do we get to that point of major concern? Perhaps the easiest way is to develop a checklist for the body that considers the stresses of flight. Let's look at a possible checklist that might lead to the advice of a flight surgeon. Remember that you don't need a certain number of minuses before seeking expert advice, but for those who would "rather do it themselves," there is a point in

FOR THE MAN

time where you *must seek additional help!* The following checklist will help identify that point.

✔ SLEEP. Adequate sleep can vary from one individual to the next. Some need six hours of sleep while others may require eight or more. In either case, we know when sleep has been inadequate. Lack of proper rest can do several things. It can prevent maximum alertness and increase reaction time where fractions of seconds may be critical. Some loss of sleep may not in itself lead to impairment but can in a cumulative way be significant when combined with other areas in the checklist.

✔ TOBACCO. We have been beleaguered by the greatest anti-tobacco campaign in history. Few will refute the statistical significance of smoking and its causal relationship to certain diseases. We shouldn't smoke but many of us do. In the acute sense, a moderate smoker will have a reduced oxygen saturation of the blood. Some of this reduction is the result of carbon monoxide inhalation which uses oxygen storage availability within the blood. Consequently, we have a reduced tolerance to a minor lack of oxygen. In addition, this small reduction in blood oxygen saturation does have a perceptible influence on night vision. Consequently the type mission involved may make tobacco a significant item on the checklist.

✔ PHYSICAL FITNESS. Although space does not permit a concise definition of this item, we are generally aware of fitness. Good physical fitness increases our ability to utilize oxygen and gain the air that we need under stress. In addition, we increase our ability to withstand some of the gravitational stresses of flight. Again, the lack of peak physical fitness may not in itself impair your ability but combined with other checklist items could cause concern.

✔ ALCOHOL CONSUMPTION. Acute excesses are readily realized. The agony of a hangover is obvious. Alcohol does not mix with flying even if the mission occurred 12 to 15 hours after consumption. This may be minimal but remember that circulating alcohol means that certain cells in the body, especially brain cells, are prevented by a toxic action from utilizing the body fuel. So under certain flight conditions a check mark might ring a bell as to the seriousness of moderate alcohol consumption. Or an accumulation of several points on the checklist plus this item might indicate that all systems are not "go" and that the red light is on.

✔ SELF-MEDICATION. In these days of readily available drugs, it is estimated that 90 per cent of the population consumes some form or other. Let's look at one of the most common and least suspect—aspirin. Aspirin is a good, relatively harmless drug which may overcome multiple symptoms but never cures the underlying disorder. Like many forms of self-medication, aspirin, if taken in sufficient quantity, reduces the oxygen carrying capacity of the blood. Although this reduction is minimal, it may be significant if added to other items on the checklist. The best rule of thumb is to avoid self-medication and seek the advice of your flight surgeon.

✔ ADEQUATE DIET. Three well rounded meals a day is the best routine for anyone. Some of us may skip certain meals and get away with it but the proper functioning of all body systems demands a balanced diet. Add this to the list and become concerned if there are several other check marks on your list.

Our checklist could go on to include you as an individual or the specific mission and requirements of your job. I don't intend that this be a complete checklist but I do want to impart the philosophy that you and your body are the most important part of the weapons system. It is expected that you treat yourself with as much importance as you expect your aircraft to be treated, prepared, or modified for any specific flight. Seek out your flight surgeon for advice and use a CHECKLIST FOR THE MAN. ★

(Combat Safety, 7th AF)

Emergency Egress Training...

The Zilch Family

Mr Zilch used to be what probably could best be described as a nasty old man, in cartoons appearing in *Esquire* magazine. The name took hold and became a part of the language. Now there is a whole family of Zilches dedicated to helping pilots perfect their escape techniques from stricken aircraft.

These Zilches are names given several training devices built and used by the 140 Tactical Fighter Group of the Colorado Air National Guard at Buckley ANG base at Denver. What makes them remarkable and worth an article here is the ingenuity and dedication of the men who operate them and the degree of pilot acceptance.

The Zilch family consists of Zilch 13, an F-100C simulator; -15, a rig for simulating a pilot being dragged by his parachute; -16, an ejection seat and egress trainer; -17, a salvaged F-100D fuselage; -18, a parachute trainer rigged on a 30 foot tower.

The motivating force behind the construction, maintenance and operation of these devices is SMSgt Tom Linam, NCOIC of the simulator section, and he has the enthusiastic support of the commander, Lt Col Robert C. Cherry.

Linam is not very modest about describing the program — in fact, he's a super salesman—but he believes in sharing the credit with the technicians he supervises as well as the maintenance and supply people who have consistently given their full support.

The description of the program that follows is for the benefit of fighter outfits who are seeking ways to upgrade their egress training programs. It should be kept in mind that this is an ANG unit and there are several differences between it and a regular Air Force outfit.

The 140 TFG emergency egress training program is run by the simulator people and started with an old F-86L simulator which they converted to the F-100C configuration. In addition to the things usually

Instructor's simulator control panel contains nearly 40 modifications. Simulator is used for emergency procedures trainer as well as for instrument training.

COCKPIT INDICATOR AND FAILURE PANELS

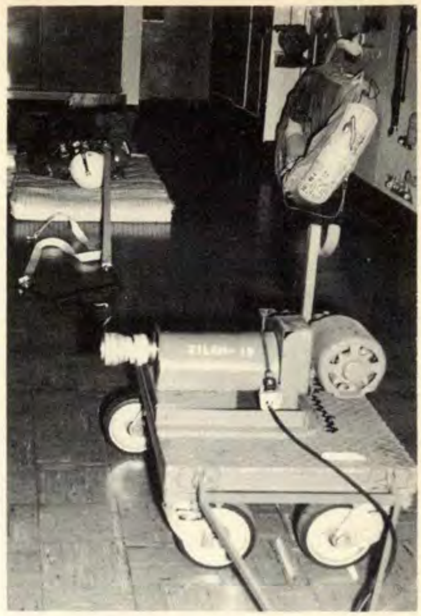
PANEL NUMBER ONE

Ram Air Pressure Off Indicator*
Emergency Ram Indicator*
2.75 PSI Indicator*
5.00 PSI Indicator*
Windshield Anti-Ice Indicator*
Emergency SIF Indicator*
Emergency IFF Indicator*
Oxygen 100% Indicator*
Emergency Oxygen Indicator*
Forward Fuselage Tank Adjustment (To Simulate Fuel Transfer Fail)
Anti-Skid Indicator (on or off)*
Bail-Out Bottle Indicator*
Chute Lanyard Indicator*
Head Rest Indicator*
Stirrups (Foot) Indicator*
Tail Hook Down Indicator*
Tail Hook Reset Switch
Oil Pressure Adjustment
Oil Pressure Failure (Zero)
Engine Oil Overheat Light
Engine Pressure Ratio Adjustment
Ram Air Turbine Lever Indicator*
Speed Brake Dump Lever Indicator*
Circuit Breaker Failure (Landing Gear Position Control, Engine Ignition Control Circuit Breakers).
MM-3, Gyro Drift With No Off Flag
Oil Smoke or Hydraulic Smoke
Electrical Smoke

PANEL NUMBER TWO

Throttle Linkage Failure
Engine Seizure
Emergency Brake Pump Failure
Cycling Gear
Canopy Unsafe Switch

NOTE: Items marked with (*) indicate cockpit components where Micro-switches have been installed. When the pilot activates these switches the instructor receives an illuminated light indication in the control room.



Thumper drags pilot lying on mattress with series of jerks that simulates dragging by parachute canopy.

Ejection seat trainer is a replica of an F-100C cockpit. It is used to train pilots, rescue personnel and maintenance people.

found in such equipment, Linam added some features of his own and incorporated others suggested by the pilots. For example, the pilot can be given an emergency in which the only recourse is ejection. Micro switches tell the operator whether the pilot assumed the best ejection posture—feet in the stirrups, head against the head rest—and whether he accomplished all the necessary steps.

In addition to Linam, SSgt James R. Sanford, SSgt Edward Moore, and A1C Ronald Germano maintain the simulator—Zilch 13—and have made most of the modifications themselves.

In the same room are a couple of other Zilches:

Zilch 16, the ejection seat and egress trainer. About 10 people had a hand in designing and building this trainer, which is a replica of an F-100C cockpit mounted on wheels. It is used to train pilots, firemen, and maintenance egress specialists in the location and operation of essential items in the egress system.

Zilch 15, better known as "Thumper," consists of a mattress—yes, a mattress—and a motor driven offset winch. Pilots, wearing all their flight gear, lie down on their backs on the mattress and a cable from the winch is hooked to their parachute harness. The motor is started and begins winding up the cable which pulls the mattress and pilot across the floor. The offset, or eccentric, winch causes an uneven, jerking motion to simulate an actual parachute dragging. The objective is to train pilots in getting to the quick release without delay.

The two newest pieces of equipment are the salvaged fuselage, Zilch 17, and the parachute tower, Zilch 18.

Zilch 17 has proved to be the most important item for ground emergency egress training. The landing gear was removed for safety reasons—who wants to fall about nine feet? Otherwise, it is identical to the real thing. It is used to train pilots, firemen, egress technicians, air police and mobile control officers in rescue techniques.

While many Air Force units require pilots to practice emergency ground escapes in the aircraft, there is the possibility of a nasty fall if the sequence takes the pilot all the way to the ground. The salvaged fuselage, sans gear, permits the full sequence without the danger of a fall.

The pilot, wearing the equipment he normally wears in flight, straps

Salvaged F-100 fuselage provides egress and rescue training. Fireman wearing protective gear practices opening canopy. Pilot removal technique calls for rescuer to stand on rails behind seat, pull pilot's feet into the stirrups and lift him from seat.

in and the canopy is closed. At a given signal he accomplishes an emergency escape.

The goal, with the pilot blindfolded, is an escape in 12 seconds. Most of the 140th jocks make it in eight to nine seconds.

Pilots, rendered unconscious in some way, have died in the cockpit of aircraft on the ground as the aftermath of a crash and fire on takeoff or landing. Usually in such emergencies the time required for rescue is critical. The rescue method for the F-100 has been for the rescuer to open the canopy, straddle the windscreen and pull the pilot out of the seat for handoff to someone else on the ground.

This method has several drawbacks. For one thing, the rescuer is in a very awkward and somewhat precarious position. Study of the problem led to a different procedure. The rescuer opens the canopy (manually or electrically) and inerts the ejection seat. He then crawls into the cockpit behind the pilot, placing his feet on the rails. The curvature of the canopy allows ample movement. As shown in the photos above, the rescuer grasps the pilot's flight suit legs and pulls his feet into the stirrups so that they won't hang up on the instrument panel. He then lifts the pilot straight up by placing his hands under his arms or by using the parachute harness straps. This method has been consistently easier and faster than the other method.

The remaining piece of equipment is Zilch 18, a parachute trainer. Suspended from a 30-foot steel tower, the suspension lines and risers are proportional to those of a fully open parachute. Pilots practice deploying the survival kit, both with the lanyard and manually, simulating a failure of the release mechanism, and practicing the four-line cut.

For water survival and rescue the Group uses a nearby lake, where pilots are subjected to simulated parachute landings in water and are dragged behind a motor boat to practice canopy release and other water survival techniques.

The 140th returned in the spring from a year of active duty and everybody has been busy settling back into the home base routine. One of the things the pilots said they missed was the frequent emergency escape practice in the realistic manner available at home (the Group did not deploy as a unit, although the F-100 squadron did, and its people were assigned to several different locations and flew several different type aircraft).

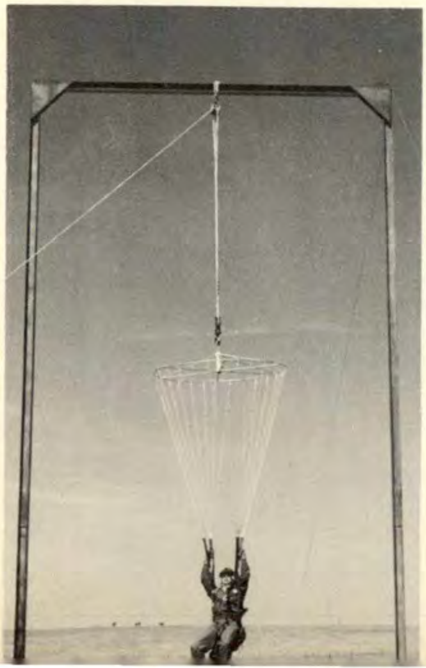
According to Lt Col Cherry, Sgt Linam and several pilots, the success of the emergency training is due to both the equipment and the attitude of the trainers. No pressure is applied and the simulator people are careful not to criticize pilot performance. Their attitude is that the pilot knows how well he performed during a practice session and that is motivation enough.

Consequently, the pilots drop in frequently for a few minutes practice and a cup of coffee with the simulator types. This makes for close association and mutual respect.

Pilot proficiency is reflected on a training status board where each man's latest time for an emergency egress is indicated. The payoff might be a life when the real thing occurs. ★

Wearing equipment he would wear on overwater flight, pilot gets ducking during water survival training.

Parachute trainer with suspension lines and risers proportional to those of a fully opened parachute.



Practice in boarding raft. Water survival is practiced at lake near Buckley ANG base, Colorado.

REX RILEY'S CROSS COUNTRY NOTES

HYDROPLANING. With autumn coming up and winter right behind, we can anticipate wet runways frequently in much of the nation, with ice following not far behind. Abroad these conditions will become chronic at many bases. So we have to think about hydroplaning.

Research has proved that coarse runway surfaces or grooved surfaces increase braking efficiency for wet runways. Grooving practically eliminates hydroplaning. However, there isn't an abundance of grooved runways. Where there aren't grooves, caution must be used by both pilots and ops if the runway has recently been resurfaced and/or sealed. A seal coat can cause a runway to resemble a solid sheet of ice with only a thin film of water on the surface.

To their sorrow, a T-39 crew discovered this when their bird made like a bobsled going down the chute at San Moritz—or wherever it is that they go after bobsledding records. The T-39 slid off the end of a 5900 foot runway and traveled another 453 feet before stopping against an embankment. Braking action was just about zero.

This crew was the victim of viscous hydroplaning and the tires showed evidence of rubber reversion. The aggregate runway had recently been seal coated and, following a rain, a thin film of water remained on the surface. An RCR, computed later, indicated that the aircraft should have been easily stopped. This caused the accident board to question the validity of RCR readings. The primary cause was miscellaneous unsafe conditions . . . hydroplaning.

GAGES AND LIGHTS in the cockpit are to the pilot the equivalent of signs on the freeway to a driver. If either one ignores or misreads the signs he can be in serious trouble. Most pilots use their gages and lights intelligently but occasionally someone ignores or misinterprets them—especially during an emergency. This apparently was the case when a pilot, not monitoring engine instruments and warning devices, failed to correctly diagnose an emergency and an aircraft was destroyed.

Another case involved an aircraft in which a fire warning light illuminated during takeoff roll and the takeoff was aborted. Then the light went out. The pilot taxied back to the maintenance area, but didn't shut down the engines and taxied back to the active for another try.

Same story—chapter two. Again he aborted and the light went out. This time he taxied back and changed aircraft. But the first aircraft was left with severely overheated brakes.

The fire warning light was trying to tell the pilot that there was a failure of the exhaust pipe support system.

In an emergency, lights and gages may be the only indicators a pilot has to warn him of trouble. One mark of the pro is that he uses all indicators to diagnose problems and take corrective action.

SIMULTANEOUS, BUT UNRELATED FAILURES in a single aircraft system are not frequent occurrences. But when they do occur we often find the pilot could have avoided some of his grief had he treated the first indication of trouble with a little more urgency.

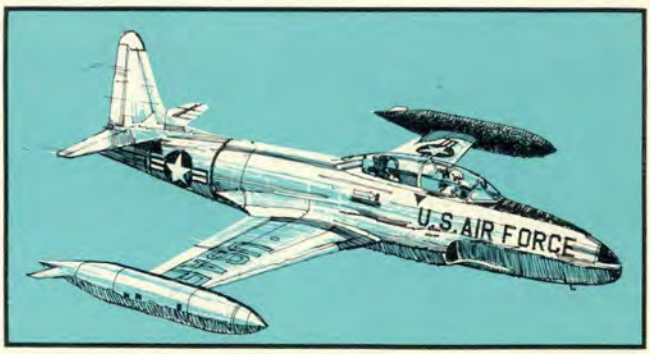
Case In Point: T-bird pilot up in the cold country noticed he had a down-and-locked indication of the left main roller as he passed 20,000 feet after takeoff. He cycled the gear, but the selsyn remained D & L. Finding a friendly ground site along his route, he descended and learned from a visual check (with binoculars) that all gear were in the wells and doors were closed. That was confirmation enough for him that the trouble was with the indicating system, not the gear. He continued with the mission.

Arriving over home base after 1 + 50 of flight, he asked tower to check his gear down—a good idea since he knew his left gear indicator was defective. Particularly good in this case, since tower reported the troublesome left gear extended only 30 degrees. Three recycles and the emergency extension system had no effect. With 40 gallons of fuel remaining, he raised all three gear and landed on the chaff tanks (which he just happened to have hanging from the wings).

The crash-rescue folks had time to lay only 800 feet of foam on an inactive runway, but happily the airplane came to a stop with only very minor damage. No fire broke out when he stopcocked the engine.

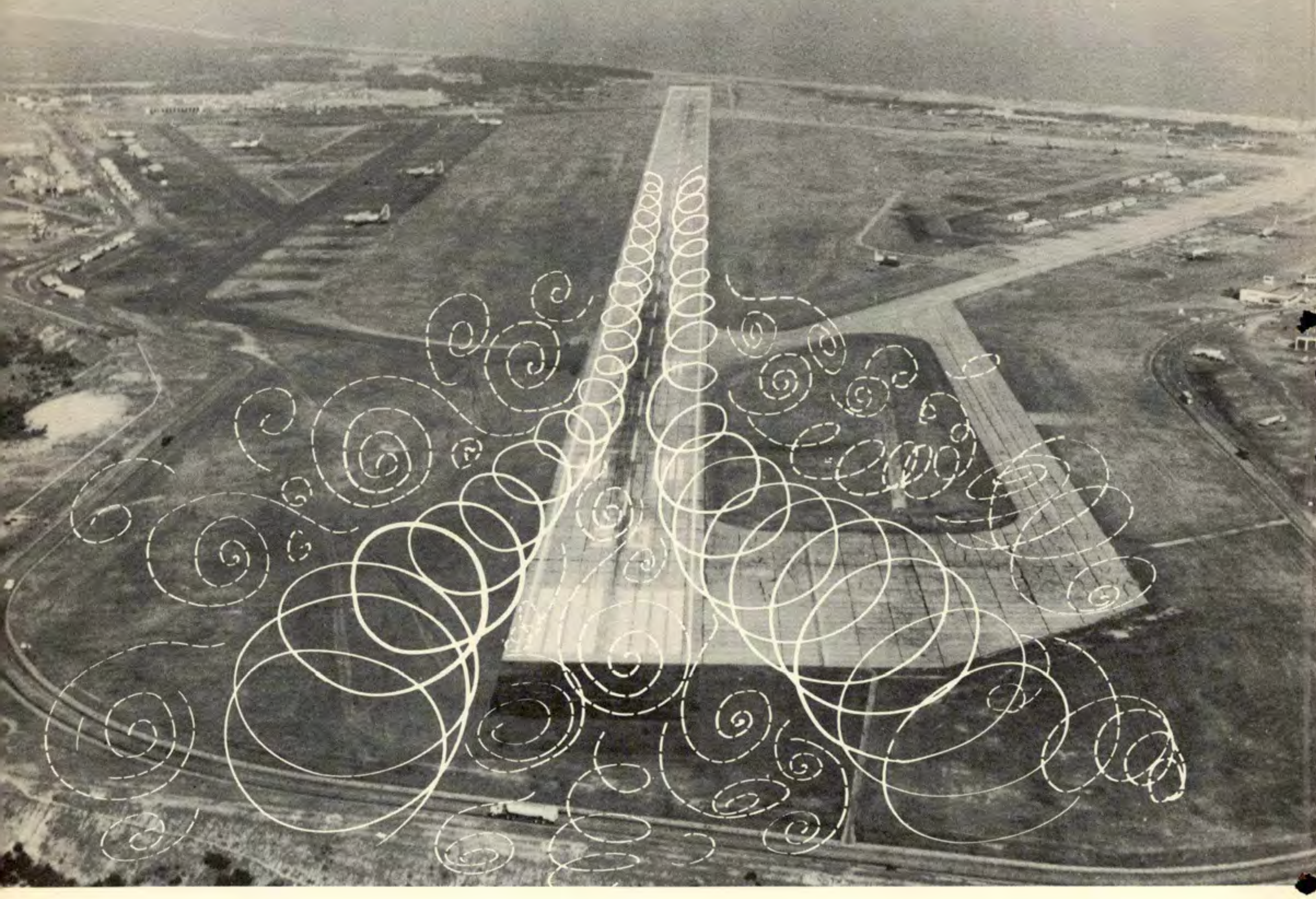
At the risk of being accused of the old Monday-morning routine, let's say that it's right smart technique to return to the base immediately when you encounter any malfunction in a critical aircraft system.

The two malfunctions were completely unrelated. A maladjusted linkage caused the left main gear microswitch to stick, and contamination in the hydraulic lines kept the gear from extending. Returning earlier, when he first noticed the gear down indication, would not have prevented the more serious extension problem. But it would have allowed more time to study the problem, spread foam, and prepare for the emergency landing.



THE SKY IS FALLING. Seems like there have been quite a few reports lately of items falling off aircraft in flight. These range from access panels to antennae to navigators' bubbles. Some of this may be due to the age of some of our birds, some to fair wear and tear. Carelessness probably is responsible for some of these. In any event, closer inspection during preflight undoubtedly can prevent many of these incidents, as will insistence on the part of crew chiefs and maintenance supervisors that hatches and inspection doors be double checked after being opened to make sure they are properly secured. ★

WAKE TURBULENCE:



The pilot population, both military and civil, has been pretty well educated on wake turbulence during the past few years by aviation publications. The reason for concentration on the subject was recognition of the true nature of wake turbulence as revealed by FAA and military studies.

For probably 50 years pilots were well aware of what was called prop wash and nearly every aviator can spin his own hairy stories about this vicious phenomenon. But jets don't have propellers, so where was that horrendous turbulence behind jet aircraft coming from? Research showed that most of this turbulence resulted from the wings generating lift and it appeared in the form of vortices in the wake of the aircraft.

Most articles on the subject have dealt with the problems pilots encounter when flying into this invisible trap—the major difficulties occurring during landing and takeoff, particularly during takeoff. That is where many pilots got into trouble, when they flew into turbulence left by a prior departure. Also much stress has been placed on the hazards of flying into the wake from behind or across it during cruise.

All of these situations can be extremely hazardous depending on the circumstances. Any fighter pilot can tell you, however, that problems occur during formation landings when the wingman falls behind his lead and gets tangled up in his wake. How frequently this happens is anybody's guess, but it is certainly not good formation technique.

While the problem exists, pilots recognize the hazards and consider

THE LAST HALF MILE

it as an inherent part of the business. Sometimes, of course, one gets a bit careless and allows his aircraft to fly into another's wake on short final for landing. While uncomfortable and adrenalin-producing, this need not result in an accident. If he recognizes the problem and takes prompt corrective action, he may not even recall the incident later.

But sometimes, when conditions are just right, an accident occurs. There were approximately 10 of these during a recent five year period. An average of two accidents a year may not have much impact on the overall accident rate, but you can bet there was an impact on the crews of these aircraft.

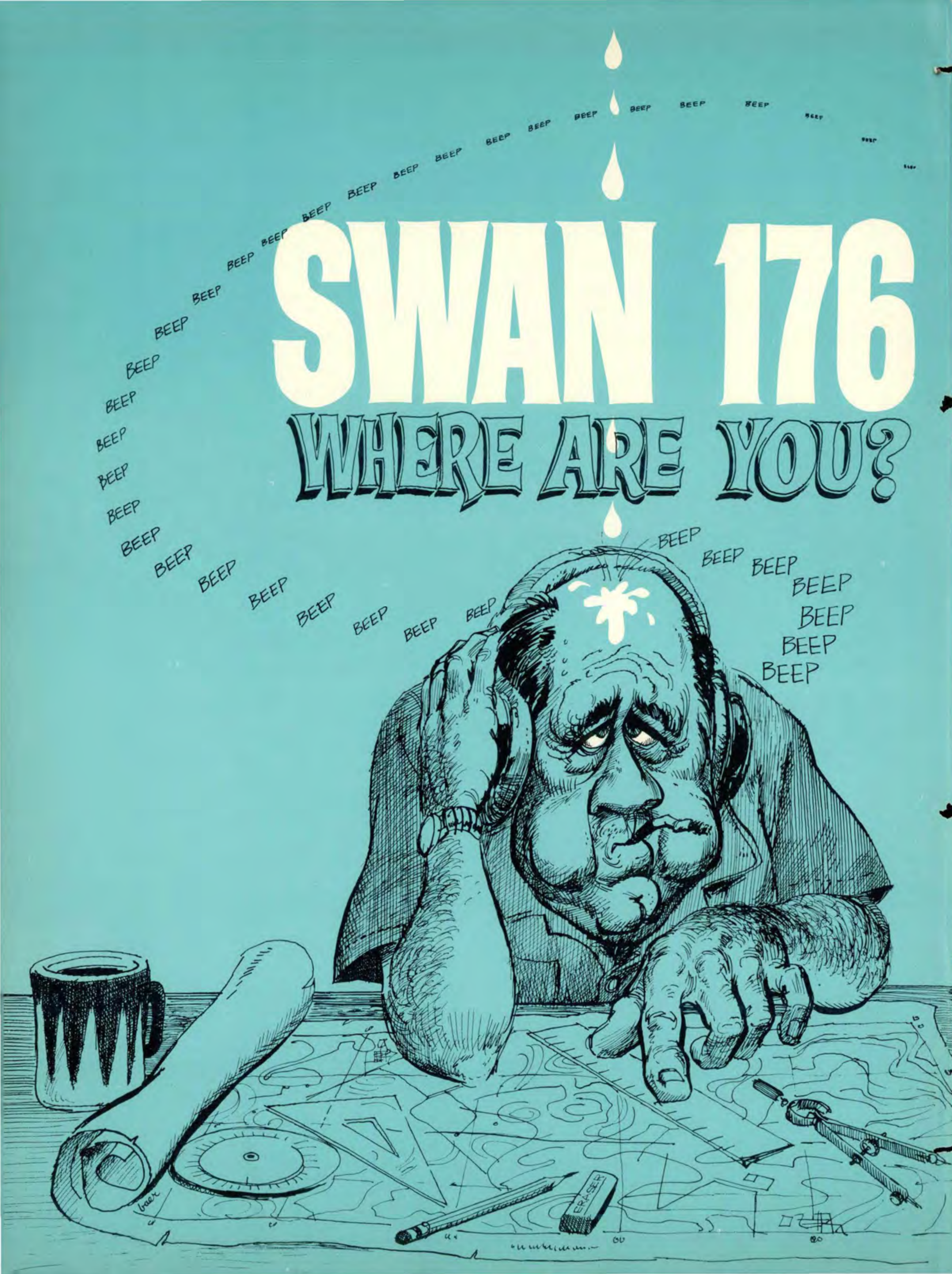
In perspective it seems that pilots are doing a very respectable job of handling the wake turbulence they encounter during landing. But there are those times, infrequent though they are, when the pilot is in trouble with a sick aircraft. He may have his hands full just nursing the bird to the runway. Wake turbulence from a preceding aircraft may then become the proverbial straw, and it's the pilot's back that is broken.

There aren't any pat answers to these situations, but there is some general guidance available, based on experience. It may seem trite to say it, but adequate spacing will prevent loss of control induced by wake turbulence. If, with a healthy bird, you find yourself too close to the one landing in front of you, slow down (usually won't do much good) or break out and re-enter (recommended). When you're in a no-go-around situation with a sick bird, or even one that's mildly ill, and the fellow in front of you is too close, explain your situation and ask *him* to go around.

Mobile control officers and tower personnel can prevent the kind of accidents we are talking about by their actions—the mobile officer by his general surveillance of the pattern, and tower controllers by anticipating the problem and spacing an ailing aircraft to avoid another aircraft's wake. This should be done early enough to prevent the aircraft ahead from leaving its vortices in the path of the pilot trying to get his ailing aircraft safely on the runway.

In this circumstance the last half mile is critical and everything that can be done should be done to help the pilot. ★

Turbulence caused by whirling vortices in wake of large aircraft can be disastrous to aircraft that fly into wake, especially at low levels where recovery time is critical.


SWAN 176
WHERE ARE YOU?
BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP
BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP BEEP
BEEP BEEP BEEP BEEP BEEP BEEP BEEP
ERASER

During the fall bird migration the pattern of encounters between birds and aircraft can be expected to change. Millions of birds, some quite large, are on the move and, as this article from the Air Canada Grapevine *indicates, their flight paths are unpredictable. This is a description of an experiment conducted last spring that pilots should find interesting, informative and a bit scary.*

Some time ago, we had a note in this bulletin concerning attempts to track whistling swans by dyeing them a deep purple, and hopefully, persuading some of them to carry transponders.

The dyeing program came off in fine shape but, unfortunately, there was some delay in developing suitable transponders (payload problems). Although there was good response from the biologists and the birdwatchers, the story was far from complete—it is pretty hard to see a purple swan on a dark night.

But this year, "ONE-SEVEN-SIX" and 21 of his friends are packing VHF transmitters.

To recap a bit, over half the North American whistling swans have their winter quarters on the estuaries of Chesapeake Bay and Currituck Sound in Maryland, Virginia, and North Carolina. Judging by the latest count, the population is increasing rapidly and on Chesapeake Bay alone, they now number something like 52,000 birds (25,000 in 1962).

An eight foot, 20 pound whistler is a formidable bogie. A closing speed of 250 knots, "12 o'clock, your altitude" means you have about a 370,000 pound force coming up. Are you still with me? Small wonder that they removed the tail from that Viscount back in 1962 and, on two occasions since, have ended up halfway down the cabin of Convair 340s, together with what was left of the windshield.

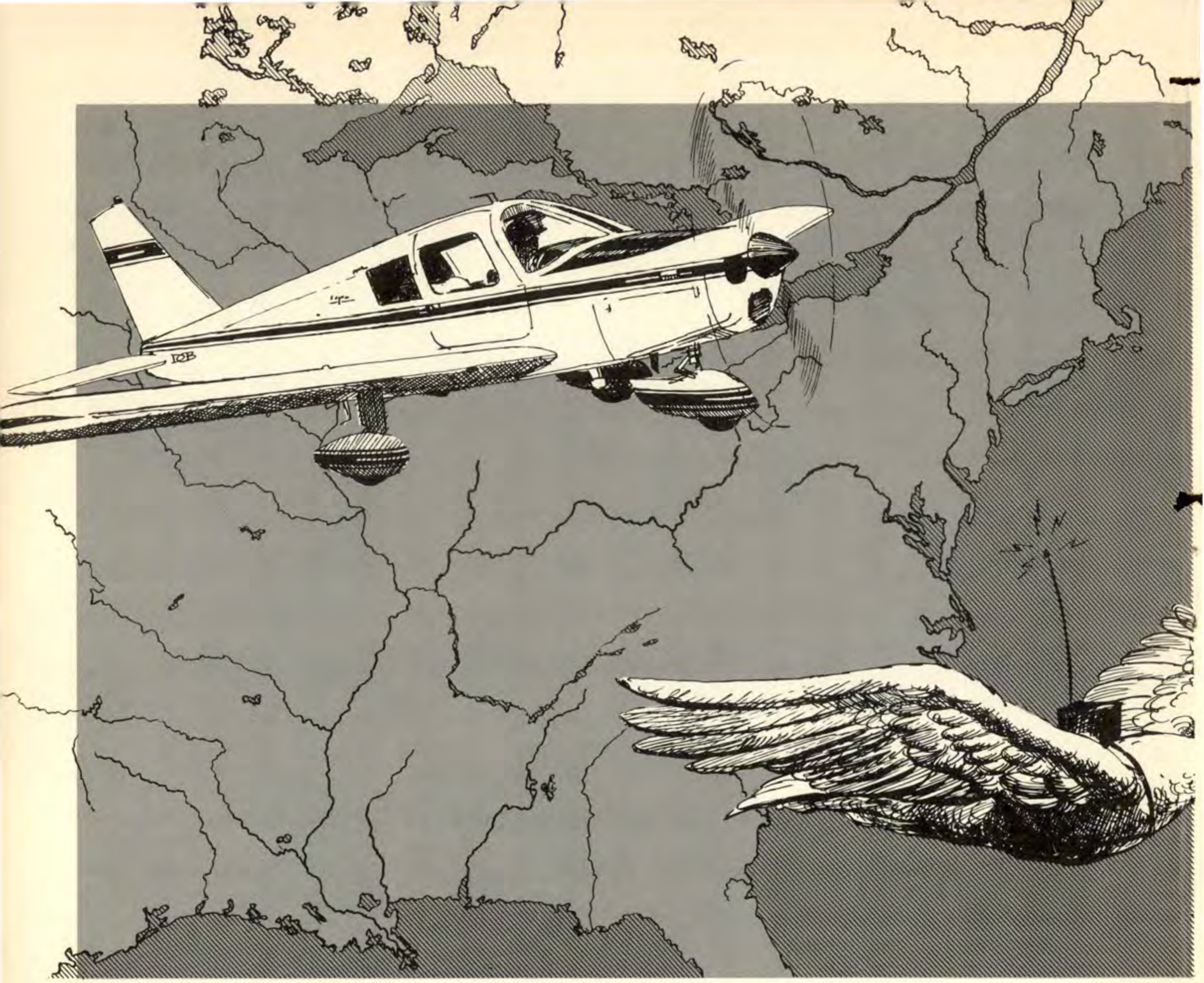
Many "experts" felt that there was no real hazard from the whistlers. After all, there weren't many; they usually flew day VFR cruising well below 3000 on a narrow track which did not greatly interfere with the established airways. It was a straight case of see-and-be-seen—the swan doesn't want to get hit any more than you want to hit him; the fact that the three incidents just mentioned were between 6000 and 8000 feet on day VFR was pure coincidence.

The track, by the way, was considered to be a narrow corridor up the Susquehanna to around Williamsport, Pa., over to Lake Erie, Lake St. Clair, up to Saginaw Bay, then Green Bay, across Wisconsin to Minnesota, North Dakota, and Montana where they fanned out in smaller groups, and headed north to the Arctic Ocean.

The Canadian Wildlife Service (CWS) was convinced this story was too pat. This year, they were able to enlarge on the "purple swan" gambit. They sponsored a predeparture program of marking the swans with a fairly elaborate color scheme. Each code designates a particular winter training area. Twenty-two of them are fitted with VHF transmitters, each assigned a separate frequency between 222.100 and 222.350 MHz, pushing out a beep signal of from 15 to about 180 pulses per minute. Six of the transmitters, including ONE - SEVEN - SIX's, are thermistor controlled—the warmer the OAT, the more beeps—which gives the biologists a rough idea as to how high they are (and when the swan goes to sleep, his head under his wing warms up the thermistor—they can tell when and how long he sacks out).

Many more biologists and observers are on the job this time, and the signals are being monitored by various ground and mobile stations, including about 15 light aircraft (but not all at once).

As this is written, the migration is not complete. But already, interesting angles are evident.



ONE-SEVEN-SIX (he is named after his assigned frequency of 222.176 MHz) left the upper end of Chesapeake Bay on March 26th at 1830. Sixteen minutes later, he and about 50 others were 17 miles out, at 2000 feet. At our latest report, he had just landed on Devil's Lake, ND, at 0500, on April 15th, having followed virtually a great circle route from Baltimore.

His first refueling stop was at Walpole Island, at the north end of Lake St. Clair. His second was on Lake Michigan where, perhaps with obstacle clearance and better minimums in mind, he first landed at 0300 some 30 miles off Ludington (pop. 9481) Michigan. Possibly too, he figured he would be some distance from his land based predators (DC-8s?). Having established a suitable landing area, the rest of his group followed him in until within an hour or so, there was a "raft" of many hundreds. At dawn, and with increased visibility, all flew visual to a suitable refueling and maintenance area just north of Ludington. So far, his stage lengths have been 300 to 540 miles, and time for refueling —four to 12 days. It is probable that much of the latter time was taken up waiting for favorable winds. He will refuse a headwind, although he *will* accept a fair crosswind component.

Approaching Buffalo at about 10,000 on his first leg, four and one-half hours out of Baltimore, he met a warm front, hit some extremely turbulent cu-nim, and went up on top. CWS biologist, Bill Banting, in a Cherokee, was bird-dogging the flight but didn't carry oxygen; besides fuel was running low, so he went in for a landing (real hairy, Bill says) at Buffalo International. An hour later the Cherokee was up again but ONE-SEVEN-SIX (transmitter range 60 miles) couldn't be

Light aircraft and ground stations tracked the transmitter-equipped swans. These 20-pound birds exceed 60 mph and frequently fly above 10,000 feet.

located. There was a visual report over Lake Ontario (that cross component again?), but he may have been on a best time course—he showed up at Walpole Island, 540 miles from takeoff right on schedule.

Block-to-block speed was a little over 60 mph—his normal average, as it turned out. His actual ground speed was between 65 and 70 mph.

It is probable that he was up to at least 13,000 feet while approaching Buffalo (quite a normal altitude), where he would be between cloud layers with at least a horizon reference. We're not sure yet as to his IFR capabilities, but his heading reference is excellent. Although he will fly day *or* night, most of his trip, so far, has been during darkness—perhaps he *does* prefer night flights (night pay?).

Perhaps a clue to this IFR business might be indicated by a flock which, a year ago, left the Bay just after dark, and over State College, Pa., at 0300, ran into a cold front. They let down making visual contact with the lights of the town, circled at about 300 feet for three hours until daylight, then hedge-hopped all the way back to Chesapeake Bay (long range cruise, no doubt). Three nights later, the front gone by, and a favorable wind aloft, they took off again and about dawn arrived near Kingsville, Ontario, at the western end of Lake Erie.

But to get back to ONE-SEVEN-SIX and his pals. Far from merely daubing a deep purple dye over some of them, over 200 of this year's crop can put our "flower people" to shame.

So, if you happened to see an orange-backed swan, with an orange left wing, or one with the lower half of his neck and his tail orange (orange because of its high visibility), etc. etc., or any of these plus black and/or orange rings painted around their necks, you can now talk about it. They *were* for real!!! Those with the multiple neck rings are radio equipped.

ONE - SEVEN - SIX is one of about 50 in his particular group. A few miles behind and off to one side, but staying visual with him, is another group, and behind that another, and another. All these groups combine to cover a front, at least a hundred miles wide.

Right about now, as the big groups head west, small wings are peeling off and heading in a generally northerly direction. For the next several weeks these will be crossing our airways, most of them probably between Winnipeg and Swift Current (others groups are moving up from Utah and California). They may be at any altitude (14,000 is easy), where the wind is generally from the south or southeast. But don't bank on it—they may have run into a headwind and are back tracking to the nearest "swanport" to wait it out.

There is still a lot to learn, and as the results come in, Dr. Bill Gunn (refer "Operation Bird Track" —July 1966 *Grapevine)* Dr. Vic Solman, Hans Blokpoel, Bill Banting, and many many others will be interpreting and assessing them.

And while we're passing out credits, the National Research Council's Associate Committee on Bird Hazards to Aircraft is the prime backer on this project. Also involved is Dr. Bill Slades of Johns Hopkins University, Baltimore, and his helpers who took on the job of dyeing over 200 swans (well tranquilized, using mated pairs where possible—the latter may have been unnecessary—it appears that only homo sapiens thinks in terms of color bars). Bill Cochran of the Illinois Natural History Survey built the transmitters (small fist size, encapsulated with mercury cells lasting from several months to a year—the trade-off is broadcast range—plus a little whip antenna, all harnessed on the swan's back).

So keep an eye open for ONE-SEVEN-SIX and his pals. And remember, if you see one, there are hundreds more within a few minutes range. Also, if you see one, please send me a tele at YULEGAC, advising time, altitude, weather and place. The Canadian Wildlife boys have spent a lot of time and money aimed at keeping those guided missiles out of your hair.

They'll be grateful for anything you can do to help. ★

(W. H. Bird,
Special Assignments Engineer)

BEHIND THE STRATUS LAYER

At any time of the year the weather, out where the wheat and tall corn grows, can be pretty violent. The frequent and sudden thunderstorms and tornados make this area suspect at all times. The weather in this mid-continent section, of about 14 states, from Canada to the Gulf, is like the little girl who "when she was good, was very, very good; but when she was bad, she was horrid."

A pilot and his crewman, departed MCAS Eastcoast enroute to MCAS Westcoast with a stop to refuel scheduled for a mid-continent airport operated by one of the armed services. It was not a spur of the moment type flight; nor was it a boondoggle. Considerable thought, study and planning had been spent getting ready, including a thorough rundown of emergency procedures. The purpose of the flight was twofold: to get the plane and crew out for phase training; and to deliver some spare parts, mail and pay checks to other squadron personnel already undergoing training.

The crew commenced briefing at 0830 for a 1030 departure. Everything proceeded on schedule until a last minute delay, caused by the line crew, in loading the aircraft. (This aircraft was being flown cross-country with the following gripes: deviation of 20 degrees between the MA-1 and standby compass on a southeast heading; radar and both Stab Aug and AFCS inoperative.—Ed.) However, an extension was received on the weather—excellent weather enroute with only a few scattered thunderstorms reported — and the flight departed about an hour and a half late. A "stop over" flight plan had been filed. After the pilot landed at his refueling stop he was directed to taxi to the hot-refueling area. The JP truck, accompanied by the MB-1, crash truck, awaited the aircraft and in short order had filled the tanks. The pilot called for clearance and even after one abort, due to a temporary high cockpit temperature, was airborne and on his way to MCAS Westcoast after only 28 minutes on the deck.

The pilot stated, "the previous weather enroute had been broken to overcast and we were on top at FL 310. One large thunderstorm was observed . . . and we diverted around it. As we approached our refueling stop the weather observed from high altitude appeared to be broken, gradually becoming scattered. The cloud coverage was mostly in stratus and cirrus layers and we observed very few cumulus buildups. Coming into our refueling stop, and looking in the general direction of where we would be departing, no significant weather was noted."

After takeoff the pilot cleaned up, established his climb and elected to fly on the gages as a matter of convenience rather than necessity. Yet, when queried by Mid-continent Center whether any weather was in sight the crewman replied, "Affirmative. Numerous thunderstorms are in sight." The pilot took his eyes off the gages, looked outside and noted they were in the clear between stratus layers and dismissed the report his crewman had made. Seconds later, "We entered another stratus layer at about 14,000 feet, climbing and began to receive moderate turbulence followed by heavy rain or hail. I considered making a left turn to get out of the weather but before I could start the turn the aircraft received two violent jolts. The force of the jolts seemed to be in the vertical plane and can best be described as a giant hammer striking the underside of the aircraft. The rate of roll and pitch of the plane was very rapid."

"I remember the crewman saying, 'There goes the gyro.' The turn needle was pegged to the right and despite all efforts I was unable to stop the turn. As the altimeter unwound toward 10,000 feet I told my crewman to eject and I followed him out."

The pilot and crewman never knew it but a Severe Weather Warning Area had been declared for the area in and around Mid-Continent Airport after they had departed MCAS Eastcoast. The various centers the pilot had communicated with, during the flight on the first leg, had not passed any weather information; neither had Mid-Continent Tower or Ground Control; and finally, since the pilot was on a "stop over" flight plan he had not left the plane and in this instance had not personally received an update on the weather.

As a result of this accident there are several things which we need to consider.

It wasn't too long ago that an aircraft leaving one coast for the other was carefully checked and all gripes worked off before it departed. Despite the fact that now one can

go coast to coast in four or five hours, good common sense would dictate all systems up; especially if the plane will be in an operational environment at destination for an extended period. In the "old" days a plane was automatically down prior to a cross-country hop if it had a bad gyro or turn and bank instrument. It would seem even more important now, with near sonic and supersonic flights, that the attitude instruments, radar and AFCS should be working properly. This was no bounce drill around the maypole at Homeplate. It was a flight of more than 2000 miles across water, mountains, desert and swamp.

Communications has always been a favorite whipping boy and this accident is no exception. It seems that the pilot was a victim of a breakdown in communications. A condition existed which was hazardous to flight on his route and he was never advised. Since the Air Route Traffic Control Centers (ARTCC) have their hands full directing the flow of traffic the blame cannot be laid at their doorstep. The pilot in this accident was not anywhere near Mid-Continent Center when the Severe Weather Warning Area was established. When he first checked in with Mid-Continent Center, perhaps the Center could have inquired if he had received the latest advisory but this didn't happen. As far as Mid-Continent Airport is concerned, where was the old what-can-we-do-for-you attitude? Certainly the tower or ground control should have passed along something as vital as a Severe Weather Warning Area since it was in their own back yard. Where's the hospitality that operations duty officers used to extend to transients? During the time that he was on the deck it's hard to understand why the pilot did not ask what the weather was like enroute and at destination.

Pilots used to be subject to unusual attitudes every time they turned around. In a single-seat fighter unusual attitudes can't be induced by someone else, but through practice in simulators, through review of spin and stall recoveries and in ready room discussions unusual attitudes can be a piece of cake.

One wonders if the same degree of attention and the same amount of time wouldn't be worthwhile with this generation of pilots and planes. In this accident a straightforward climb suddenly turned to a can of worms. The pilot had been on the gages; how did he so suddenly lose control? Perhaps there is a design problem trying to rear its ugly head; or perhaps there is a problem of instrumentation.

Who is responsible for staying clear of severe weather? The pilot in command! Double check the weather prior to departure and keep abreast, while airborne, by periodically checking with Metro.

The best procedure in thunderstorms is still a 180 but if you stumble into one, or if operational necessity dictates that you crack it, set up for best penetration and fly attitude, FLY ATTITUDE, *Fly attitude!* ★

(*Approach,* USN)

TO HELP YOU STOP

Maj Thomas F. Egan
and George Kammerer, SMAMA

Pilots and maintenance men share responsibility for proper drag chute installation. Here are a few words on the subject for F-100 drivers and maintainers.

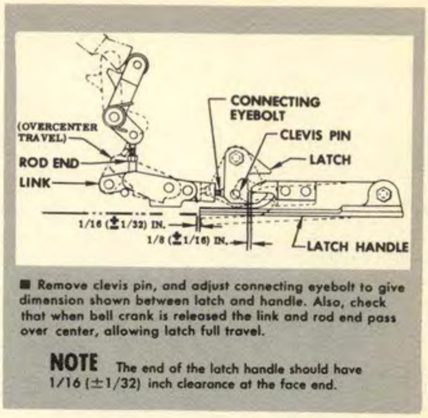
Innumerable times since the inception of the F-100, the lost drag chute has reared its ugly head. All the incidents occur about the same way. In flight, during climb or cruise, a slight jolt is felt; instruments are checked without any trouble indications. A wingman, if he is observant, may have noticed the drag chute leave the aircraft. Or upon landing, the pilot discovers that the drag chute is missing.

Postflight investigations of lost F-100 drag chutes during the last year indicate that an oft recurring cause factor is a bent drag chute door latch handle which prevented the locking mechanism from positioning properly and resulted in the loss of the chute. An upward bent latch handle depressing the latching mechanism can result in the system being halfway triggered. This is especially true if the over-center download spring in the drag chute door linkage is weak. Air loads, buffet, and other disturbances may then cause an inadvertent opening of the drag chute doors and loss of the chute.

How not to do it. With properly adjusted linkage and correctly packed and installed chute, doors close easily.

A few steps can be taken to prevent this type loss. The first step is to read the Tech Order 1F-100A-WC6-1PRPO, "Preflight-Basic Postflight Inspection Work Cards," which requires the inspection of the drag chute doors for adjustment, and the latch handle and linkage for excessive bends and wear prior to chute installation. Now the question is, what is an excessive bend? Since excessive is not definable, *any* bend should be questioned and the latch handle straightened or replaced. For best results, this straightening or replacement must be done before the flight, not after the chute is lost.

Now that we have determined that the latch and mechanism are OK, the next step is to install the chute. The important part of this step is to keep one's feet and excessive forces off the latch. Yes, it's easier to use the feet to close the doors and latch, especially when we formed the habit while we used the fat pack, or loose pack chute. However, now that we have the "hard pack" slimline type of drag chute, hand pressures can close and latch the doors. (This could be done with the "soft pack" drag chute if it was packed properly.) If one set of



Bent latch handle (left above) holds over-center plunger linkage in half-released position. Proper plunger position is shown in center photo. T. O. instructions, right, illustrate important step.

hands is not enough, get another man to help, but above all don't bend the latch handle. Brute strength and awkwardness have bent many a bird. If the chute is properly packed, the door linkage is properly rigged or adjusted IAW T.O. 1F-100D(I)-22, and proper procedures are used, such archaic methods are unnecessary.

The installation is now complete and the chute should stay in place till it's wanted for the slow down bit. Just to make sure pilots should also check the installation. Be certain that the latch handle is not bent, that it is flush with the fuselage, and that the plunger release button is not hung up and is also relatively flush.

Education of all chute installation personnel and F-100 drivers is the answer to the lost chute problem. Responsibility lies with commanders, supervisors, maintenance personnel, *and the pilot.* The F-100 drag chute system itself is actually pretty well perfected. All that remains is to indoctrinate the user. ★

Properly functioning drag chute is a necessity for some landings. Failure could mean an accident if conditions were just right.

MOUNTAINS DON'T MOVE. A C-119 on a day mission flew into a mountain in zero-zero weather, just 10 miles from departure base. Primary cause was pilot factor, although there were several contributing causes:

- Other crewmembers failed to correct faulty navigation.
- Materiel—inadequate radio aids, lack of VHF, inoperative IFF.

A KC-135 on night approach in mountainous terrain hit 1000 feet below crest of 7300 foot mountain 47 NM short of the airport. Primary cause: pilot factor. Contributing were:

- Materiel—intermittent operation of TACAN.
- Pilot used poor judgment in attempting to fly an airborne radar approach when other facilities were available for normal penetration and approach.
- Tech data relating to air traffic controllers' responsibilities were deficient.

An F-4C, one of 21 flying a low level, VFR Operational Readiness Evaluation, hit just 35 feet below top of a 5000 foot mountain. Cloud bases were variable 3000 to 4500 feet with tops at 6000. Visibility below clouds was three miles in haze. Primary cause: pilot factor, because he failed to maintain terrain clearance and overestimated his ability to navigate VFR in deteriorating weather.

These three fatal accidents occurred during a six week period last year. They cost the Air Force three aircraft and several crewmembers. Mountains don't move—aircraft must.

SPEED PERMITTING. How often have you had the tower operator tell you: "SPEED PERMITTING, turn right at the next taxiway?"

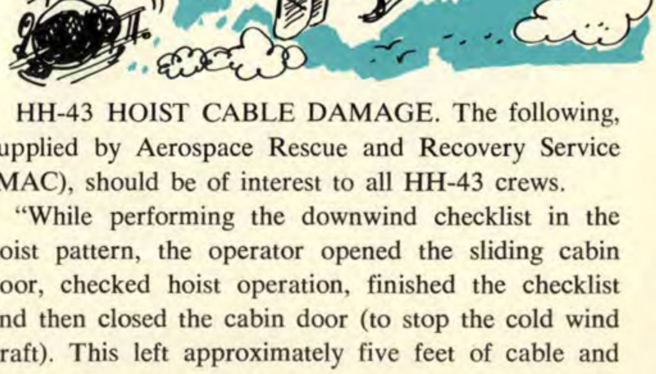
Sounds innocent enough, doesn't it? After all, the emphasis is on safety, it starts right out with "SPEED PERMITTING." But, what if speed doesn't permit? You know they want you to clear the runway or they wouldn't have called you. So you try to make the turn and POW—there goes a tire!

Now there are times when this "SPEED PERMITTING" can get even more out of hand. For example, if the traffic is heavy and they really want you to get off the runway, it can come out this way: "TURN RIGHT AT THE NEXT TAXIWAY, speed permitting." So you try to make the turn and wind up bounding through the boondocks!

The tower operator's intentions are good—he is trying to assist you and keep traffic flowing smoothly. Your intentions were also good when you blew the tire and ran out into the boondocks. Unfortunately, good intentions can lead you astray.

When you are asked to turn off, speed permitting, keep in mind that the controller is depending on YOUR good judgment . . . USE IT.

(From Maxwell & Gunter's Safety Bulletin)



HH-43 HOIST CABLE DAMAGE. The following, supplied by Aerospace Rescue and Recovery Service (MAC), should be of interest to all HH-43 crews.

"While performing the downwind checklist in the hoist pattern, the operator opened the sliding cabin door, checked hoist operation, finished the checklist and then closed the cabin door (to stop the cold wind draft). This left approximately five feet of cable and

the hoist cable hook inside the cabin; as a result, the sliding door was closed on the cable. The pinching action on the cable was not apparently great, but pinching will cause distortion in braid pattern which will effectively reduce the rated load capacity. This unsafe practice normally has occurred only during cold weather. One additional hazard arises from this situation; i.e., if the hoist is activated accidentally it could pull the sliding door off the aircraft."

PRESSING. The flight of two F-100s had delivered their bombs and were strafing a target under the direction of a FAC. Making low-angle attacks, they were pulling off over terrain that climbed gradually away at 12 o'clock from the target.

Flight lead planned to fire out his guns on the third strafe pass. But it took longer than he anticipated. His pullout was lower than he'd anticipated, too. Happily, he struck only the top of a tree, causing a tear in the fuselage skin and some sheet metal damage to the slab. He was able to fly it to a recovery base.

Others, caught below minimum pullout altitude for one reason or another have not been so fortunate. Whether you want to call it overzealousness, poor judgment (this guy had 500 hours in the bird), or target fixation—pressing pretty well covers the subject.

Pressing, as the result of a low roll-in, poor lineup and too many corrections, or a desire to deliver too much ordnance in one pass usually has a more basic cause factor called eagerness. That eagerness is just great—you couldn't do your job well without it. But to be good, and come back the next day to do more good, you must temper that eagerness with dive angles, airspeeds, and release altitudes that you dug out of the Dash 34.

A-1H ENGINE PROBLEM. The A-1H had been airborne for nearly two hours when the engine began to backfire. The pilot, thinking fuel starvation, switched to the main fuel tank, went to full rich and tried the primer. No luck, so he declared an emergency and turned toward the nearest suitable landing field. Then the engine smoothed out and the aircraft began climbing slowly; however, oil pressure was dropping. When the aircraft was 12 miles out the oil pressure dropped to 15 PSI, the sump light came on and the engine quit. Fortunately, the pilot had enough altitude and he did a sterling job of deadsticking onto the runway.

It turned out that Nr 7 jug was split from front to rear between the spark plug inserts. ★

Keesler AFB, LOUISIANA???

How much travel pay will I lose as a result of Keesler AFB having been moved to Louisiana? That is my next station. See your July issue, page 3, last line.

MSgt G. C. White
3 TFW, APO San Francisco 96227

ED. NOTE: Sgt White is referring to the credit line for the article "Fun and Your Boat" which read: Courtesy of Accent on Safety, Keesler AFB, LA. Our apologies to the State of Mississippi for moving Keesler AFB without permission.

AN ANTIQUE

Here are some identification plates I removed from a World War II crashed airplane. I think it was American. There are no human remains and the plane's wreckage is scattered over a wide area. The plane went down about 17 miles northwest of Pt. Moresby near the coast.

Thought it might be of interest for an Air Museum.

Pastor John Gwilliam
Konedobu, Papua
New Guinea

Thanks for your letter and the plates. We are sending them to the Air Museum at Wright-Patterson AFB, Ohio.

IMPROPER HOOK-UP

Let me add my congratulations and thanks for finding a fine group of beautiful girls to help educate the troops. The May back cover really hit home because of a recent fatality at this base where an improper hook-up was highly suspect.

The picture that you borrowed from the T-Bird depicts a situation which will make all the crew chiefs rather nervous, the pilot has strapped in with the armrests in a raised position.

Keep up the good work but try not to negate a whole month's work with a small slip up.

Maj Edwin H. Clark
Base Life Support Officer
Shaw AFB, SC

"DO YOU KNOW" Quiz

Regarding the "Do You Know" quiz which appeared in the June 69 *Aerospace Safety*: As the F-4 member of the 3AF Stan/Evan Division, I have taken the liberty of "nit-picking" the exam.

The answer to question 3 is not entirely correct without qualification. For example:

A Flight Examiner is in the rear seat of an F-4 giving a Flight Examiner check to another Flight Examiner in the front cockpit of the same aircraft who in turn is administering a flight check to another aircrew in a formation: In this case, both may log IP time. Ref: AFM 60-1, para 7-6.

Similarly, the answer to question 9 is not entirely correct:

When takeoff and landing stations are in different time zones, zulu time will be used to record flying time. Ref: T.O. 00-20-5, 10 Mar 68, change 1, 30 Apr 68, para 2-31.

Maj E. R. Grischkowsky
Hq 3AF
APO San Francisco 09125

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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.

Lt Col John R. Delmore
Aircraft Commander

Capt Joseph P. Donahue III
Pilot

Capt Robert M. Lake
Navigator

SSgt John K. McCall
Flight Engineer

21st Tactical Airlift Squadron, APO San Francisco 96235

Sgt James D. Chesser
Loadmaster

Colonel Delmore and his crew, flying a series of airlift sorties in a C-130, were diverted for a Tactical Emergency mission to Kham Duc, RVN. The mission was to evacuate friendly forces that were surrounded by several thousand enemy troops and in danger of being overrun. At Kham Duc numerous strike aircraft were laying down a heavy barrage along the airfield perimeter, and there was a destroyed helicopter occupying one side of the runway. These factors and heavy hostile anti-aircraft fire made landing an extremely hazardous operation. On final approach the C-130 received multiple hits. A heavy caliber shell ripped through the bottom of the flight deck and tore a large hole in the top of the fuselage. All four engines were hit and the aircraft started a roll to the left. With the interphone system knocked out, Colonel Delmore shouted to the copilot for help in leveling the wings. They made a crash landing on the runway after shutting down the engines and feathering the propellers approximately 100 feet in the air. Brakes were inoperative, nose wheel steering not available and there was no hydraulic power for operation of the control surfaces. Nevertheless, Colonel Delmore kept the aircraft going straight ahead until at about 35 knots it veered off the runway and stopped gently on a sand embankment. The crew evacuated the smoking aircraft and were airlifted to safety within minutes by Marine helicopter.

The extraordinary airmanship, courage and crew coordination exhibited by Colonel Delmore and crew under extreme stress resulted in landing a badly damaged aircraft without injury to any crewmember. WELL DONE!

12th Special Operations Squadron, APO San Francisco 96205

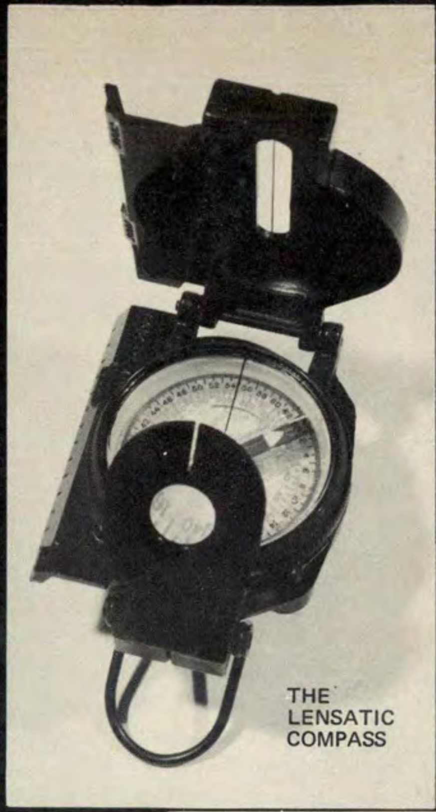
Maj Edward W. Ridgeway

Major Ridgeway was flying a defoliation mission in a C-123 over hostile terrain 35 miles northwest of Nha Trang AB, RVN. The target was a canyon road system flanked by two 4000 foot ridgelines. During a maximum rate descent to a spray altitude of 100 feet above the canyon floor, the Nr 2 engine of Major Ridgeway's aircraft backfired and burst into flame due to a cylinder separation. Because of the heavy weight of the aircraft, level flight could not be maintained with one engine feathered. The aircraft was now at 2500 feet, only 800 feet above the canyon floor. Major Ridgeway made the decision to keep the burning engine in operation as long as power could be maintained. The aircraft continued to descend as the defoliation load was being dumped. After the weight was sufficiently decreased, the burning engine was feathered, and the fire extinguished. Due to the extremely hostile environment, the aircraft was maneuvered at treetop level where it was less vulnerable to ground fire. The only escape route for the aircraft was through a narrow saddleback; an extreme wind shear was encountered causing severe turbulence and airspeed fluctuation between 85 and 115 knots. A very thin tolerance existed between altitude for terrain clearance and airspeed for aircraft control. Even under these adverse conditions, Major Ridgeway was able to maneuver his aircraft through the pass to a safe emergency landing at Nha Trang AB. Major Ridgeway's judgment and professional handling of an inflight emergency under severe combat conditions averted possible loss of a combat aircraft and personal injury to this crew. WELL DONE! ★

MISS LIFE SUPPORT SAYS . . . . .

I HAVE A DIRECT LINE

. . . . . for rescue with my radio and compass.



THE LENSATIC COMPASS

1. Sight in on the rescue craft, if possible, or on prominent local landmarks.
2. Holding the compass level and away from metal objects, take a reading of the bearings from them to you. This will be the number closest to your eye in the magnifying window (see photo above).
3. Transmit the bearings to the rescue craft plus corrections as needed.

Our thanks to pretty Miss Debbie Reynolds, (no kidding, that's her name) for being our Miss Life Support this month.

The lensatic compass has been a major factor in SEA aircrew rescues.