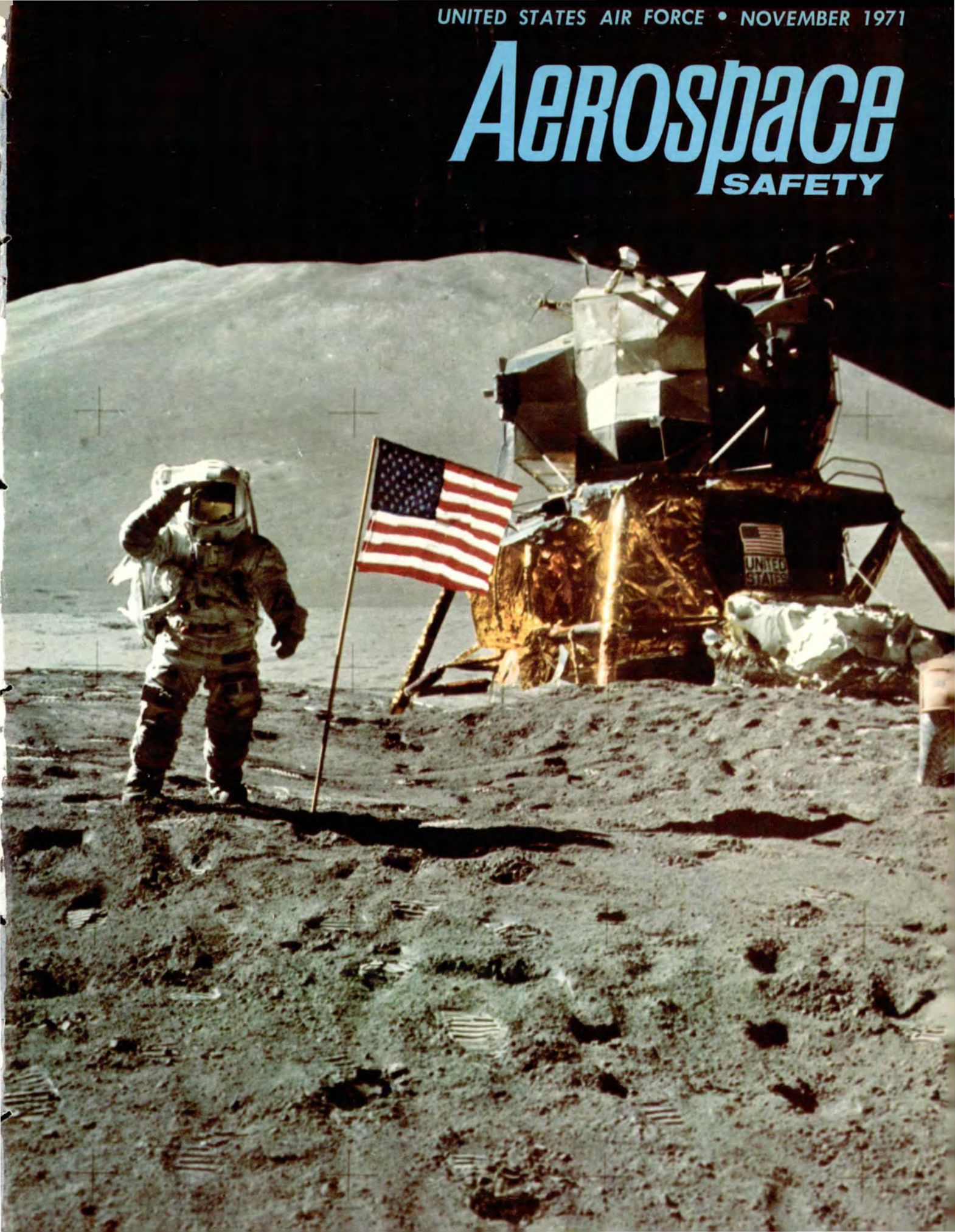
UNITED STATES AIR FORCE • NOVEMBER 1971

Aerospace SAFETY



Astronaut James B. Irwin salutes U.S. flag at Apollo 15 Hadley-Appenine landing site. Hadley Delta in background. Mountain rises 13,124 feet above plain. Photo was taken by Apollo 14 Commander, David Scott.

UNITED STATES AIR FORCE NOVEMBER 1971

Aerospace SAFETY

FOR AIRCREWS, MAINTENANCE & SUPPORT TECHNICIANS

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

SUBSCRIPTION—AEROSPACE SAFETY is available on subscription for $4.00 per year domestic; $5.00 foreign; 35c per copy, 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 accidents 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 the Editor, Aerospace Safety Magazine, Deputy Inspector General for Inspection and Safety, USAF, 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.

NOVEMBER 1971 AFRP 127-2 VOLUME 27 NUMBER 11

WHAT YOU TOLD US

Every so often it is a good idea to pause and take stock of things, just to make sure you are going in the right direction. *Aerospace Safety* magazine did that last summer by having several questions included in a USAF Sample Survey. We wanted to know whether you are getting the magazine, how well you like it and whether you find it useful in your work. The instructions called for only persons in flying operations, maintenance and flying support activities to answer our questions. Here's what you told us.

Eighty-four percent of the officers have little trouble getting the magazine, but only 57 percent of the airmen are able to get one. This indicates that we will have to improve distribution and correlates with other items that point to the same thing.

In order to understand what the figures tell us, it is necessary to know who answered the questions. Here's who: Sixty-one percent of the officers were in flying operations, 10 percent in maintenance, and 28 percent in support activities. The airman breakout was *flight* 9 percent, *maintenance* 40 percent, and *support* 51 percent.

The third question asked whether the respondents found *maintenance* articles useful in their job. We were gratified to learn that 54 percent of the officers answered in the affirmative. However, only 38 percent of the airmen so answered. This bothered us until we checked back and found that only 49 percent of the airmen completing the survey were in maintenance or operations jobs, 51 percent being in flying support occupations.

Then we asked about flying articles. Two-thirds of the group of officers engaged in flying operations (60 percent of the total number surveyed) said that these articles were of value to them. Twenty-nine percent of the airmen found flying articles useful, which surprised us because only nine percent work in flying operations.

Next we wanted to know if you find the articles in *Aerospace Safety* interesting. What we had in mind with this question was, aside from their usefulness to individuals, are the articles well written, and do they cover the right subjects? Seventy-nine percent of the officers and 55 percent of the airmen said the articles are interesting.

Finally we wanted to know if articles in the magazine ever help anyone during an emergency. We really didn't expect much on this question, but in this business you seldom get a chance to see direct results from your efforts. So we were very happy to see a startling 21 percent of the officers and 17 percent of the airmen had been helped in an emergency by something they had read in *Aerospace Safety* magazine.

This survey indicated that you are finding the magazine useful, interesting and of direct application in your work in maintenance, flying operations, and in flying support activities. It also indicated a couple of soft spots that we have already started to work on. Remember, you don't have to wait for a survey. Write or call direct anytime. If it is a question, we'll do our best to get the answer. If it's a gripe, tell us and we'll try to get whatever it is changed, fixed or resolved. ★

We don't know if shamrocks will grow on the moon, but Colonel James Irwin, lunar module pilot and one of Apollo 15's all-Air Force crew, put one there. Colonel Irwin kindly granted *Aerospace Safety* an interview to give our readers some insight into how it felt to be one of the select few who has been privileged to take that

Walk on the moon

ASM: Jim, from the time you were selected as an astronaut, how long was it until liftoff?

COL IRWIN: Just over five years, but it went so fast. It seemed more like two or three. Time never did drag; everything was so interesting.

ASM: Were you and the rest of the astronauts personally involved in the safety design aspects of the command and lunar modules?

COL IRWIN: I guess I have been involved in the design of the lunar module since shortly after I was assigned. When a new engineering change comes up that effects system operation we always get involved up here in the astronaut office. We get a chance to consider it from both the operational and flight safety standpoints. We had some new gear on board, in our particular lunar module, having to do with failures that might occur to the ascent engine—that it might fail to ignite. We had some new electrical harnesses that we could plug into either bus in the descent stage giving us a little more insurance that we would get ignition from the ascent engine.

ASM: How much do you have to say about cockpit design—such things as where the switches are put?

COL IRWIN: Well, at this stage in the game everything is pretty well set in concrete. All our spacecraft have already been built. However, originally the astronauts who were here had a great deal to say about the layout of both the command module and the lunar module.

The all-Air Force Apollo 15 team.

ASM: Is there a problem interchanging crews, if for some reason one could not go?

COL IRWIN: I can't say there is no problem. It depends on when it occurs, when the change has to be made. I think this was put to the test when on Apollo 13 Jack Swiegert took Ken Mattingly's place. It depends on which crewman it is. Everybody works so differently that you get used to working with the same person.

ASM: Most of the training is done here at Manned Spacecraft Center, isn't it?

COL IRWIN: Yes, it is until you come up for the next flight; in other words, the 16 crew will now move into the simulators at the Cape, the 17 crew will take over the simulators here; we, as backup crew for 17, will train here until Apollo 16 goes, then we will move our training equipment down to the Cape.

ASM: What type of confidence levels do you have that you will successfully complete your mission?

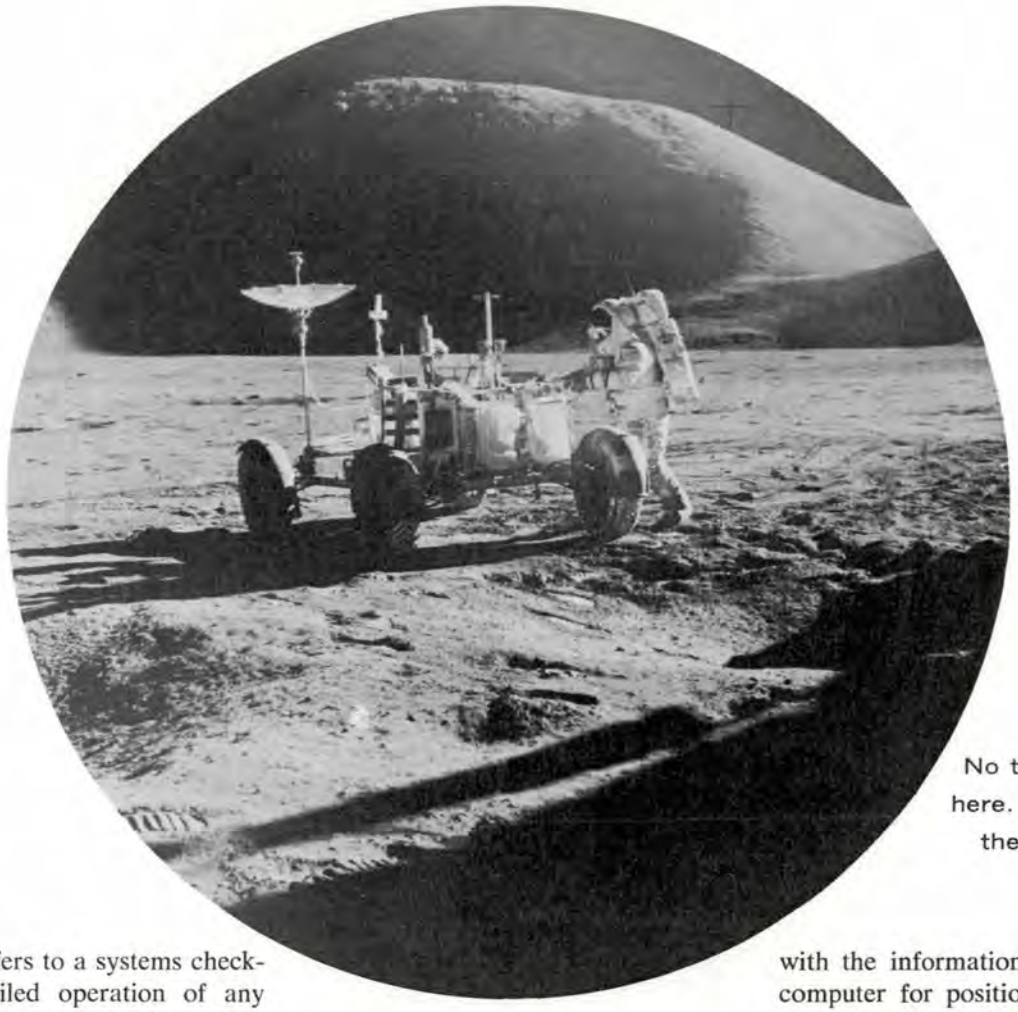
COL IRWIN: We do have a very high level of confidence because of redundancy and high quality control. I would say I was 99.9 percent sure the mission would be successful.

ASM: What goes through your mind when you hear that phrase, "We have ignition"?

COL IRWIN: I guess we always expect it—ignition. It is gratifying and heart-warming that you've got those engines burning down there, but I guess the call that was more meaningful to me was "tower clear," because that portion between ignition and "tower clear" could be very critical. If you had a failure, not so much of an engine, but if you had a hard over, it might swing you into the tower and you are pretty well strapped there. Once we had "tower clear" I figured we were really on our way.

ASM: Are you so familiar with the systems in the module that you can minimize the checklist and do each one of you have a particular system that you specialize in?

COL IRWIN: We have a checklist for every operation of the spacecraft—the launch checklist, which takes us through launch, through earth orbit, through translunar injection and then after that we get into the flight plan. The flight plan has all the steps required; if it



No traffic problem here. Jim Irwin and the Lunar Rover.

doesn't, it refers to a systems checklist for detailed operation of any systems in the command module. Then when we get into the lunar module, we have an activation checklist—we have a timeline book which essentially duplicates the flight plan in the command module. We have a surface checklist and then to supplement that, we have cue cards for the EVA preps and posts, so everything is covered by a checklist. If there is a malfunction of any equipment, we have malfunction procedures and the entry in those malfunction procedures is in the symptom—hopefully, it is a caution warning light that illuminates. Then we would refer to the malfunction checklist which we carefully and methodically complete. We also have schematics for all the systems—like a TO—so if the malfunction procedure doesn't do the job for us we refer to the more detailed system schematics to also help us in understanding the malfunction procedure. We have several pounds of paperwork on board. I think it was something like 40 pounds of paperwork in the form of flight plans and checklists.

ASM: As you travel through space, does your onboard computer keep your location pinpointed at all times —say in terms of nautical miles from earth and so forth?

COL IRWIN: It doesn't read out that particular parameter, but I am sure that within the computer that knowledge is available. We frequently take star sightings with the optical system and compare them with the information that is in the computer for position. In addition, we get small torquing angles because of the drift of the platform. They were always very, very small corrections. There is just a wealth of technology improvements that have been made, because of the Apollo program, that I am sure will effect basic design of aircraft in the future.

ASM: How much difference is there between flying a space vehicle and flying a conventional airplane as far as attitude or control maneuvers or technique?

COL IRWIN: As far as attitude control, it handles very much like an aircraft except that you are making step inputs to change your attitude. As for the control system, there is a greater flexibility—greater variety of control modes that are available to you.

ASM: How many backup modes do you have?

COL IRWIN: In the lunar module, for instance, we have the primary guidance system and we have the abort guidance system, so we have the two guidance systems available to us. We can automatically control the attitude in the spacecraft. In the manual modes, we have manual modes in both of those systems, controlling certain jets. Then we have another set of jets that we can select manually. Then finally we can go to the hardover on the controller and fire a set of jets, so we have all sorts of redundancy.

ASM: Did you carry the tape of the Air Force song up there secretly or did Mission Control know you had it?

COL IRWIN: I'm sure they knew we had it. They probably didn't know when we were going to use it.

ASM: I think the pictures were really more beautiful this time than they ever were before. Seems as if the cameras had been improved. The depth perception was much better. Do you have a feeling of invasion of privacy with so many people on earth watching you all the time?

COL IRWIN: You mean that little TV camera that followed us around? Actually we never gave much thought that they were watching us. In some instances I guess it gave us some degree of comfort to know they were watching over us. It has really paid off after the flight to play back those tapes and review what we did at each geological station so we could put everything in the proper order.

ASM: Do you think there is any fallout from your program into our undergraduate pilot training program? In other words, could the Training Command benefit from the ways in which you approach your training?

COL IRWIN: I think we have learned a great deal from the pilot training program, since all our new people on board, the scientists, went through the pilot training program. I think that since most of the people in our program have either been pilots or are pilots, most of our training is patterned after your program.

ASM: How about the family, how did they feel about it?

COL IRWIN: Of course, they are all happy that it is over with now. But they had no apprehension. They were very well adjusted, I thought, and prepared for just about anything.

ASM: What are your plans now?

COL IRWIN: Our crew has been assigned as backup for 17, so after we finish the speech tour, the next two months, we'll be back here to get ready for the flight in December of '72.

ASM: Are you ready to go back again?

COL IRWIN: Yes! ★

ED. NOTE: Our thanks to our friends at the 63d MAW, Norton AFB, and the 147th Ftr Gp (ANG), Ellington AFB, for their cooperation in obtaining this interview.

Splashdown!

GUARANTEED ABSOLUTELY FOOLPROOF

Our language is rich in descriptive terms. A couple are "foolproof" and "failsafe." They sound good, but they are absolutes and we've long since become wary of anything that positive.

There's another word—Murphy—which has come to mean that if there is a wrong way of doing something, someone will. Here's a Murphy to disprove the wisdom of accepting the absolute terms cited in paragraph one.

First, to set the stage. After years of futilely attempting to prevent the servicing of aircraft with the wrong fuel, the Air Force devised a system of safeguards last December that gave promise of being effective. Regulations were rewritten, SOPs developed and hardware obtained. Everyone rejoiced. No more JP in recip tanks.

Enter Murphy to prove that if there's a way . . .

During refueling of a twin engine recip, the refueling crew noticed the fuel was frothing. Color check confirmed that the fluid was not 115/145 avgas. How come? The trucks had been fitted with locks, and keys were attached to dispatch folders, along with the other steps required to insure the correct fuel. (Fuel Servicing Controls, *Aerospace Safety*, May 1971.)

The explanation was simple—and chilling—because it showed one way of circumventing the system. The truck was old and scheduled for the boneyard. However, it had been filled with diesel fuel to be delivered to a communications facility. Then the truck was parked on the front line of the 115/145 POL parking area. This set the stage.

Step II. The driver got the wrong truck. Since it was scheduled for salvage, the lock on the truck pump valve had been removed. Step III, with no lock there was no need for a key. Why this didn't alert the driver wasn't stated in the report.

Fortunately, in this case, the wrong fuel was discovered before any harm could be done. Nevertheless, this experience should alert us to the fact that those words "foolproof" and "failsafe" should not be taken for granted. ★

almost

THE I.P.I.S. APPROACH

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

FLYING

Q Can I file in the high altitude route structure to a low altitude initial approach fix?

A Yes. There is nothing that restricts a pilot from doing this. High altitude instrument approach procedures are associated with flight in the high altitude route structure. Interestingly, the IAF altitude for some high altitude approaches is quite low (4000 feet for the TACAN RWY 3, Mathis Field, San Angelo, Texas).

* * *

Q If I have filed in the jet route structure to a low altitude IAF, what should I do in the event of radio failure?

A The rules governing two-way radio failure, as described in the IFR Supplement, still are applicable. We do not recommend filing a route of flight which may be impossible to fly in the event of communications loss. One example of this would be filing to an outer marker at FL 450. Obviously, a certain amount of discretion must be exercised by the pilot. You are required by FLIP, Section II, to "clearly indicate the proposed flight path." In the absence of instructions to the contrary, the proposed route will become the assigned route with communications loss. Good sense then would require that you file only what you would be able to fly in the adverse circumstance of two-way communications failure.

* * *

TDY TO TEXAS

The USAF IPIS is often asked by individual pilots throughout the Air Force how they can attend IPIS. The USAF IPIS has no direct control over who is selected to attend the course of instruction. The training "slots" are allocated to the various commands by Headquarters USAF. Current production of instructors is 140 per year. It is obvious that many units may have to wait a year or more to receive a training slot.

If your unit desires to send someone to USAF IPIS for instructor training, we recommend you submit an application for formal training through your local CBPO in accordance with AFM 50-5. The USAF IPIS course is listed as *USAF Instrument Pilot Instructor Course, Number F-V5G-A*. Using the application for formal training will help to match the training requirement and individual with the training slot at command level.

It is the goal of the USAF IPIS to have one graduate in every squadron in the Air Force. If no one in your unit has been to USAF IPIS, we suggest that you initiate action to send someone. ★

ELSIE

The Air Force is experimenting with an emergency escape system for transport/cargo aircraft that employs a linear shaped explosive charge. Called ELSIE (Emergency Life Saving Instant Exit System), it will cut emergency exits in an aircraft fuselage after a crash landing, allowing passengers and the crew to escape before fire destroys the aircraft.

ELSIE resulted from studies of the causes of death in survivable accidents. The studies showed that, in commercial aviation, approximately half of the persons involved in survivable crashes perish and half of the deaths are attributed to post-crash fire. The Air Force, likewise, has experienced fatalities from post-crash fire, due to the inability of crew and passengers to open jammed exits and escape. The causes of death among persons who seem to have been capable of unassisted escape were usually found to have been from asphyxiation due to smoke and fumes or burns. They simply didn't have time to get out before being overcome.

At first blush it would seem that more and bigger exits would be the answer. The desirability of this fades, however, when structural strength and weight penalties are considered. Linear shaped charges have been used for several years in a number of applications; for example, for stage separation on missiles and to separate the F-111 escape capsule from the airframe. They have proven to be highly reliable and safe.

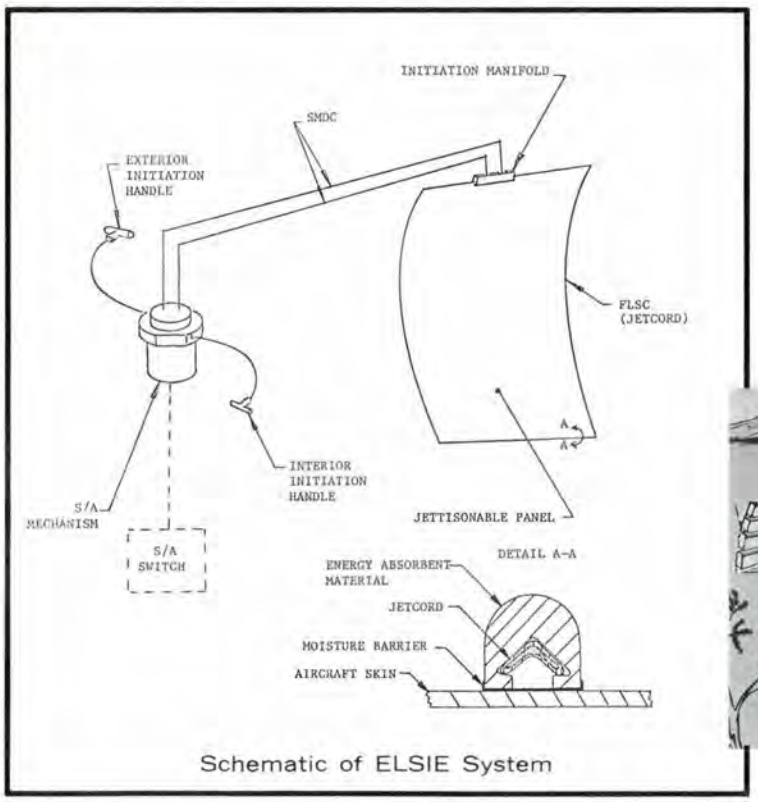
Since this seemed to offer an effective means of providing emergency exits, the Deputy for Engineering and the Life Support System Program Office, Aeronautical Systems Division at Wright-Patterson AFB, is developing the ELSIE system under a contract with Explosive Technology of Fairfield, California.

Advantages of the ELSIE are:

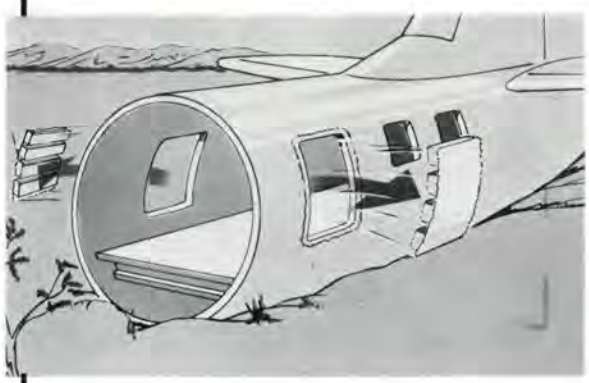
- Opens emergency exits in less than one one-thousandths of a second.
- Is jam-proof even after severe deformation of the fuselage.
- Door jettisons outward.
- Is instantly operable after a crash, by passenger or crew, yet cannot be operated inadvertently.

Currently two applications of the system are in operation. One is in

Adapted from material supplied by Capt Burt Chesterfield, Life Support Project Engineer, ASD



Schematic of ELSIE System



an AC-130 where no opening in the aircraft structure exists prior to actuation of the system. The other is a door within a door which is being installed in an ASD Flight Test C-131.

In the AC-130, the system is an integral structural part of the airframe. When the charge is fired, an opening of a pre-determined size is instantaneously cut in the fuselage. The system installed in the C-131 is mounted in the emergency exits and is intended for use only when the door cannot be opened by other means.

To insure safety, the following requirements were established:

(1) The actuating mechanism must be manual. That is, not be dependent on any external energy source, such as the vehicle electrical system. (2) Arming capability is provided only in the pilot's crew station. (3) Arming is accomplished only during takeoff and landing. (4) Once armed, the system is operable by anyone, but only from the occupant area. That is, the system is incapable of being armed and fired from a single location. (5) Dearming capability is provided in both the pilot's crew station and in the occupant section (the system may be de-armed from the occupant section, but not armed). (6) System status indicators must be provided for flight crew stations.

With these requirements in mind, it was decided to use an electromechanical safe/arm actuator. Thus, the device is fool-proof against any spurious inputs which may be encountered either during normal aircraft operation or during crash conditions.

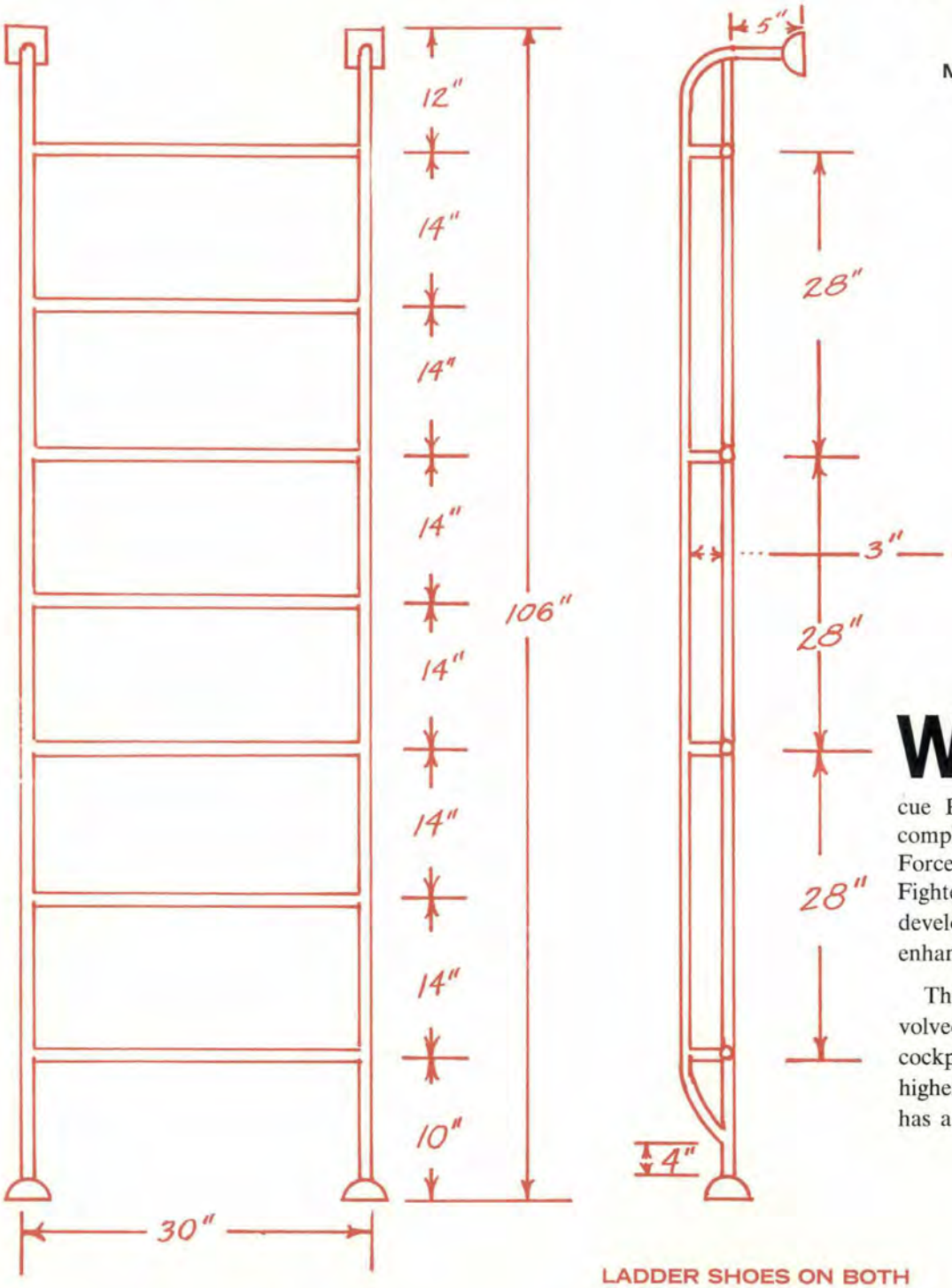
Because of the inherent simplicity of the ELSIE system, crew training will consist primarily of familiarization and will emphasize the reliability of properly used explosive devices and their importance in safety applications in military aircraft. The responsibility for each flight crew member in actually triggering individual egress panels will be described and demonstrated.

Maintenance personnel need not necessarily be explosive ordnance trained; but they must be made aware of the existence and behavior of the explosive components that exist in this system. This includes routine replacement of warning lights and possible service to the control toggle switch. ★

ALUMINUM TUBING
FSN 4710-177-5911
(1" OUTSIDE DIAMETER)

A-7D CR

MAJ WILLIAM G. SHIDELER
354 Tac Ftr Wg
Myrtle Beach AFB, SC



RESCUE LADDER (A-7)

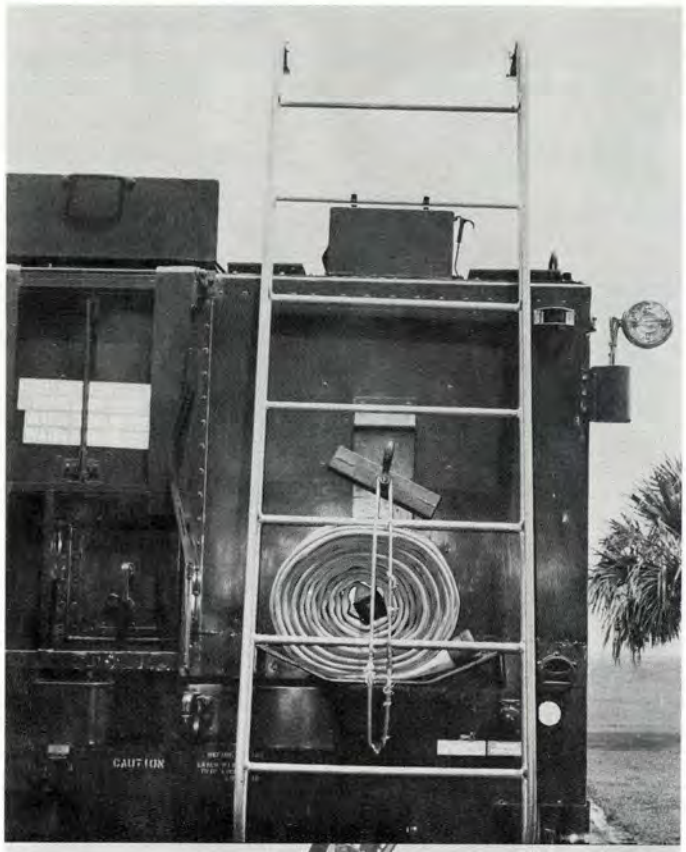
LADDER SHOES ON BOTH
ENDS OF LADDER
FSN-5440-683-8992

SCALE 1/16=1"

With the continuing emphasis by the Directorate of Aerospace Safety on Crash Rescue Procedures, and faced with a completely new aircraft to the Air Force inventory, the 354th Tactical Fighter Wing rescue personnel have developed a complete program to enhance aircrew survival.

The first problem encountered involved aircraft design. With the cockpit located well forward and higher than most fighters, the A-7 has a telescoping access ladder nor-

ASH RESCUE/PILOT EXTRACTOR



mally stored in the fuselage. Rescue operation using this ladder would be severely hampered, so a special lightweight ladder with protective "feet" and "pads" was developed to allow two or more rescuers access to the cockpit. The canopy locking and opening mechanism is intricate and finely balanced, so special instruction was required. A friction cutting saw (K-12) is required to enter the cockpit if the interdependent canopy downlock system becomes jammed. Seat safing instructions in the TO, while adequate for normal maintenance in a hangar, were deemed inadequate for aircrew extraction practice. A new checklist was devised and submitted for inclusion in the TO. This checklist insures that no "Murphyism" will cause an inadvertent canopy jettison or seat ejection.

A complete training program was developed providing initial indoctrination on the FTD trainer and Ground Egress simulator. Only then are neophyte rescuers allowed to take part in extraction exercises on the actual aircraft.

During exercises, protective mats for the sensitive canopy rails are used. A special non-skid "bathtub" mat precludes windscreen damage, and pilots are physically lifted only to the edge of the canopy rail. They then climb down the ladder, are placed on a fracture board, and carried a safe distance from the simulated crash site while receiving mouth-to-mouth resuscitation and heart massage. A resuscitator is available and used until the flight surgeon's arrival.

Hopefully these procedures will never have to be used, but if they are, the training and practice of the 354th Tactical Fighter Wing rescue section will add significantly to the pilots' chances of survival. ★

DOLLARS AND SENSE IN HUD HANDLING

HAROLD W. ROSENBURG, Naval Weapons Center, China Lake, Calif.

The AN/AVQ-7(V) Head Up Display (HUD) used in the A-7D/E is, in its present configuration, an inherently reliable and relatively trouble-free system. Yet, in spite of this, an unexpectedly large number of HUDs are still being turned in for repair or replacement.

Investigation of these units reveals that a distressing number of them have failed because of problems, such as broken fan wires, defective combiner glasses, torn night filters, broken microswitches, blurred symbology, and missing components and assemblies, which can be directly attributed to careless and improper operational and maintenance practices and rough handling. The following discussion covers the chief problem areas and concludes with a "horrible example" of what carelessness can do.

Item 1: The Display Unit (DU) Combiner Glass

The combiner glass is a vital part of the DU. In fact, it is the core of the entire HUD system, for without it, there is no HUD. So far, several dozen of these combiners have had to be replaced, at a cost per unit of $390, and a total cost of nearly $20,000. (This is a cost for material loss and excludes any additional labor costs.) And of course you have an unusable DU until a new combiner can be procured and the damaged unit replaced. It is suspected that most damage to the combiner glasses occurs because of rough handling during installation and/or removal of the DU from the aircraft.

Item 2: The Projection Lens System

There have been several cases of damage to the projection optics system of the display unit. For the most part, the reported damage consists of scratches on the coated projection lens. Sand and dust particles have been allowed to collect on the lens and, instead of being carefully removed either by being blown away or by being brushed off with a soft bristle (camel's hair) brush, they appear to have been ground into the glass.

Item 3: The Cathode Ray Tube (CRT)

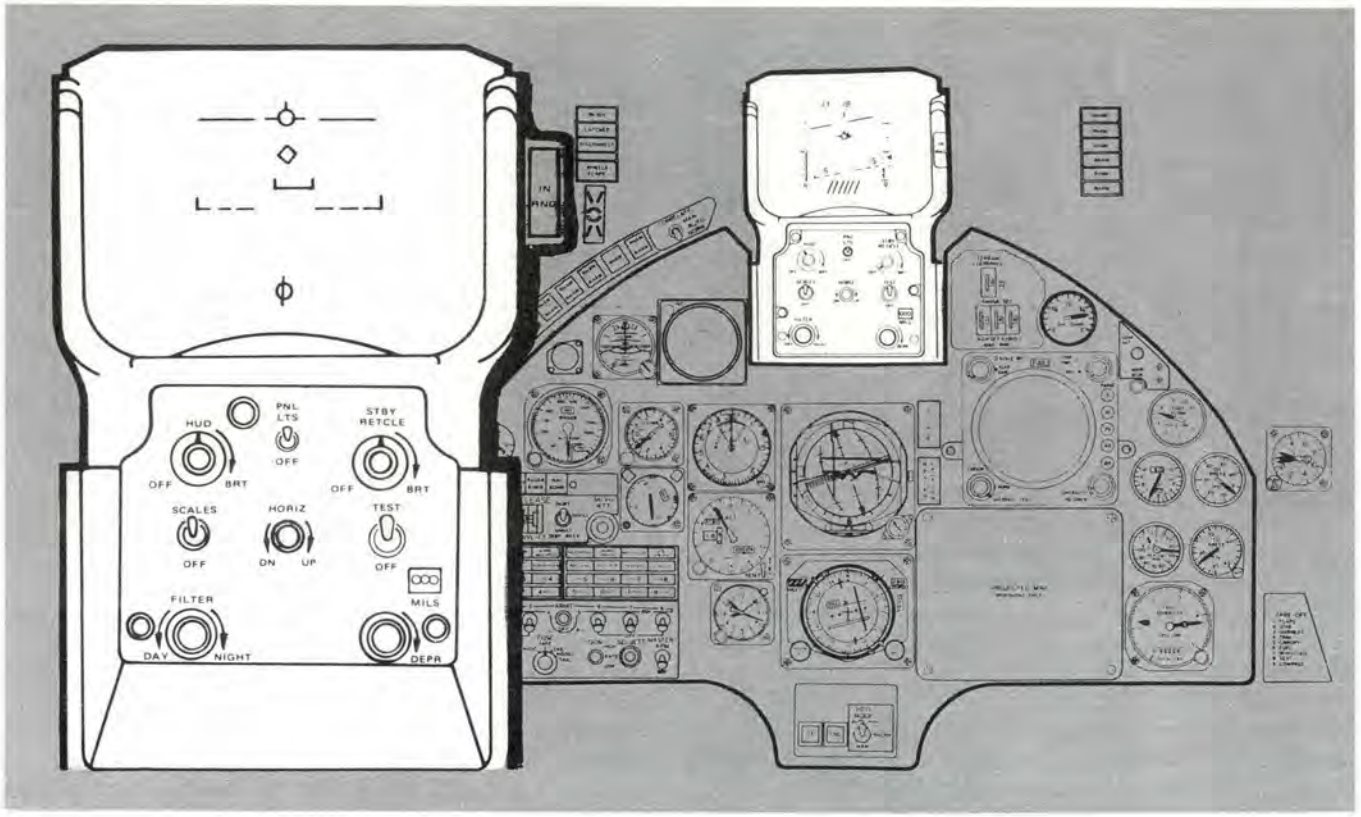
While the combiner glass and the projection lens system can be regarded as important passive components of the HUD's display unit, the CRT is one of its vital active parts. Two things common to the combiner glass, the projection lens system, and the CRT are the high cost of replacement and the need for improved operational and maintenance practices. At the present time, two types of CRTs are used in the display unit. One is a ceramic tube. Its individual replacement cost (excluding the necessary labor, such as focusing, alignment, etc.) is $1700. The other tube, a conventional glass type, costs $780.

Most of the CRT replacements have been made because of burned spots on the tube's phosphor coating. The cause of such burn spots has been traced to the rather neglectful practice of permitting the CRTs to operate at their maximum light intensity—or nearly so—for an excessive period of time. Applied analyses indicate that such phosphor burning effects did not occur during normal flight, where the symbology keeps changing with flight conditions, but on the ground, where a fixed pattern is displayed.

The obvious corrective measure is to avoid such conditions. Most important, operate the CRT at a lower light intensity, meeting the operational requirements rather than just turning the CRT light intensity control to its maximum setting and leaving it there. The operating life of these CRTs varies inversely with the setting of their light intensity controls, so by reducing light intensity, operating life can be greatly extended.

Item 4: The Signal Data Processor (SDP) Blower Motors

Broken SDP blower wires constitute the most frequent HUD problem. The blower wires and the SDP handle are in close proximity, and to the unwary or the quick-acting maintenance technician, the blower wires may appear to be a more accessible handle than the SDP han-



dle itself. The obvious result of this mistake is broken blower wires. (As an aid in preventing this, work is being done right now on designing a protective cover.)

A "Horrible Example"

To conclude with an illustration of what rough handling and careless maintenance practices *can* do to a HUD assembly, the following true report is repeated. Only the names have been omitted to protect the not-so-innocent.

Subject: Damage Report to Lens Housing Assembly S/N . . .

Line Replaceable Unit Serial No. _____ was received by the vendor from _____ military base on March 10, 1971. The following physical damage was reported:

1. The combiner glass was broken.

2. The microswitch normally attached to the combiner was missing.

3. The combiner cables were not secured.

4. The cover on the purging valve assembly was dented.

5. The EHT cable was not connected.

6. The cable designated 1A2J3 was not connected.

7. The night filter was missing.

The Lens Housing Assembly was rejected to the end item repair area. Upon further investigation, physical damage was noted as follows: When the top wedge was removed, the right field flattener was found broken away from the prism and the left field flattener was missing. The number three lens and prism were covered with fingerprints and Hylomar (a jointing compound used to seal the Lens Housing Assembly.) The night filter was missing, and the prism assembly carried evidence of the number three lens being pried away (scratches left by screwdrivers). The rear cell assembly had had the lens combination removed and reinstalled incorrectly, necessitating lens realignment. The left fiber optics had been damaged by persons trying to pull out the assembly and breaking the fibers. All the lenses were generally dirty and covered with fingerprints.

The mirror alignment had been disturbed and a large chip had been broken away from the mirror, which in addition was covered with Hylomar and fingerprints. The righthand mils depression shaft was bent. Fine metal filings were found in the bottom of the casting. The exit lens was scratched and required reblooming. The casing of the nitrogen purging valve was dented and required replacement. In fact, the entire unit would have required more than replacement cost to repair; so it was recommended that it be scrapped. Cost: thousands of dollars. 'Nuf said? ★

(Vought Maintenance Digest)

Blue two didn't feel good. In fact, he felt rotten. His head hurt like crazy, and that last pull-off from the range had set the little spots dancing in front of his eyes and almost cost him his breakfast.

"Well," he thought, concentrating on his join-up with Blue lead, "that's over. Let's go home and get out of this sweat-box!" He pulled into an easy route formation, concentrating on maintaining his position and wishing he could get more air through the cockpit vent system.

Passing ten thousand feet it was worse—much worse. His head had never hurt like this before, and the waves of dizziness that passed over him intensified his nausea. He had trouble keeping lead in sight, and finally punched the mike button to let lead know about it.

"Lead—Two. I'm kinda sick."

"S'matter, buddy?"

"Dunno, but I'm feelin' above-average bad. Take me home, huh?"

"Rog. You on 100 percent?"

"No, going there now." Two reached over and flipped the switch on his regulator.

"Hang on, buddy—have you home in a minute."

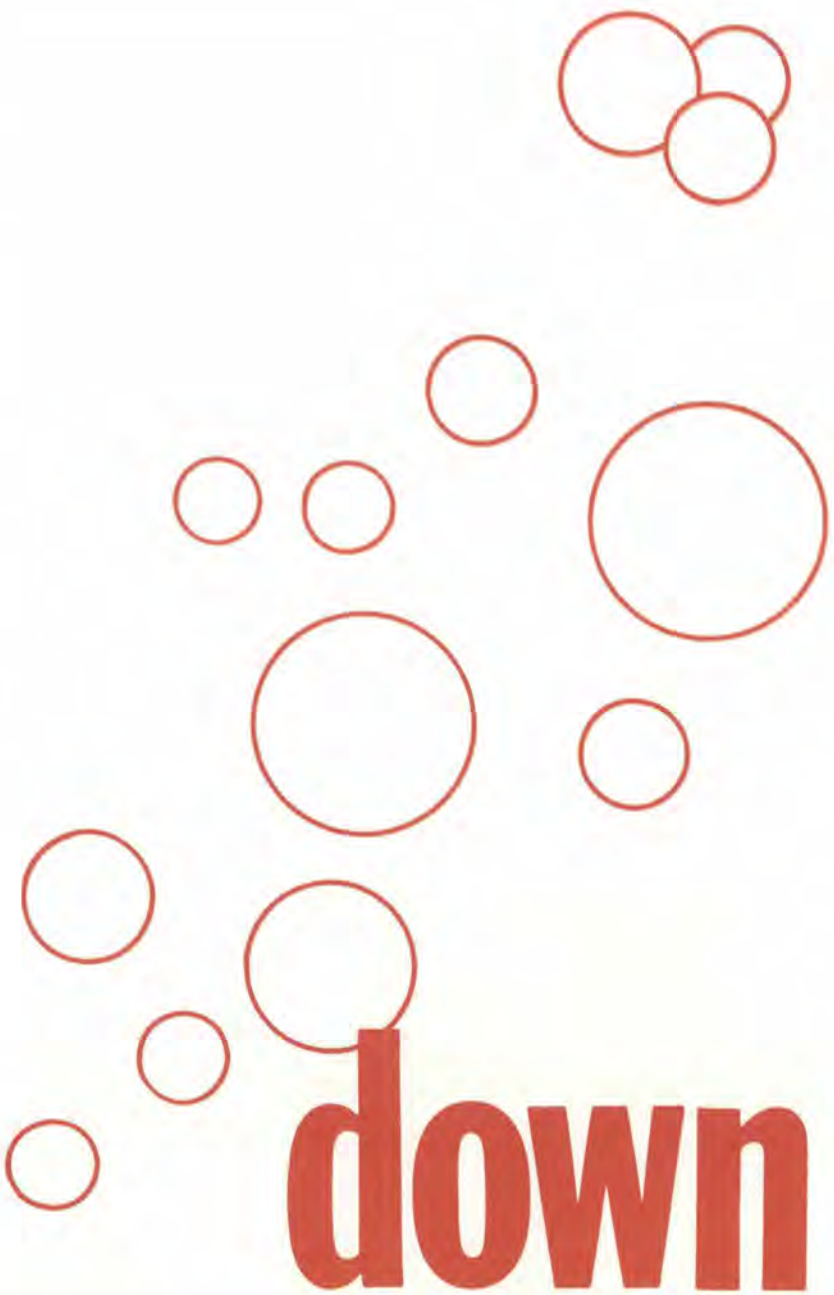
Two was an old head, and Lead knew immediately that the situation was of an emergency nature. He clicked to Guard transmit: "RAPCON, this is Blue lead on Guard. I have a sick wingman, and need immediate vectors to home base, with straight-in GCA. Squawking emergency."

The professional voice came back immediately: "Blue lead, radar contact. Turn left heading three-one-zero, descend at your discretion to four thousand. Expect precision radar approach, runway three-zero. Remain this frequency, we will coordinate for emergency equipment at landing."

"Rog, Blue flight turning left three-one-zero, level twelve-thousand, will call leaving."

Lead clicked back to company frequency. "Okay ol' buddy. Let's go over to Guard and I'll take. . . ." But Blue two wasn't there anymore.

Business as usual. Eight-thirty show for a ten o'clock go. On the range at ten-thirty, tanker rendezvous at eleven-fifteen, three nav legs and back on the ground just in time to miss the lunch-line at the club. The routine had the well-worn comfortable feel of a favorite pair of boots. Swig a coke while Frank briefs—sign the PIF—long, hot walk to the P.E. shop—chute and



down

helmet off the rack—careful check of the mask and hose—on down the line to where the bird waits, primed, loaded and ready to go.

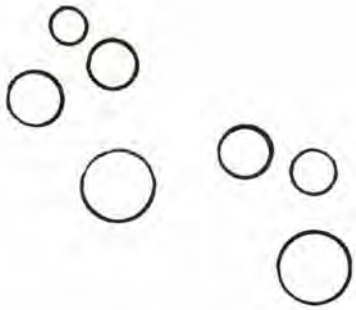
Man, it's hot! Radio check, engine start, checklist items falling away like those old movies where the leaves of the calendar go marching off in quick-step. Good thing we started early, gotta taxi all the way to the other end. Wow, that sun is something else!

What this country needs is a good $100 air-conditioner to keep the pilot cool while he's waiting for the arming crew to figure out that we changed runways! Here they come, finally! Always that ten percent. . .

These kerosene-burners sure stink when you're sitting downwind of them. Don't tell me we're ready to go! Rog, hold for traffic on eight-mile final—we could be halfway to Acapulco by the time he gets here.

and out

OUT . . . *CONTINUED*



At last! Quick, take the runway before somebody changes his mind. Canopy locked, mask hooked—line her up, check her over, catch Lead's nod and awaaaay we go! Another on-time departure!

The noise is terrific . . . wind rushing . . . somebody talking in my ear . . . "Ed, get out of there! Eject! !" Reach for the handles . . . here somewhere . . . OOOF!

It's cool. White sheets. Quiet. Smell of disinfectant. Craggy face hanging over the bed.

"Good morning." The face had a deep voice. "How do you feel?"

"I'm not real sure. What happened?"

"We're hoping you could tell us. We've got a good idea, but need some confirmation from you. What do you remember?"

"Last thing I recall is, I must have passed out, and I heard someone, Frank, I guess, telling me to get out, and then it felt like someone punched me all over at the same time . . . and that's about all, until now. How long have I been here?"

"Just overnight. Rescue pulled you out of a tree, which probably saved you from being dragged. You've got some bruises and a scratch here and there, but we can't find much else wrong.

"Tell me about the flight—how'd you feel, what kind of symptoms were you having?"

"Lemme think . . . I guess they started in about the time we were leaving the range. Bad headache, dizzy, floaters in front of my eyes, nausea—almost made a mess of my new Nomex."

"Did they come on all at once?"

"No, I guess not. I was feeling great earlier—before the flight, I mean—but I guess that heat and sun got to me taxiing out. I was still okay—nothing I'd consider aborting for—but it just seemed to get worse as we went along. Was my oxygen bad?"

"Quite the contrary. In fact, if you'd been on oxygen for the entire mission I doubt that any of this would have happened."

"No joy, Doc. I was on oxygen the whole time."

"Not quite. When did you hook up your mask?"

"The minute we got clearance for takeoff."

"Uh-huh. But according to the other pilot, it took your flight about 20 minutes to get off the ground after engine start. In the meantime, you sucked up a lot of exhaust fumes."

"I remember—the fumes were bad, but it was so darned hot—you think that's what got to me?"

"No question about it. Your blood showed almost 20 percent carbon monoxide when we got you back here."

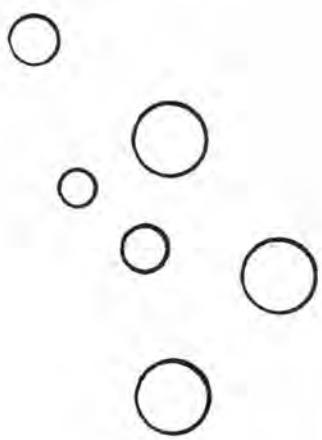
"How come it didn't get to me before takeoff?"

"Well, the effects of carbon monoxide depend on a lot of things. Mostly on how much oxygen the body calls for and how much oxygen is available. When you got to the range and went to work, your body started calling for more oxygen but your blood couldn't deliver. Then when you climbed to altitude the reduced availability of oxygen—which would normally have had a negligible effect—put the finishing touches on you. Almost literally."

Blue two leaned back on his pillow. There was a long silence while he stared at the ceiling.

"Well," he said, finally, "I'm grateful I'm still alive. What happens to me now?"

"Not much. We're going to keep you here for a few more days, just to make sure you're okay. Then you'll probably be back on the job. There's been quite a bit of activity down at the squadron, rewriting SOPs concerning the use of oxygen and such. And the boss is making sure the word gets out to everybody concerned—Air Force-wide—so maybe we can keep what happened to you from happening to someone else. If we can do that, that airplane won't be too high a price to pay."★



REX RILEYS
CROSS COUNTRY NOTES

AIR CONDITIONING has become a generally accepted convenience in most of our transient quarters, but on the last outing we found quite a few quarters that had units installed but inoperative. Unfortunately, the bases we looked at were located in areas where the temperature doesn't cool off at night. If this is the case, then maybe some consideration should be given to sending the fellows down town.

PIREPS. Hardly a day passes without a message describing how this or that pilot found himself in a big hairy thunderstorm, which resulted in a flameout, hail and all the associated things that go on in one of those bears. Although the thunderstorm season is gone, it's time for all of us who fly to get in a habit that will pay big dividends, not only next summer but year round. If we would all make a practice of submitting a PIREP to the weather stations after or during each flight, it wouldn't be long until the forecaster would have an excellent picture of what the situation is throughout the country. As it is now, we estimate that less than ten percent of the pilots call metro while airborne for an unsolicited PIREP and fewer than this debrief after landing. The ole axiom "one eyeball is worth a thousand sweeps" is just as true in this instance as it is in the intercept business. That's why some commanders still employ the weather recce. The extra five minutes involved in this exercise could easily be the factor that decides a go or no go on an important mission where weather is a controlling factor.

NUMBER, PLEASE. We've hit on this subject before but it still is worth correcting. Although a minor irritation, how many times have you landed at a base, needing to make a phone call, but can't find a telephone book. Or, sitting in your BOQ, you think it's time to check on the progress of maintenance on your broke bird but can't find the number of transient maintenance. We still think that calling cards with a list of important numbers on them is well worth the small amount of money it takes to print them. ★

THE

REX RILEY

Transient Services Awa

RICHARDS-GEBAUR AFB
GRANDVIEW, MO.

LORING AFB	Limestone, Me.
McCLELLAN AFB	Sacramento, Calif.
MAXWELL AFB	Montgomery, Ala.
HAMILTON AFB	Ignacio, Calif.
SCOTT AFB	Belleville, Ill.
RAMEY AFB	Puerto Rico
McCHORD AFB	Tacoma, Wash.
MYRTLE BEACH AFB	Myrtle Beach, S.C.
EGLIN AFB	Valparaiso, Fla.
FORBES AFB	Topeka, Kans.
MATHER AFB	Sacramento, Calif.
LAJES FIELD	Azores
SHEPPARD AFB	Wichita Falls, Tex.
MARCH AFB	Riverside, Calif.
GRISSOM AFB	Peru, Ind.
CANNON AFB	Clovis, N.M.
LUKE AFB	Phoenix, Ariz.
RANDOLPH AFB	San Antonio, Tex.
ROBINS AFB	Warner Robins, Ga.
TINKER AFB	Oklahoma City, Okla.
HILL AFB	Ogden, Utah
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, N.C.
ENGLAND AFB	Alexandria, La.
MISAWA AB	Japan
KADENA AB	Okinawa
ELMENDORF AFB	Alaska
PETERSON FIELD	Colorado Springs, Colo.
RAMSTEIN AB	Germany
SHAW AFB	Sumter, S.C.
LITTLE ROCK AFB	Jacksonville, Ark.
TORREJON AB	Spain
TYNDALL AFB	Panama City, Fla.
OFFUTT AFB	Omaha, Nebr.
ITAZUKE AB	Japan
McCONNELL AFB	Wichita, Kans.
NORTON AFB	San Bernardino, Calif.
BARKSDALE AFB	Shreveport, La.
KIRTLAND AFB	Albuquerque, N.M.
BUCKLEY ANG BASE	Aurora, Colo.

TECH TOPICS

KC-135 maintenance error

At the completion of an alert exercise which required "taxi only," the KC-135 pilot reported the reserve brake pressure low. Maintenance was notified of the discrepancy and a hydraulic specialist dispatched to the aircraft.

The hydraulic specialist quickly determined that the reserve brake accumulator was defective and would require replacement. Permission was granted to remove the aircraft from alert status, and the aircraft commander released it to maintenance.

The accumulator was replaced and the system operationally checked by running number one engine. After this maintenance was complete the crew chief boarded the aircraft to close the left main gear well door. With electrical power applied, he pressurized the left hydraulic system with the auxiliary pumps. After about one minute, the gear doors had not closed. The crew chief, remembering a trick he had been shown by another crew chief, raised the gear handle in an attempt to get the doors closed . . . followed by that sudden, sinking feeling as the nose gear collapsed.

Damage to the aircraft came to 1500 manhours and $16,000. The primary cause of this accident was maintenance in that the crew chief raised the gear handle. However, there were several deviations from tech data leading up to the accident: the aircrew failed to install the gear pins as required by the uncocking checklist; maintenance personnel failed to install the pins prior to any maintenance being performed in accordance with TO 1C-135KA-2-4-1 and 1C-135KA-2-3; the supervisor allowed maintenance to be performed without insuring that proper precautions were taken; and the crew chief went well beyond authorized procedure with his "home remedy" for closing the gear doors.

RF-4C chafed oil line

After approximately one hour of flight, the number one engine nozzle failed to the full-open position, followed shortly by a generator failure light and zero oil pressure. The engine was shut down, an emergency declared and a return to base was completed without further incident.

Maintenance found the low pressure oil scavenge line cut and frayed. The support clamp asbestos lining was badly compressed and worn away. The exposed metal of the clamp was worn to a fine edge from rubbing against the steel-jacketed line and continued vibration had caused the clamp to cut through the line. The clamp was the correct type and size as specified by the technical order.

Excessive wear of the asbestos lining indicates that the clamp was either badly worn when installed or it was loosely installed.

engine installation

Recovering from an air combat maneuver in which 7.2 positive Gs were registered, the F-4 pilot heard a loud thump. All engine instruments and handling characteristics remained normal.

Postflight inspection revealed that number two engine had dropped approximately two inches into the engine bay. Further inspection by maintenance personnel and the investigating officer found that the top forward engine mount (skate mount) had been improperly torqued during the last phase inspection. Improper torqueing of the skate mount, ag-

gravated by G forces, caused the mount to fail, which allowed the engine to drop into the engine bay.

The solution to problems such as this lies in first class supervision and well trained, conscientious people who follow the TO.

arming area goof

Two F-4Es were armed for a night tactical mission. The preflight, start, and taxi to the arming area were uneventful. As number two approached the arming area, the flight lead was moving forward after the tire check. Number two then passed behind lead and into the arming area. As the ground crew moved under the aircraft, the pilot felt a thump and the ground crew advised him to shut down the engines as they had detected sparks coming from the number two engine exhaust.

Investigation later revealed that a wing tank safety pin had been ingested into the number two engine. However, all arming pins for both aircraft in the arming area had been accounted for. This led investigators to conclude that the ingested pin was left on the ramp from a previous aircraft. This leaves the reader wondering—why isn't the ramp cleared of FOD between missions?

(AIRSCOOP, Sep 71)

pressurization problems

On initial climb the aircrew noticed their WC-135 was not pressurizing in the automatic mode. The aircraft was leveled at 10,000 feet and pressurization obtained by using the manual mode. The climb was continued and the system failed again at 11,500 feet. The mission was aborted and the aircraft returned to base.

Maintenance found two lines to the pressurization controller crossed. This would render the automatic mode inoperative. The discrepancy was corrected and system operationally checked okay. The aircraft again departed.

Approximately 45 minutes into the second flight at 25,000 feet the pressurization failed again—in both auto and manual modes.

This time the maintenance team found that the two rubber lines to the pressurization controller had the coil spring inserts missing. These inserts prevent the lines from collapsing during pressurization cycles. A review of the aircraft records indicated a history of pressurization malfunctions on this aircraft dating back eight months. Evidently the spring inserts had been missing for this period.

All environmental system personnel were briefed on these incidents and the personnel directly involved scheduled for remedial training.

intake inspection

The EB-66 returned from flight with constant speed drive problems on the number one engine. During the course of maintenance the alternator was removed, the constant speed drive was removed and replaced and the alternator was reinstalled. Both CSD and alternator system checked good during engine run.

Inspection of number one engine inlet after shut down revealed extensive damage to visible rotor and stator blades. Investigation of the engine inlet area did not reveal any missing hardware. The type of foreign object is not known, but a hard metal object is suspected. The engine specialist and the crew chief both stated that the intake area was inspected with a flashlight prior to engine run. However, no entry was made in the Form 781 to reflect that this mandatory inspection had been accomplished. Primary cause was undetermined, but most probable was maintenance personnel factor in that the required intake inspection was not properly accomplished prior to engine run.

parking problems

An airman had four years' experience operating fork lifts—two and one-half of these years in warehouse type support. On this particular day he was driving a 4000 pound fork lift with an automatic shift. Using his fork lift to carry a warehouse cart containing numerous supply items, he drove into a warehouse and lowered the cart in an aisle. Then he backed the fork lift away about five feet, and dismounted to help his buddy push the cart to the side of the aisle. Looking back over his shoulder, he saw that the fork lift was following him.

The driver yelled to alert his buddy and attempted to stop the fork lift. But too late—he couldn't prevent the forks from striking his buddy's left leg and pinning it against the warehouse cart. He then remembered that he had not set the parking brake, nor had he lowered the forks to the floor. One thing he did do, however, was to leave the engine running.

CONTINUED

Two contributing maintenance factors influenced the actions taken against the driver. It seems that during repainting, all directional markings for the fork controls and directional shift lever were painted over. Also, it was found that there was excessive play in the gear shift linkage. Nonetheless, there is a proper way to park a fork lift, as our experienced operator was officially informed.

(AIRSCOOP, Sep 71)

TECH TOPICS

engine eats static wire

The crew chief of an F-104G was performing an ops check of the engine prior to functional check flight. After running the engine for approximately 20 minutes, he heard an unusual noise and shut down to determine the source. It didn't take long to discover the cause of the unusual noise. The static ground wire, with streamer attached, had been drawn into the intake.

The crew chief stated that he had disconnected the ground wire from the forward attachment point and had laid it three feet in front of the intake prior to entering the cockpit.

wheel failure

While taxiing for takeoff, the C-123 crew heard a loud crack and felt the aircraft settle to the left. The crew shut down the engines and deplaned to find that a 180 degree section of the left outer wheel rim had separated.

It was discovered that this unit was not conducting an NDI of the wheels during tire buildup as required by TO 1C-123B-6. This wheel showed evidence of a preexisting fatigue crack. Had the required NDI been performed, this crack would have been detected prior to failure.

Procedures have since been established in this unit to comply with the Dash 6 requirements.

How about it, QC, are the requirements of the Dash 6 being complied with during wheel and tire buildup in your organization?

Murphy strikes again

Murphy got a chance to show his stuff when two young airmen had to be checked out on how to inflate an aircraft tire.

"Simple enough," said Murphy, "grab your hats, get me a tire gage and I'll meet you at the aircraft." Since everyone knows one tire gage is as good as another, Murphy didn't see any reason to check it for serviceability before directing his helpers to inflate the tire. On the first try, the airman couldn't read any pressure on the gage, so he asked his buddy to connect the hose again and give him more air. After checking the second time and seeing only 80 psi on the gage, he asked for more air again. About that time, the wheel exploded tearing the hub in two. Both airmen were killed instantly.

This tragedy did occur, although in another branch of service. It is a grim warning to those who disregard the use of TO procedures and a gruesome reminder to all who permit faulty equipment to remain in service.

(5 AF Safety Bulletin)

aye, that's the rub

During trouble-shooting of flight write-ups on the navigator's altimeter and true airspeed indicator, maintenance men found the static line to the navigator's instruments leaking. The line had been cut as a result of chafing against the elevator control cable. The inflight effect was altimeter readings up to 3200 feet in error and true airspeed as much as 100 knots low. In addition the static line to the copilot's instruments was being chafed by the aileron cables. It was determined that the static lines had been improperly positioned during modifications.

A one-time inspection of all RC-135 aircraft assigned to the unit revealed one other aircraft with the same discrepancy at the navigator's station. Also, approximately five inches forward of station 400 a bolt securing a clamp was chafing the elevator control cable. Another unit inspected 31 KC-135A aircraft and found eight incidents of elevator cables chafing static pressure lines.

Chafing of static lines is a hazardous condition. Even more serious is the chafing of control cables. Fortunately, the static lines failed prior to the control cables. It would appear that quality assurance was at fault. Quality control must have been looking the other way when these birds rolled out of the mod line.

tech data again

Two T-28s, in different parts of the world, landed gear up within the same week when the pilots could not get the gear down. The cause was the same in both cases.

A bolt (Part No. AN173-11) connecting the gear actuating rod to the clevis assembly (PN 159-34412) was installed backwards and jammed against the nose gear brace bolt. This prevented the gear from lowering.

Obviously those maintenance men responsible worked from memory rather than follow the tech data. These two incidents emphasize the necessity and importance of using the TO during maintenance.

T-37 speed brake

Following a stall recovery the speed brake failed to retract. A visual check by another aircraft verified that the speed brake was down and hydraulic fluid was leaking from the right actuator. An uneventful straight-in landing was accomplished.

The right hand actuator rod turned out to be one-half inch shorter than the left rod. With this incorrect adjustment, every time the speed brake was actuated extra stress was applied to the actuator attaching bracket. This increase in stress caused the bracket and attachment screws to fail.

How did the speed brake actuator get out of adjustment? Somewhere there is a maintenance man who knows the answer.

a villainous B-Nut

Just as a T-38 was taking off during a touch-and-go landing, a loud bang was heard. The takeoff was continued. However, the gear would not retract, both engine fire warning lights came on, the flight controls became unresponsive and the crew ejected. The fire resulted from a fuel leak at a fitting on the variable guide vane actuator fuel inlet port. A "B" nut was improperly torqued. Hooking up the fuel lines so they don't leak is one of those things that just has to be done right. The "B" nuts must be torqued and inspected properly. If they're not, they will leak. If they leak, there will be fire, and if there's fire, airplanes will be lost and people may die.

light FOD

During the inverted portion of a clover leaf, the control stick of a T-38 froze in the pitch position. The aircraft was rolled to wing level with the ailerons, and by applying 20 to 30 pounds of pressure to the control stick, the pilot was able to level the aircraft. Any pitch movement of the stick from there to landing required extra pressure and the stick would remain in the new position selected. A straight-in full stop landing was accomplished.

A rechargeable flashlight was found jammed between the cockpit floor and the flight control bob weight connected to the rear stick.

All aircrew and maintenance personnel must realize the importance of reporting and locating all items lost aboard aircraft prior to its release for further flight.

slippery hands

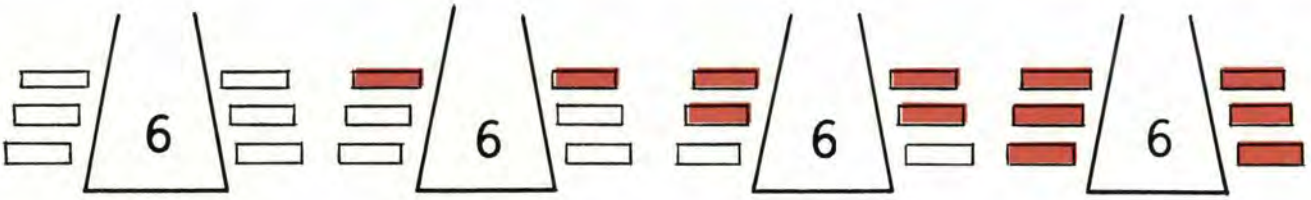
During upload of an AIM-4D missile, the missile was positioned at the left inboard station and was being aligned with the aft attachment lugs when the nose slipped from the team member's hands. Impact damage to the missile was extensive, costing over $8000.

Cause: The team member's hands were covered with a residue of hydraulic fluid. The combination of hydraulic fluid and a moderate rain caused his hands to become extremely slippery and he simply couldn't maintain his grip on the missile.

Cleanup goes hand in hand with any job. In this case, cleanup before the job was started should have been assured by the load chief. It is the responsibility of all supervisors to identify potential safety hazards and take corrective action immediately. ★

HOW MANY BARS?

How many bars are there in a VASI system? Normally the Visual Approach Slope Indicator (VASI) will show you a "near" and "far" bar on each side of the runway. The system is usually lined up with the GCA and/or ILS glide slope. It's a fine approach aid day or night. If you happen to be landing Runway 6 at Montego Bay, Jamaica (!), you'll see three bars on each side of the runway. The extra bars, farther down the runway, are for 747 and C-5A types. Los Angeles International is another airfield scheduled to get extra bars soon. Installation at other airports will follow. So whenever you see a three bar system and you are not in a C-5, use the near and center bars. The significance of the red and white colors is the same:



OVERFLIGHT **O.K. FOR C-5** **O.K.** **CRUNCH!**

After landing, the choice of bars is yours.

(NOTE: Light aircraft types can stay high on the normal glide path by using the jumbo-jet glide path—maybe avoid some wake turbulence.) ★

Adapted from Maxwell/Gunter All Safe.

THE TRAVELING MAINTENANCE MAN

SMSGT HAROLD MOORE
Directorate of Aerospace Safety

Right off the bat I want to tell you this article is for you traveling maintenance types. I don't mean just aircrew members, but also those of you who occasionally have to go TDY to Boondock AFB to make an engine change, repair a hydraulic leak, or what-have-you.

I know from several years experience that a TDY can be a smooth operation or, on the contrary, a frustrating experience, depending on the service and support provided by the host base.

If you have read the Rex Recommends column appearing in this magazine each month, you are aware of the continuing efforts being made to improve the lot of the transient aircrew. This same effort applies for us all, including those who travel only occasionally.

Let's say you have driven to Boondock AFB and are checking in with Transient Alert. They should be able to bring you up to date on the aircraft involved and what maintenance has already been performed. They should give you a brief rundown on local maintenance procedures. Bases vary as to runup procedures, getting the bird in and out of the hangar, etc.

Maintenance control should be notified of your arrival by Transient Alert. Establish coordination between your team chief and the control room for specialist support (if needed) and AGE. Maintenance control should make any necessary arrangements for transportation and communications.

Next on the list are billeting and messing. We don't want tired and hungry men working on our birds. This brings to mind an incident that occurred a couple of years ago. A young sergeant was selected to drive to Boondock AFB—about 200 miles away—to repair a hydraulic actuator on a grounded aircraft. The sergeant had been on duty about six hours when he was instructed to drive to Boondock. He was to get quarters for the night, repair the aircraft the next day and return home. All went well until the sergeant arrived at the billeting office about 2300 to find the man behind the counter appearing to be more tired than he. There were no quarters available and the clerk didn't know anything about the situation down town. The sergeant asked him about chow. He wasn't any help there, either. There was a night mess but he didn't know the hours. The clerk settled a little deeper into his chair as the confused and frustrated sergeant left. Outside a couple of airmen gave the Sarge directions to the night mess.

Being unfamiliar with the local area and remembering that the closest town was about five miles back up the road, the sergeant chose to spend the night on the seat of the pickup. After a few hours of aching, tossing sleep, he reported to the transient alert section, repaired the faulty actuator, assured the pilot the bird was A-okay and headed home —dead tired.

There is no excuse for the type of treatment this man received. Had the desk clerk been alert and responsible, he would have been able to direct the sergeant to the mess and would have had some knowledge of off-base quarters. A short phone call to a local motel to confirm a vacancy means a lot to a tired individual in a strange area.

Then there are those annoying cases such as that of a T-29 flight engineer who has just put his bird to bed and arrived at the transient airman's quarters. He finds himself in a four-men-per-room situation. To make matters worse, the rooms are hotter than the flightline ramp. Perhaps this man is a little better off than the sergeant who slept in the pickup, but not much.

Now, what can you do about situations like this? Write to Rex, in care of this magazine, giving your comments as to the conditions of the transient airman's quarters, messing facilities, and the service in general, as you tour bases away from home. Be sure to tell about the good as well as the bad. Here's the address:

Editor, Aerospace Safety Magazine
Dept IG for Insp & Safety (IGDSEA)
Norton AFB CA 92409. ★

straight talk about how maintenance can help itself

HEY, SARGE!

JAMES H. SMITH
SAAMA
Kelly AFB, Texas

You and I have a problem. Like every problem, if it's to be solved we troops will have to solve it. Otherwise, a lot of sweating and knuckle-busting will be necessary to get the job done.

The problem is poor quality of some supply items. To keep the problem in perspective, most of the items you draw from supply are good. Comparing the number of Quality Unsatisfactory Materiel Reports (QUMRs) that have been submitted with the number of line items shipped, less than one-third of one percent of the items shipped from SAAMA (and we ship nearly two million per year) are bad enough for a report. As long as the items shipped are about 99.7 percent pure, we can't afford to go to the warehouse and inspect everything to find the problem items. We would break more supplies than we would fix.

Most of us who work in the Quality and Reliability Assurance Office have worked on the line, and we are well aware that it doesn't take many bad items to deal you some real misery. You need supplies that are 100 percent good all the time, and it is our job to see that you get them.

To assure that you will get good items, we test some, we provide for quality assurance tests at the time items are bought, we even take a few samples out of the warehouse and test them. We can't afford to eat the whole apple to find out if it is rotten, though. There comes a point where it is better to spend the available money for more supplies rather than for more inspections.

You will give every item the acid test of using it, and if we can learn from you where the remaining quality problems are hiding, we can take corrective action. However, the present system of defect reporting doesn't always succeed in correcting the problems you report. Here are some reasons why:

The procedure for reporting quality defects is to submit a Quality Unsatisfactory Materiel Report (QUMR, DD Form 1686). This same report form is used for several other purposes besides quality defect reporting, and by several other services besides the Air Force. So, the form is a compromise. Some of the labels on the blocks are not compatible with the Air Force system; therefore, TO 00-35D-54 tells you what to enter in each block.

Please note that the information requested by TO 00-35D-54 does not agree exactly with the block titles on the DD Form 1686. In order to correct your quality problem we need the information called for by the TO, *so please follow the TO instructions!*

In the past ten months we have reviewed more than 800 QUMRs. A whopping 80 to 90 percent have errors on them. The three most common bloopers have been:

(1) Distribution of the completed report to the *wrong* office(s). Under

the tight deadlines we work to, misrouting the action copy practically guarantees that you will turn in the exhibit before we can get our hands on the report and arrange for an exhibit request. This results in loss of the exhibit. Since TO 00-35D-54 was revised in January 1971 to simplify and clarify the QUMR distribution, this problem cannot be blamed on the TO or on the form. The solution should be obvious.

(2) Required information is frequently omitted. This happens on a third of the forms in Block 30; and to a lesser percentage in other blocks. Since the information omitted from Block 30 is your own phone number, the reason is obvious—you aren't reading TO 00-35D-54 to find out that your phone number is required in Block 30! We need that phone number to discuss questions that come up, to obtain additional information, and generally to expedite action to correct the problem you reported.

(3) Contradictory information as to which manufacturer or SRA caused the defect. Both Block 7 and Block 22 are defined by TO 00-35D-54 as the agency that "accomplished the repair or manufacture of the item." Since only one agency can meet this definition, these blocks will obviously list the same contractor or SRA. Block 19 will be the Federal Manufacturer's Code for this same agency. (Yes, Sarge, there *is* a Federal "Manufacturer's Code" for each SRA. The code for SAAMA is 98750). The TO is being rewritten so that the name, address, and FMC will all be put in Block 7, and Blocks 19 and 22 will be marked NA. What is important is that one, *and only one*, responsible agency be completely and positively identified on each QUMR.

By now a picture of the reports we have to work from is emerging. Too often the QUMR arrives late because it has bounced all over the country looking for a home and the exhibit has been turned in to supply before we can catch it. Required information is missing and basic information on the face of the form is contradictory. As a result, *about half of the QUMRs we receive cannot be supported well enough to prove the defect occurred and definitely identify the contractor or SRA responsible.*

Here are some specific things you can do to help us furnish good supplies:

(1) Use TO 00-35D-54, TO 00-25-115, and the checklist published on pages 17 and 18 of TIG Brief 11, 1971, when you prepare a QUMR. If you have further questions call us Autovon 945-6868 or Area Code 512 + 925-6868 and we will be glad to help you.

(2) Send photographs of the defective item showing the defect and copies of photos of identifying tags and decals. Remember, we cannot tell you to ship the exhibit before the contractor agrees to do whatever work is necessary at no cost to the Government.

(3) If you don't think our reply to your QUMR is reasonable, follow up right away and tell us what is wrong with it. With further information we can sometimes get a better response.

(4) If the problem you are considering isn't worth the effort it takes to file a one-page report and send a few photographs, do yourself (and us) a favor and forget the whole thing. When you do have a problem you think is worth reporting, give us an accurate, complete report with enough supporting photos and documents to give us a fighting chance. ★

T-BIRD FLAMEOUTS (REVISITED)

The pilot estimated that they were in rain at FL250 for two-three minutes when, with no indication of trouble, the engine flamed out. The pilot selected idle and gangstart, and restarted the engine at FL240 with no problem. They landed without further incident.

A fuel sample from the fuel source revealed no discrepancy, nor did a Dash-Two postflight reveal anything that might have caused the flameout. Great Mystery! Except that T-Birds have experienced numerous flameouts while cruising at a constant power setting in precipitation above freezing level. Pilots should avoid that unhappy combination whenever possible.

(For a thorough discussion of this problem, refer to *Aerospace Safety*, April 1971, "T-Bird Flameouts.")

DISTRACTION/DESTRUCTION

A STOL aircraft usually has a lot of runway left in front of it when it breaks ground. This is not normally a problem; however. . . .

Right after the Caribou broke ground, the upper escape hatch blew open. (Much noise—something like the effect of an alarm bell and red light in the cockpit.) The pilot still had about 3000 feet of runway left and elected to set the bird back down. He touched down smoothly 4700 feet down the runway and slid to a screeching stop—gear up.

The open escape hatch provided the necessary distraction—enough, apparently to divert the pilot's attention from the task at hand. (Note: the escape hatch was improperly secured—a condition which would have been prevented by proper attention to pre-takeoff checks.)

It was recommended that the unit directive to "land immediately" in the event of a malfunction should be clarified. Surely not that many of us need to be told to put the gear down first.

Interestingly, a look in the book showed that sliding distance was considerably more than that required for normal landing with brakes and reverse thrust available.

Ops topics

CLOSE, CLOSE!

The T-29 was on a local IP upgrading mission. During closed traffic the flight engineer left his seat for a few moments; when he returned, RPM and flaps had already been set to approach setting, so he turned the landing lights on and called the Landing Checklist. On short final the IP noted that the approach lights were bothersome and asked that they be turned down. Returning his attention to the cockpit he saw for the first time that the gear indicated up!

About this time there must have been a fast three-handed game of seeing who could shove the throttles the fastest and farthest. The crew completed a successful go-around and, since there was no indication that anything was wrong, they went ahead and completed this mission. After landing, maintenance found that all three blades on number one prop had been ground off one-quarter to one-half inch!

Sure enough, the gear warning horn and light were way out of adjustment. Even more sure is the fact that no one called for the Before Landing Checklist. And that simple omission led this crew about as close as you can get to dinging a bird.

Many aircraft include a re-check of the gear in the Landing Checklist; this might be a worthwhile addition to the T-29's. In any event, a re-check of the gear on short final should be a part of every pilot's (copilot's/flight engineer's) technique.

WHO PICKED THIS PATCH?

The fighter unit was deployed to an island airfield belonging to an allied country. Conditions were known to be somewhat less than perfect, and, with the parallel taxiway closed, the standard procedure was established to taxi down the active and make a 180 into position for runup and takeoff.

Just prior to making his 180 at the end of the runway, one fighter taxied into a hole where the taxiway joins the runway. The hole was about three feet by four feet by one foot deep; the center of the hole went to a depth of three feet.

When the right main gear hit the hole, the right drop tank struck the runway and was ripped from the aircraft; the right main tire failed from the impact; and the left drop tank broke off due to the shock of impact.

Two small red warning flags, put out by the allied owners of the field to mark the hole, had blown over and were not in place at the time of the accident. The hole was marked only by a painted yellow outline.

The parallel taxiway had been NOTAMED closed for some time. No mention was made of the hole, however, and *none of the deployed personnel were aware of its existence.*

We can't help wondering if an airfield survey were run prior to deployment to that airfield. If not, there certainly should have been. And it's obvious that a continuing survey is needed to keep up with the airfield status.

T-BIRD POP-TOP

Shortly after takeoff, the front-seater noticed that the canopy locking handle was not in the locked position. He advised the back seater of the problem, then attempted to lock the handle. When he did, the canopy departed the bird in a great rush of noise, dust and windblast.

They got the bird back down okay, and neither pilot was injured. Investigation showed no discrepancy in either the mechanical overcenter locking system or warning light and microswitch. Downlock adjustment was within tolerance. No evidence of any unlock or release was found.

Preventive actions included:

(1) A challenge/response system of canopy check;

(2) Painting an aligning mark on the canopy rail to indicate downlock interconnect rod position to the pilot in the aft cockpit; AND

(3) Renewed emphasis on *actually accomplishing checklist items.*

FLIP CHANGES

Addition to Part II FLIP Planning:

The September issue of the Flight Planning Document Section II, North and South America and Europe, contained instructions for completing the Department of Defense International Flight Plan (DD 1801). These instructions appeared in the October issue of the Pacific Section II. NOTE THE MANDATORY ENTRY IN ITEM 18 UNDER OPR. FAILURE TO MAKE THIS ENTRY MAY RESULT IN A USER CHARGE AGAINST THE DOD.

Aircrews also note that four-character identifiers are used in international flight plans, e.g., DD 1801, and three-character identifiers are used in the domestic flight plans, e.g., DD 175. If the supplement shows a four-character identifier the first letter is not used in the DD 175.

Expansion of Positive Control Area (PCA):

Effective 0901Z 14 October 1971 the balance of the conterminous states PCA will be lowered to 18,000 feet excluding the Santa Barbara Islands, the Farallon Islands and that portion south of latitude 24° 04′ N. As a result, effective 14 October 1971 symbols for the PCA will be removed from the FLIP Enroute High Altitude Charts.

SOME STARCHY SUIT!

Some aircrew members, eager to look sharp in their new Nomex flight suits, starched them. This was before they read the warning tag inside the suits which reads, "Do Not Starch. Starching will destroy the flame resistance." (When all else fails, read the directions.)

In some instances, the starched flight suits were then discarded, in the mistaken belief that the suits were no longer fire resistant. Not so, advises AF Systems Command Headquarters: Nomex is permanently fire resistant—only the starch will burn. Launder the starch out of the suit and it will be as fire retardant as ever.

Ops topics

CONTINUED

A flight surgeon met the aircraft on its return, in order to take blood samples as quickly as possible after the incident, but neither these nor a physical examination of the pilot showed any abnormality.

Examination of the pilot's oxygen equipment revealed two holes, one at each end of the hose. The pilot stated that he had performed a visual inspection of his equipment prior to flight, and had completed all PRICE/ oxygen checks in the airplane. It's possible, of course, that the holes were poked in the hose during the flight. It's a lot more likely, though, that that particular pilot will be more careful when he checks his equipment from now on. ★

WHEN YOU GOTTA GO..

A tragic accident darned near happened recently when an F-4, cleared for a full stop landing, decided to go around and nearly creamed a helicopter which had been cleared across the active for a landing on the taxiway. Tower showed signs of consternation at not having been advised of the F-4's intent to go around. The helicopter pilot was downright perturbed.

Now, there's no denying the basics which keep us alive; the old maxim, "If it doesn't look right—take it around," has kept most of us out of a bad situation. There's a lesson to be learned here, however.

1. When you're cleared to do something, do it . . . UNLESS:

2. UNLESS: some important consideration dictates otherwise (such as the continued good health of old Ish).

3. IF you deviate from clearance (for the aforementioned good reason) TELL SOMEBODY!

OXYGEN DISCIPLINE

During an instrument training mission, the student began to feel a tingling sensation in his hands and feet, then an unusual sensation of warmth over his entire body. Recognizing his symptoms as hypoxia, he went to 100 percent oxygen, which cleared his symptoms.

T-BIRD BURNIN'

Engine shutdown appeared normal, and both pilots started getting out of the aircraft. At that moment the crew chief yelled, "It's on fire! Stopcock it!" The front seat pilot confirmed starting fuel and throttle off. Meanwhile, fuel continued to drip below the aircraft, the EGT reached 1000 degrees and the crew could see fire in the tailpipe. Both pilots left the bird in a hurry, and an alert crew chief jumped into the front cockpit, turned on the battery and turned the main fuel shutoff switch to OFF. The fire went out immediately.

Some after-incident experimentation turned up the fact that very little pressure on the aft throttle moved the front throttle forward in the stopcock range—which admits fuel to the engine. The forward throttle looked like it was stopcocked, but had in fact moved forward one-half to three-quarters of an inch. Best guess is that the rear seat pilot nudged the throttle forward with his knee when he stood up to get out.

The front seat pilot was not in the habit of tightening the throttle friction after shutdown (as required by the T-Bird Dash-One). Other T-Bird types should take note.

And thanks be to an alert crew chief, for saving a valuable piece of machinery.

Toots

is interested in your problems. She spends her time researching questions about Tech Orders and directives. Write her c/o Editor (IGDSEA), Dep IG for Insp & Safety, Norton AFB CA 92409

Dear Toots

I would appreciate further clarification in regard to oxygen servicing in TO 00-25-172, para. 4-1 and 4-2. I feel that besides a person being AFTO Form 35-qualified, he should have technical data in hand to familiarize himself with the type of system, precautions and instructions for handling oxygen, and potential hazards involved. I believe gaseous oxygen servicing is not a simple task and should require technical data. What is your opinion?

TSgt R. G. Rawson
Nellis AFB, Nevada

Dear Sarge

Although paragraphs 4-1 and 4-2 of 00-25-172 do not specifically state that the individual servicing oxygen will have the TO in hand, I believe the Air Force has made it perfectly clear that tech data will be used during all servicing, and I interpret this to include oxygen.

Gaseous oxygen servicing will only be a simple task when the checklist is followed. Oxygen itself is not flammable but will support combustion in other flammable materials. If oxygen is permitted to mix with flammables such as fuel and lubricants, the result can be highly explosive.

I suggest you bring the contents of AFM 127-101, para. 0802.18, to the attention of anyone who thinks servicing oxygen is a simple task and that no tech data is required. This paragraph describes the hazards involved with oxygen servicing and also lists several TO references that should be of interest.

Toots

Explosives Safety

Color it Loaded

GORDON S. TAYLOR, Directorate of Aerospace Safety

Primary cause, supervisory factor on the part of the aircraft munitions loading crew chief in that he did not follow the loading checklist, and did not demand strict compliance with all checklist procedures from every member of his crew. Contributing causes: (1) Supervisory factor on the part of the shift supervisor in that there was an obvious disregard for the proper use of checklists, (2) personnel factor—the number two man deviated from the checklist procedures, (3) personnel factor—the number four man deviated from the checklist procedures.

The above was taken from a report on an explosives accident in which a 20mm gun was fired inadvertently. Mishaps like this will continue to occur unless strict enforcement of the use of checklists by all concerned is assured.

If you are a supervisor, remember that being a good guy also requires you to protect your men—often without their eager support. If you are a worker, support your supervisor and comply with directives. The number four man mentioned above didn't. He was a fatality.

This item had hardly cleared the typewriter when another man was injured in a similar accident. He was hit in the groin when an M-60 machine gun fired while the de-arm crew was working on the gun.

Further checking revealed that another man was shot in the foot while working with a 7.62mm gun. Obviously there is a need to tighten up in this area. Supervisors and explosives safety types can help, but the individual working with the equipment has a like responsibility—and a greater interest, it would seem, since he probably will be the one to suffer from any goofs. ★

EXPLOSIVES SAFETY AWARDS

The July 1971 *Aerospace Safety* magazine proclaimed that awards will be established in AFR 900-26 for outstanding units contributing to *explosives safety*. Suggestions for a distinctive emblem, to be portrayed on plaques presented to award winning units, were received from the field. Judges have reviewed these suggestions and made their decision. Their selection is a simple flash of lightning, symbolizing aerial delivery of devastating energy. How well this potential force is controlled will determine 1971's award winners. ★

EGRESS SYSTEM MAINTENANCE

Ejection systems are powered by explosive devices that are rather stupid. When they are signalled to go, they respond regardless of the circumstances. We make them that way because when all else fails, they must function.

Highly trained technicians are required in order to maintain the system in perfect operational condition. Also, for obvious reasons, they must render it completely safe while they are working on it.

Experience during the past year indicates that egress systems have functioned reliably for the aircrews, but the safety side doesn't look as good. During this 12 month period there were 66 incidents involving inadvertent firing of egress components, due to improper maintenance operations.

The list of cause factors is long and quite familiar. Poor supervision, misjudgment, failure to follow the tech order or checklist, improper rigging, failure to install the safety pins . . . the list goes on and on.

to this problem is the supervisor. He must insure that his people, especially those newly assigned, are thoroughly trained on the specific type aircraft to which they are assigned. The new man may have been highly proficient on another aircraft at his last duty station, but he must be properly retrained and evaluated before being assigned to duty on a different type aircraft.

The supervisor must insist that the tech data and checklist are used at all times, regardless of how routine the job may seem.

Here is an example of what can happen when tech data is not properly used. A seat was being removed from an F-4 for phase inspection. As the seat was lifted upward the seat-mounted canopy initiator fired. Cause: the egress mechanic failed to perform all of the steps on the checklist. The linkage had not been disconnected and the safety pin installed as required by tech data.

In another case, an airman accidentally fired an M-12 initiator while attempting to remove the seat. He failed to install the lap belt initiator safety pin. This airman did not possess the 422x2 AFSC, although he was assigned to the egress shop. He had been transferred from OMS and had some egress system experience, but was not fully qualified to perform egress maintenance without supervision. The supervisor used poor judgment in allowing the airman to perform maintenance alone on a system in which he had not been trained.

Would these incidents have occurred had the supervisor done his job? Probably not. The supervisor must continually stress the importance of tech data. He must follow through to insure that his personnel are performing each task in a safe manner. And, above all, he must see to it that only qualified personnel maintain the system. This does not mean that an airman in training cannot be dispatched along with a qualified mechanic. He can and should be, so he can get first-hand experience. But he should never be dispatched alone to any job until he is fully qualified and certified as an egress mechanic on that specific equipment.

The secret of preventing most egress mishaps is forethought. Before taking any action, think of what can happen if you assume a head-up and locked attitude. Egress systems are provided for rapid inflight emergency exit, but they will function just as well on the ground if triggered inadvertently. ★

HEARING LOSS

Reference your reprint of MAICO Hearing Instruments' "Ten Danger Signs of a Hearing Loss," in the August 1971 issue. The third paragraph implies that hearing problems can almost always be overcome by medical attention or a hearing aid. The above statement is true provided that the hearing loss is a conductive type loss.

A conductive loss is one in which there is some impairment in the outer or middle ear which keeps sound pressures from reaching the inner ear. Typical conductive losses include ear drum perforations and wax build-up.

The hearing loss that the Air Force is most concerned with is caused by noise; noise induced losses are termed sensorineural because the nerve elements in the inner ear are impaired. The same ten danger signs, as stated in the article, may also apply to noise induced hearing losses. It should be emphatically emphasized that permanent noise induced hearing losses cannot be restored through any known surgical procedures or mechanical devices, such as hearing aids. Fortunately, noise induced hearing losses are easily prevented. By wearing the proper hearing protective devices when working in noise hazardous areas, Air Force personnel can insure themselves against noise induced losses.

Since a noise induced hearing loss is gradual and *painless,* one may never know he has defective hearing until it is too late. Noise hazardous areas are designated by the Base Bio-environmental Engineer who is normally located in the Military Public Health Section of the Base Medical facility.

Capt Thomas S. Webb
Chief, Military Public Health/Occupational Medicine Svcs Sec.
Hill AFB, Utah

Your point is well taken, so we'll print it for all to read. Ed.

☆ U.S. GOVERNMENT PRINTING OFFICE 1971 789-122/3

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.

Captain ROGER L. CRAKE

3250 Flying Training Squadron, Tyndall AFB, FLA

On 18 May 1971, Captain Crake was the instructor pilot in the lead aircraft of a two-ship, T-38 formation mission. When the throttles were retarded to military power on the takeoff leg at 300 KIAS, the right engine stalled, rolled back to idle, and would not recover. Almost immediately the aircraft began to roll to the right requiring full left aileron trim, one-half left stick deflection, and rudder to keep the wings level. Realizing that a serious control problem was developing and that time could be critical, Captain Crake elected to make an immediate landing. As he lowered flaps on final approach, the nose pitched up, and full forward stick and trim had no effect. Captain Crake then quickly raised the flaps which decreased pitch. He determined that by manipulating the flaps, some degree of pitch control could be maintained at 200 KIAS, while sink rate was held in limits by adjusting power on the left engine. Using this technique, he was able to accomplish a successful landing without the use of an elevator.

Investigation later revealed that a serious engine malfunction caused extensive heat damage to the aft section of the aircraft, melting portions of the horizontal stabilizer so that it could not be moved by the control stick. Captain Crake demonstrated outstanding skill in maintaining control of his aircraft using only flaps and power. WELL DONE! ★

USAF HAZARD REPORT	HAZARD REPORT NO. *(Assigned by Safety Officer)*

1. **HAZARD** *(To be completed by individual reporting hazard)*

TO: *(Safety Officer)*	**FROM:** *(Optional - Name, Grade and Organization)*

ORGANIZATION	LOCATION	DATE/TIME

WEAPON SYSTEM *(Type - model, series/A.G.E./material/facilities/procedure)*

TYPE OF HAZARD

	FLIGHT		MISSILE		GROUND		NUCLEAR		EXPLOSIVES

DESCRIPTION OF HAZARD

WHAT: A procedure which replaces the old OHR and provides a way to report all types of hazards on ONE form.

WHEN: Submit anytime you feel that a hazard exists in one of the safety disciplines (flight, missile, ground, nuclear or explosives).

WHO: Anybody can submit one!

WHY: To get the hazard removed or corrected, of course.

HOW: Through your supervisor to the safety officer. If this is not feasible, send the AF Form 457 direct to the safety officer—*but send it!* Check AFR 127-6, 30 Jul 71, for more details.

DATE	REVIEWING PERSON *(Typed or printed name and grade)*	SIGNATURE	DESIGNATED OPR
			DATE FORWARDED

AF FORM JUL 71 457 PREVIOUS EDITIONS ARE OBSOLETE. REPLACES AF FORM 471, DEC 68, WHICH IS OBSOLETE.