flying SAFETY

JULY 1990

- Is There Safety In Numbers?
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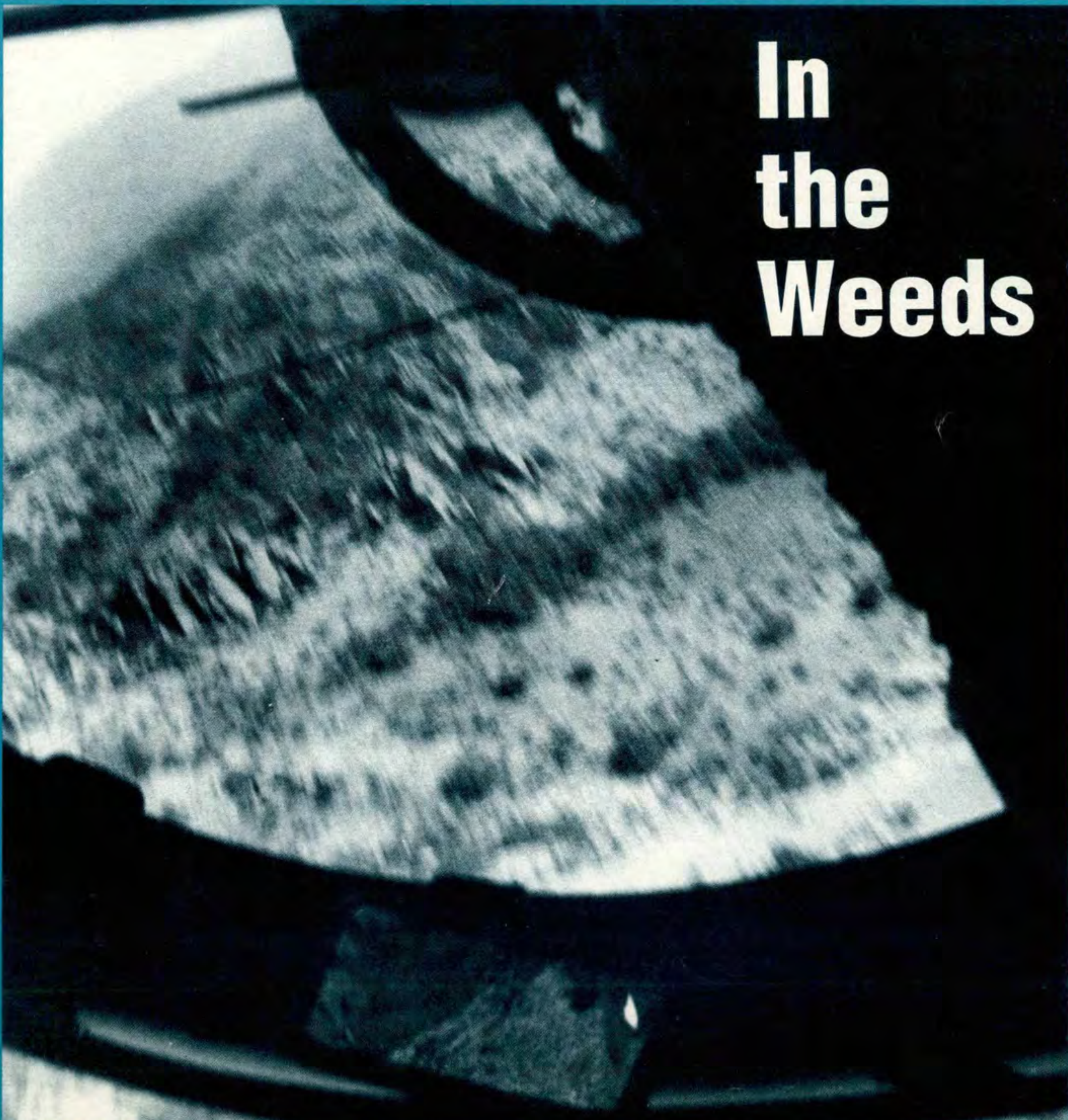
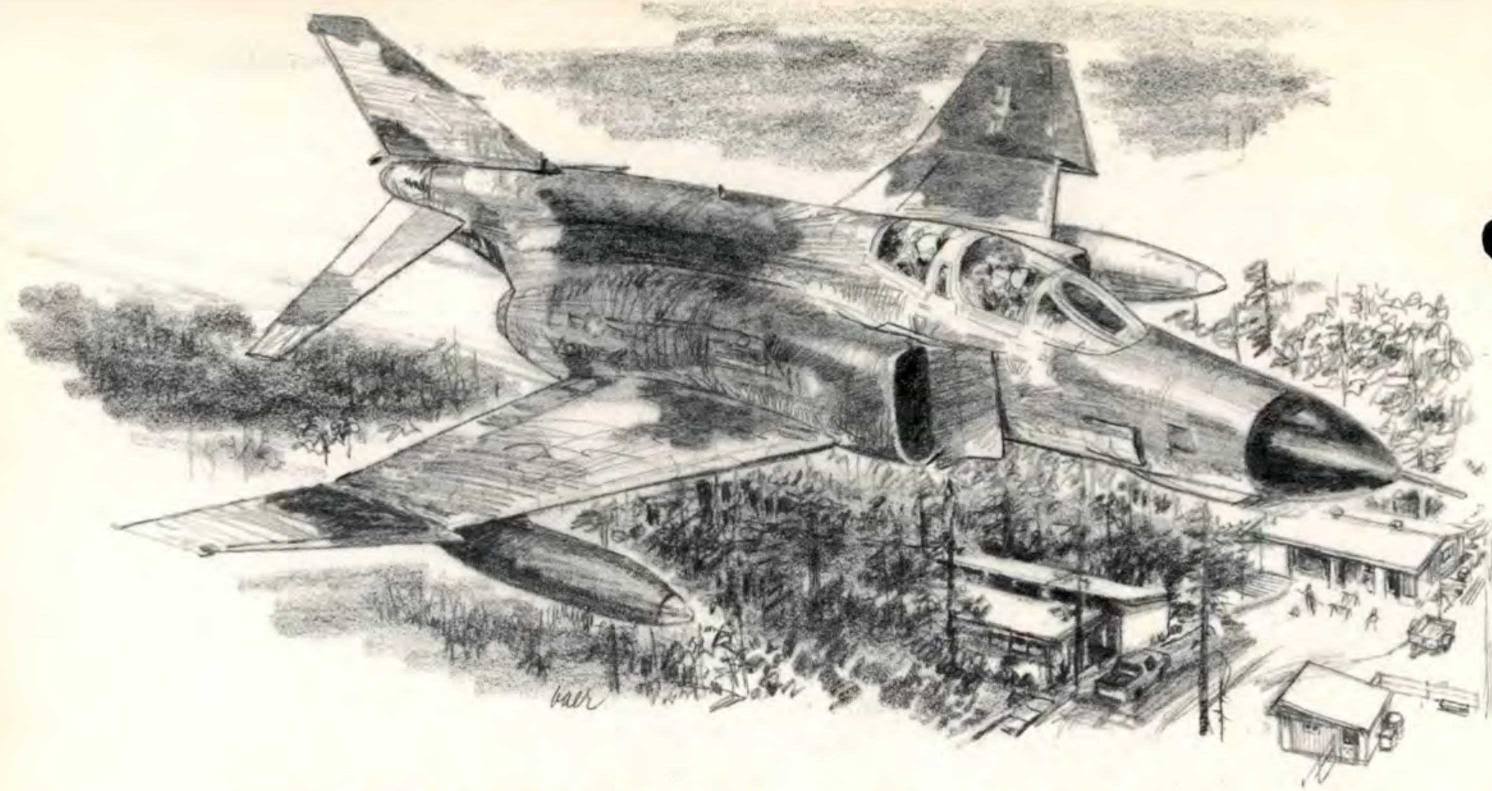
- Low Altitude Time Sharing



In the Weeds



THERE I WAS

■ The schedule called for a two-ship formation low-level training mission to acquire three targets on film, then enter the Alpha MOA for visual awareness training with a Baron aircraft. A pretty standard mission on routes we're all familiar with.

My pilot, an RF-4C qualified IP, briefed the flight which consisted of Baron 01 (us) and Duck flight. Duck flight would take off in formation, fly the low level in tactical formation to acquire the targets, then call entering the MOA to notify Baron 01 they were entering and ready for the training. Baron 01 was going to fly a low level to arrive in the MOA prior to Duck flight. Duck flight agreed on a sanctuary altitude of 3,000 to 5,000 in the MOA with Baron staying above or below until tally ho.

I asked my pilot how he felt because he looked a little pale and was not his normal, jovial self. He reassured me he had had a touch of flu but felt fine despite his appearance, and he'd been skiing the previous week and needed to fly. What he didn't say was he had been sick for the past several days with little desire to eat. Time to walk to the jet.

Baron 01 flew our low level with little luck as it seemed our heading system was pulling us off far enough to miss the targets, or my pilot was having some difficulty holding heading and ground speed accurately.

We decided to hold low in Alpha MOA so Duck flight would be highlighted against the sky, and we'd be harder to see against the dark ground. We'd been in holding only a minute when we heard the radio call of Duck flight approaching the MOA, and they were established in their altitude block.

After the radio call, we knew we had 1 to 2 minutes for Duck flight to get to our position. We started searching in the direction we expected the flight to come from. Our racetrack holding pattern became more of a 360-degree turn.

We expected to see Duck flight at any time, but it seemed they made their call earlier than we figured. We kept searching for them so they wouldn't slip through. The conversation in the cockpit revolved around "Do you see anything yet? They have to be here by now."

Suddenly the warning of "ALTITUDE! ALTITUDE!" in our headsets. "Pull up!" I yelled and reached for the stick as it came back and we began to climb.

In our concentration of searching for Duck flight, the pilot had allowed the aircraft to develop a descent rate which was recoverable... with warning. A slow cross-check as evidenced by erratic heading and ground speed indicated one of us had trouble concentrating on the events at hand. We were very lucky our bank angle was shallow enough for the radar altimeter and "Bitchin' Betty" to save our lives. ■

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SPECIAL FEATURES

REGULAR FEATURES

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IS THERE SAFETY IN NUMBERS?

MAJOR KELLY M. HAGGAR
Directorate of Aerospace Safety

■ Why do airplanes fly into the ground? The simple answer—they are pointed at it for too long—belies a lot. After all, what is actually necessary for an aircraft to collide with the ground? It literally need only have the wrong vector for a few seconds too many. Why else are low-level missions so sporty?

Provided the aircraft is properly equipped, the low-altitude environ ment itself isn't particularly hostile. The engines will tolerate throttle bursts a lot better at 500 AGL than FL 500, the generators don't care about air density, and the radar will work as well as it did at high-level cruise. True, gusts, wind shear, and turbulence are all greater at low level, but airplanes only come apart when a limit is exceeded. Aircraft that can't structurally endure the low-level environment shouldn't be in it. This leaves birds as the remaining low-level peacetime threat. Birds fly low, so that's where most of the bird hits are reported. But, bird hits are not the most common reason for low-level losses; the ground is. More airplanes simply fly into the ground than are lost from any other reason at low level.

Perhaps this is easier to see in fast movers. The fighter pilot is alone (or has only one other crewmember, the WSO) and has no one else to say, "stop looking over your shoulder at your wingman, and look at this big rock dead ahead." (Sorry for the pun.) Additionally, the fighter/attack missions involve much steeper dive angles and more maneuvering than do "heavy" sorties.

Then why do heavies fly into the ground? The B-1, B-52, C-141, and C-130 all have lots of folks with window seats. The bombers have special radar modes just for terrain following, and the B-52 even has both low-light television and an infrared sensor for terrain monitoring. With all that going for a heavy crew, how could they come to grief on a hillside?

In much the same way fighter pilots get bit: Everyone's attention is focused on something other than where the airplane is going. It doesn't matter if "everyone" is one solo pilot or a whole crew. For that matter, the airplane doesn't have to be on a tactical, low-level mission. If "everyone" is a whole L-1011 crew, and they are all concentrating on changing a burned-out bulb on a landing gear light panel, the Everglades swamp will do just as thorough a job of destroying the aircraft as a mountain in the Red Flag ranges.

For example, a bomber crew is descending into a low-level route.

Fighter pilots spend a lot more time in the low-level environment than most pilots. So why is "collision with the ground" the leading cause of mishaps among "heavy" fliers?

Their plan is to level off at 800 feet on the radar altimeter. They have not computed a rough pressure altitude which corresponds to 800 feet above the terrain. The pilot flying the descent suspects the radar altimeter isn't working right because it shows roughly a constant height above the terrain while the aircraft continues to descend. The crew becomes focused on analysis of this radar altimeter as the descent continues. Unknown to the crew, the radar altimeter is working perfectly. The flightpath is over down-sloping terrain, resulting in a near constant height above terrain even though the pressure altitude is dropping steadily. Mere seconds before impact, the other pilot sees a ridge and attempts to pull up over it. They almost make it . . . the aircraft is too damaged from the impact to be flyable, but it pitches up and rolls just enough for nearly all aboard to eject before that final impact.

Large aircraft have crews for many reasons, one of which is extra eyes can see more. The solo pilot can't delegate these other tasks to anyone else; the only option is "time sharing." ("Can I look inside the cockpit or behind me *now*? If so, for how long? If not, when can I?") For heavies, other choices are possible. "*You* look at those; *Nav*, get out the books; *I'm* going to level off here." In any event, alone or with a crew, somehow the flightpath of the aircraft must *always* be continually monitored. If it is not done by the autopilot, the TFR equipment, the WSO, the right seater, the solo troop...it will be done by the ground. ■

ARES (Agile Responsive Effective Support) prototype. Designed by Burt Rutan, who also designed the around-the-world Voyager, makes a test flight over the Mojave Desert. Designed for a close air support role, it has an all composite fuselage and sports a 25-mm cannon.

COMPOSITES

Envision an aircraft with an unlimited structural life—one that requires little or no airframe inspection—an aircraft with almost no screws or fasteners of any kind and is virtually immune to corrosion. These qualities describe a new generation of aircraft being developed through a technology called . . .

Advanced Composites

CMSGT ROBERT T. HOLRITZ
Technical Editor

■ A loose definition of a composite is the combination of two materials that create a *new material* with different characteristics. Basic composites have been around since Biblical times when entire cities were constructed with blocks made up of a composite of straw and mud. During World War II, an aircraft carrier was actually designed to be constructed of a composite of ice and wood pulp. Although the iceberg warship was never built, the idea won the favor of General Hap Arnold after he failed to effect any appreciable damage to a 3-foot square sample of the wood and ice composite with a woodsman's ax.

Modern composites were developed in the thirties, but their use in aircraft did not begin until the mid-forties when scientists and engineers at Wright Field, Ohio, conducted research using fiberglass to manufacture aircraft. While fiberglass was ideal for use in aircraft because it was strong and light, it lacked rigidity, and its use was limited to nonstructural aircraft components such as cowlings and radomes.

However, in the late fifties, scientists discovered that filaments of certain materials combined with newly developed epoxy resins provided the strength and rigidity needed for use in airframe construction. Two of the most promising elements were boron and carbon. Today, the term "Advanced Composite" generally refers to composites that are composed of either boron or carbon fibers. But because it is less expensive, lighter, and easier to machine and drill than boron, carbon/epoxy composites are now used almost exclusively by aircraft manufacturers.

Advantages

From an engineering standpoint, the greatest advantage of using composites is weight reduction. For example, a component such as a rudder constructed from carbon composite is 44 percent lighter than one constructed from aluminum.

The lighter the aircraft, the greater its range and capacity. Furthermore, carbon/epoxy composites are highly resistant to stress cracks. Studies by aircraft manufacturers and the Advanced Composite Program Lab at Sacramento Air Logistics Center showed cracks do not occur in composites until the applied loads approach the designed failing load of the part. Therefore, fatigue is not generally considered a problem with these advanced composites.

Another advantage of composites is that they are virtually immune to corrosion. Unlike metals, they are impervious to most corrosive elements. Consider the time and money saved in repair and corrosion-prevention costs. In addition, composite design greatly reduces FOD potential because fewer screws, rivets, and fasteners are needed. In fact, the pure composite airframe will be almost free of fasteners.

Drawbacks

As with any technology, advanced composites have their problems. For one thing, field repair capability is mostly limited to cosmetic repairs (scab patches), normally no larger than 3 inches in diameter. Virtually any structural damage requires depot-level maintenance. Fortunately, composite airframes are extremely rugged and fare well when subjected to battle damage. In a test conducted by McDonnell Douglas Aircraft, a vertical stabilator constructed of carbon/epoxy composite was subjected to numerous 50-caliber bullet strikes and one 20-millimeter high-energy incendiary bullet strike. In spite of the damage, engineers determined the stabilator would have performed well enough to get the aircraft home.

Lightning also poses a problem to composite structures. Since composites are largely nonconductors, they do not enjoy the relative immunity which metal-clad aircraft have from lightning damage. Instead, a composite acts as a capacitor. When struck by lightning, a tremendous amount of heat is generated, causing damage along the path of the current. Generally, though, what composite aircraft lack in conductivity they make up in survivability. In another test by McDonnell Douglas aircraft engineers, a composite wing was subjected to a 200,000-ampere, laboratory-generated, lightning strike. The result was a 2-inch-diameter hole which penetrated 12 to 15 layers of composite. But, as with the projectile test, engineers determined this damage would not have placed the aircraft in jeopardy. There have been incidents when pure (or nearly pure) composite aircraft were struck by lightning, but all were able to land safely. Nevertheless, aircraft manufacturers and government agencies, including NASA, are working on ways to make composite aircraft less susceptible to damage from lightning strikes. Several methods are being tested. The Beechcraft Company incorporated a metallic mesh in the skin of its all-composite business jet, the Starship, to help dissipate lightning. Conductive paint offers us another possible solution, but at the cost of the stealth properties of composites.

A 62 percent prototype of the "Advanced Technology Tactical Transport" (AT^3) being developed by Scaled Composites of Mojave, California, will be manufactured almost entirely of composites.

Advanced Composites Program Office

Although there are problems with advanced composite technology, the people at the Advanced Composites Program Office (ACPO) at Sacramento ALC are working on solutions.

The most serious problem we find with composites is delamination. Delamination can be caused by an impact or can occur as a result of the expansion of moisture within the structure. Moisture may find its way into a composite during repair or manufacture. The main problem with delamination is that it is quite often undetectable from outside of the structure, and most nondestructive inspection procedures cannot detect delamination or the presence of moisture that can cause it. ACPO engineers have developed a three-step process to detect delamination and moisture in a composite structure.

The first step in the process is conventional X-ray. While X-ray will not detect delamination, it will show any major damage to honeycomb materials. The part then undergoes ultrasonic testing. This procedure is so precise it can not only detect delamination, but can even identify which layers of the material are damaged. Finally, the part is sent to the Air Force's only nuclear reactor, where neutron radiography (N-ray) is used to detect even the slightest amount of moisture which may be trapped within the composite structure.

Product support is a major concern of ACPO. "We are concerned that the technology is advancing faster than the equipment, and the training needed to maintain composites can be made available in the

continued

COMPOSITES

continued

Wade Richards (right), Chief of Sacramento ALC Nuclear Section, explains the operation of the center's N-ray facility to Joe Tilson, top structural engineer from the Air Force Inspection and Safety Center, Norton AFB, California.

field," said Milt Swope, the ACPO program manager. "Structural repair and NDI specialists in the field are not equipped or trained to maintain the sophisticated composite aircraft that are now on the drawing board. ACPO is working with manufacturers to create a standardized Field Transportable Design and Analysis System that will ensure technicians in the field will have all the technical data and tools to perform a quick and effective repair in the field."

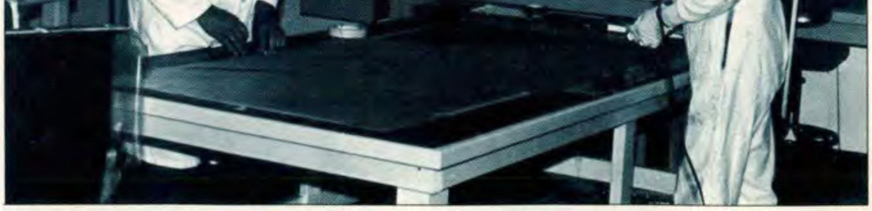
In 1975, the F-15 became the first Air Force aircraft to use "advanced composites." Much of the Eagle's tail and the speed brake were made of advanced composite material. The F-16 contains almost 200 pounds of composite material. The first military aircraft to be constructed almost entirely of advanced composites, the CV-22 Osprey, is already undergoing flight tests.

The pure composite aircraft is not a new concept. Scaled Composites, a company located in the Mojave Desert a few miles from Edwards AFB, California, has been building composite aircraft for almost 20 years. The company is owned by Burt Rutan, the designer of Voyager, the first aircraft to fly around the world nonstop without refueling. The company has built, and is currently flight testing, a 62-percent scale model of the Advanced Technology Tactical Transport. Except for the engines and landing gear, this aircraft is built entirely of composite material. According to the project engineer, the full-size aircraft, which weighs 28,000 pounds empty, can carry a cargo of nearly 9,500 pounds and fly at a gross weight of more than 54,000 pounds.

In the next few years, composites will revolutionize aviation maintenance, not just with new aircraft, but also with composite replacement parts for aircraft already in the Air Force inventory. ACPO has more than 70 replacement parts under design for existing aircraft. They have built a composite rudder for the F-4 that weighs less than 9 pounds. They are also constructing a composite leading edge to replace the aluminum one on the A-10. Incredibly light and strong, it is designed to withstand the impact of a 4-pound bird at 300 knots without significant damage.

It is difficult to predict what aircraft designers will come up with in the next 20 years. But it is almost certain the aircraft they build will be made of composites. ■

Milt Swope, manager of the Advanced Composites program office at Sacramento ALC, holds an F-4 rudder made of composite material. It weighs less than 9 pounds.



Technicians lay out composite material for the manufacture of an improved A-10 Thunderbolt II leading edge. The new edge will be lighter and stronger than the current aluminum edge.

FIRE CONTROL

Perhaps the worst horror of battle is the firing on friendly troops. The effects can be devastating on both ends of the weapon.

CAPTAIN DALE T. PIERCE
919th Special Operations Group
Duke Field, Florida

■ When the upload was complete and the munitions vehicle was clear, the ramp was raised and the AC-130 Gunship taxied to hold short. Final checklists were accomplished, and flight deck lights were dimmed. All systems were go.

As the navigator, I brought the fire control system on line when the aircraft lifted off, checked the navigation systems, and performed the after-takeoff checklist. The pilot called, "Nav, heading."

"Three-zero-two, pilot. Now 28 minutes to the entry point."

We proceeded along the route inbound to the target area, and the usual coordination calls were made.

"MOONBEAM, PEPOD 23."

"PEPOD 23, MOONBEAM. Contact ROADWATCH on 41.95 at 0308 Z."

Our TOT for the target area entry point was 0310 Z.

"ROADWATCH, PEPOD 23."

"PEPOD 23, ROADWATCH. Contact IRONMAN, this frequency."

"IRONMAN, PEPOD 23."

"PEPOD 23, IRONMAN. We have radar beacon, IR strobe, and are located EK022916."

After a couple of minutes, "IRONMAN, PEPOD 23. We have your position . . ."

"Nav, pilot, could you dim your lights some more?"

"Roger." I turned them down to minimum.

As the mission continued, the number of tasks to be performed and the degree of difficulty increased. After we'd been on station for about 45 minutes . . .

"PEPOD 23, IRONMAN. Need immediate assistance. Incoming from 120 degrees at 900 meters."

"Nav, FCO. Make your radar primary."

"Roger." I made radar primary in the fire control system. "Radar is primary."

As we reacquired the friendly position, I prepared the fire control system for offset delivery.

"Nav, FCO. Make TV primary."

"That's a Roger." I made TV primary in the fire control system. "TV is primary."

As the pilot positioned the aircraft in an orbit around the friendly position, I "targeted" the position to ensure we were tracking the desired position.

"Nav, make IR primary."

"Roger." I selected IR. "The IR is primary."

While the IR searched for the off-

continued

FireControl continued

set position, the TV and radar tracked the friendly position.

"Nav, make radar primary."

"Roger." I selected radar. "Radar is primary."

We were tracking the friendly position. Offset position was ready. As I calculated firing altitude for the target and confirmed fire control settings, the FCO had TV move to the target. While I was calculating the required indicated airspeed . . .

"Nav, make TV primary."

In the dim light, I looked up at the fire control panel. The sensor select switch looked like it was on TV, one detent left of radar. "Roger, TV is primary."

"Pilot, Nav. Fly 6,345 indicated altitude and 163 indicated airspeed."

"Pilot, FCO. Ready to fire."

"Nav's clear."

"In the sight." The trigger switch was pressed and released. "Super." (The gun sight indications were perfect.)

"FCO, TV. No joy."

"Nav, make radar primary."

I reached up to select radar and found the weapons select switch on radar.

We had just fired on the friendly position. A platoon of US Army Rangers had just been fired on by the most lethal direct-fire weapon system in the world!

Most of these dedicated military professionals would be wounded or dead if this had not been a Checkered Flag dry-fire training exercise. If the trigger had caused the guns to fire live ordnance instead of activating the gun simulator light... thank God for training exercises.

As I began considering the implications of what had happened, I realized it had to wait. I screwed up, but we weren't through with the mission yet. We completed our work with Ironman and proceeded to the "wet fire" range.

After landing, I started to seek the causes for the error. As is usually the case with mishaps, I found more than one contributing link in the mishap chain.

The first link was that I was a second lieutenant without much experience, who became overwhelmed by the wartime workload of the Checkered Flag training exercise.

The second link was that I focused my attention on setting up the fire control system and positioning the aircraft (secondary tasks) and relegated situational awareness (a primary task) to a secondary role.

The third link was the sensor select switch was a black teardrop-shaped switch on a black panel, and with the lights turned way down, the position of the black switch can't be seen reliably. Touch was the only way to confirm its position without looking at the fire control display located at the far left end of the console.

So what did I do to prevent recurrence? The first thing I did was to promise myself I would make the best of future training opportunities. Second, I made a conscious effort to learn to maintain proper task priority. I believe training and experience, along with a conscious effort to maintain situational awareness, is paramount to prevent this type of mishap.

I also requested a minimal cost modification to the fire control panel. The sensor select switch is now white on a black background, and its position can now be seen with almost no light.

Last night, like most nights when I fly, I looked at the freshly painted, white sensor select switch, and I remembered how and why I "killed the friendlies" on that training exercise 9 years ago.

Peacetime training exercises are an excellent time to learn valuable lessons at minimum cost and reduced risk. Most of the time during these exercises, we emphasize putting ordnance on target and ask whether we are doing all we can to accomplish that task. That's appropriate. However, in addition, each time I look at the sensor select switch, I also ask myself whether I'm doing all I can to prevent putting ordnance on the wrong target.

Lessons learned in training are inherently less expensive than lessons learned in combat. Are you making the most of your training opportunities? ■

LOW ALTITUDE TIME SHARING

When you're down in the weeds and flat out honking with one eye on 12 and the other checking 6, you had better have a plan ready to keep all your priorities straight.

CAPTAIN CHUCK LOUISELL
HQ USAF/IGF
Washington DC

■ It's your first RED FLAG mission, and you've got to go deep into Red territory to hit a well-defined fuel storage area. Are you ready? You've got a lot of responsibilities combined with strange ranges, unfamiliar terrain, and lots of threats. You need to have a plan for accomplishing a lot of tasks in a dynamic environment. This article presents a plan for low-altitude time sharing which will allow you to be successful. Time sharing requires two things—knowing your responsibilities and having a game plan for accomplishing them.

Responsibilities

The first thing the flight lead needs to do is outline responsibilities for each flight member. Dividing responsibilities is the key to giving each guy a manageable number of tasks to perform. The second key to success is each flight member stick to their own responsibilities. Since the basic fighting unit is the four-ship, a good breakout of responsibilities looks like this:

- **No. 1** Get the flight to the target and back. Primary planner and decision maker—primary navigation and radar lookout responsibilities for the flight. Visual lookout for mutual support of no. 2. No. 1 should also be the primary engaged fighter, if practical.
- **No. 2** Support no. 1. Visual lookout and capability to support no. 1 in an engagement. Keep up with navigation and monitor the radar.
- **No. 3** Support no. 1. Assist no. 1 with planning, and act as alternate decision maker. Maintain a position of support for the lead element. Secondary navigation and radar lookout responsibilities. Visual lookout for the flight. Should be the secondary engaged fighter, if practical.
- **No. 4** Support no. 1. Visual lookout and capability to support no. 3 in an engagement are the primary responsibilities. Monitor position on the flight plan and keep your

continued

Low Altitude Time Sharing continued

radar turned on. Don't devote time to the radar which should be spent doing your primary job of visual lookout.

Notice the four-ship responsibilities are not outlined as two two-ships put together—we are going to employ as an *integrated four-ship* so we can *maximize* our effectiveness through division of labor.

Time Sharing

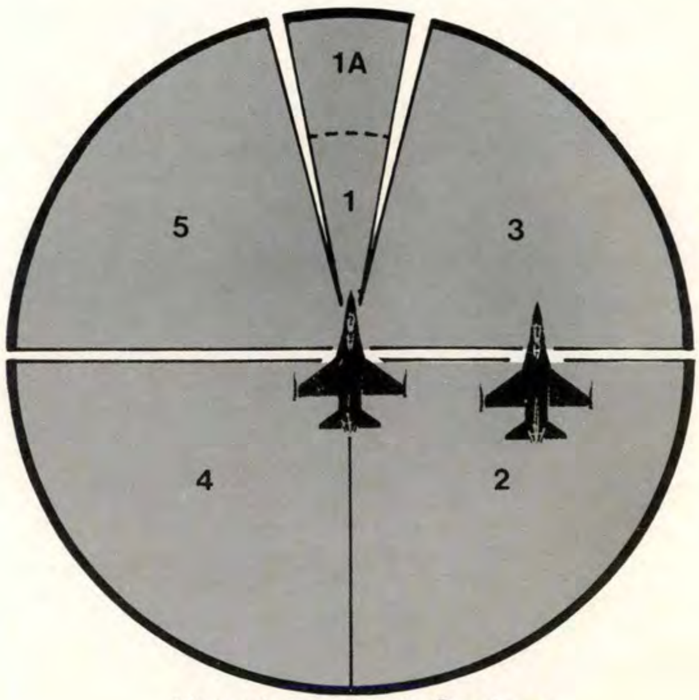
Our eyes and brain function as information-gathering and processing devices, but they can gather and process only one thing at a time. Therefore, we have to develop a time-sharing plan so we can quickly and efficiently accomplish many tasks.

Just like the fire control computer, we have to prioritize tasks and make a plan to do them all in a limited amount of time. This means we need to assign a frequency for accomplishing each task based on its priority. Basically, we build a "computer program" to systematically direct our efforts in gathering and processing information.

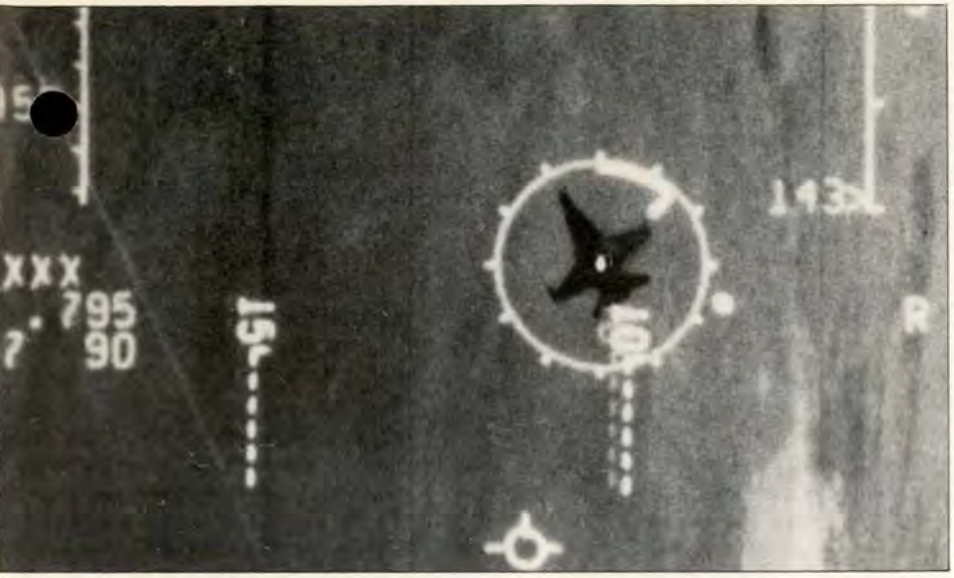
So, what does this scientific stuff have to do with checkin' six and shootin' MiGs? Well, remember the priority list from the responsibilities section? If we combine those with the idea they all require information gathering and processing—which we must do one thing at a time—we see we have to time share our brain and eyes computing device. Almost every fighter pilot has come up with some system for time sharing, but I'll throw this one out as a technique younger guys can use to develop their own in 150 hours versus the 500 hours I took.

Building the Time Share Plan

Since most of our responsibilities involve visual lookout, we need to make a plan to cover the airspace around our aircraft. The first thing we'll do is divide the airspace into sectors and assign a priority to each as shown in the figure. This plan will be developed from the point of view of no. 2 of a four-ship, but it applies to all the flight positions.



Visual Lookout Sectors



To avoid this critical position on your enemy's HUD, your goal on every low-level mission should be to fully develop your cross-check. This will take practice and discipline but will pay off when the shooting starts.

Sector 1 Sector 1 is the hub of our cross-check. It is divided into two parts. Sector 1 is *Near Rocks*, the rocks which will affect our flightpath in the next 5 to 10 seconds. This sector is the highest priority and is the center of the cross-check. *Near Rocks* are the ones which will fold your Falcon. Sector 1A is *Far Rocks*, the terrain ahead that will affect our future maneuvering. Pilots who look ahead at the *Far Rocks* are the ones who are smooth in their maneuvering to maintain position or navigate, because they see the mountain peaks and valleys in time to make small corrections. The smaller your corrections are, the more time you will have to check six, and that's what it is all about.

Sector 2 Besides not fracturing your Falcon, the next most important area for your lookout is inside the flight's "six." Sector 2 allows you to monitor your position and check your leader's 6 o'clock. Sector 1, 1A, and 2 make up the basic cross-check—*Near Rocks, Far Rocks, — Check Six.*

Sector 3 Once you have the basics down, it's time to pick up more areas of the visual lookout. In keeping with your mutual support contract, the next area you would want to pick up is inside the flight, ahead of the 3-9 line. By searching this area, you can pick up bandits in a conversion, as well as SAMS fired from the front quadrant. You can take this area and integrate it into your basic cross-check. Remember, Sector 3 is a lower priority than Sectors 1, 1A, and 2; therefore, it should be searched less frequently. Also, don't forget you need to come back and reference *Near Rocks* and *Far Rocks* between each sector search.

Sector 4 After you have Sector 3 in your lookout, you should strive to pick up Sector 4. Sector 4 is outside the flight's 6 o'clock. Once again, remember the priority listing when setting the frequency for searching this area.

Sector 5 When you are really on top of things, you can go to a 360-degree lookout by picking up Sector 5. Sector 5 is outside the flight, ahead of the 3-9 line. When you get this into your cross-check, remember it is your lowest priority—you owe it to your flight lead/wingman to provide inside-the-flight lookout in accordance with your mutual support contract.

Building and Breaking Down the Cross-Check

Your goal on every low-level mission should be to fully develop your cross-check. This will take practice and discipline, but the ability to quickly set up your lookout will pay off when the shooting starts. On each mission, start with the basic *Near Rocks, Far Rocks, Lead—Check Six* pattern and build it up to your full capability before you get to the threat.

Your cross-check will break down for various reasons such as extremely rough terrain, defensive reactions, navigation turns, etc. When this happens, start dropping out the lower priority items in order. There will be times, such as hard turns, when you'll drop all the way back to *Near Rocks*. The key is to quickly reestablish the cross-check one step at a time when you roll out.

Radar Integration and Cockpit Tasks

Where does the radar fit into the picture? The answer to this question is in the responsibilities section listed above. Your position will determine where to incorporate radar lookout. As nos. 1 and 3, it should be put at the same level as Sector 3. As no. 2, the radar should fit in after Sector 4. As no. 4, the radar would come after all visual lookout has been put into the cross-check.

Performing cockpit tasks is the next problem. The best plan is to do as many of them prior to hitting the low level as you can. Cosmic switch plans are often forgotten in the heat of battle, so the best plan is a simple one. When switch changes are required, they should be substituted for a sector search in the cross-check. This will keep us on track with the idea we never stagnate our efforts—we do one task, then reference our flightpath before moving on to another task.

Summary

This technique for setting up a systematic low-altitude time sharing plan is not *the* answer—it is just a guide. It will not work in all situations, but it provides a starting point from which to develop your own method. The successful fighter pilot will take advantage of peacetime to develop the discipline and skills to be able to kill *and* survive when the opportunity comes. ■

Reprinted from *Flying Safety*, March 1987.

NOTAM NEWS

MAJOR JIM KEPHART
DOD NOTAM System Manager
USAF Instrument Flight Center
Randolph AFB, Texas

Remember when in June 1989 those guys at the DOD NOTAM office totally screwed up your idea of what a NOTAM should look like? Last month's (June 1990) issue of Flying Safety *magazine contained a story about the Automated Weather Distribution System (AWDS). The September 1989 issue of* Flying Safety *described the integration of the military NOTAM System with the Federal Aviation Administration civil NOTAM system and touched briefly on the NOTAM portion of the forthcoming AWDS. We don't want our aircrews to be taken by surprise again, so here is some advance information on the AWDS system and how it will affect your flight planning.*

■ In May 1990, Electronic Systems Division let a $78.4 million contract to Contel Corporation for the installation of AWDS at selected Air Force and Army facilities. The AWDS system brings total automation to squadron flight planning rooms and to base operations. The aircrew member planning a mission will now have fingertip access to real-time NOTAM information on any location covered by the DOD NOTAM system. Along with the convenience and safety of accessing the new system from any AWDS terminal location comes the extra responsibility of learning how to use the system to get the desired results.

"ARQ" Makes It Work for You

Before we talk about how to use the AWDS NOTAM terminals, it's important to understand the advantages the new system offers the aircrew member. A new concept in near real-time communications, Automatic Response to Query (ARQ), was employed in the development of AWDS. This simply means instead of storing all information in a central remote data base (at the US NOTAM Office computer) and sending hourly NOTAM updates to airfields, the AWDS system establishes local NOTAM data bases at each airfield. The DOD/FAA computer system will automatically update each of the local data bases around the world. These local data bases contain NOTAM information on 300 of the most frequently used airbases. The list of airbases contained in the local data base is determined by the type of mission flown out of the airbase, and the list can change according to the wishes of the local flying organizations.

At the squadron level, a terminal with limited capabilities will be available for aircrews flying "local" missions. To make the system as user-friendly as possible, the five most frequently used airbases and the home station can be called up at the touch of a button. AWDS then automatically displays weather and

NOTAMs for these bases. For flying organizations with standard training routes and transition training bases, this will be an especially convenient feature.

"I Wonder If Villafranca's Runway Is Closed . . ."

Now, you're probably wondering what happens if you want to go somewhere not on your list of 300 locations contained in the local data base. This is where the ARQ comes into play. You will simply enter the four-letter ICAO identifier for the airbase, Flight Information Region, or Area Control Center you desire. Your AWDS system will automatically request the information from the DOD/FAA central computer and reply back to you with the desired information, normally within 1 minute. The NOTAM terminal will take up to 10 ICAO entries at one time, and you can also personalize your information by entering aircraft call sign, tail number, mission number, or even your "significant other's" private phone number on the optional requestor identification line (see figure 1).

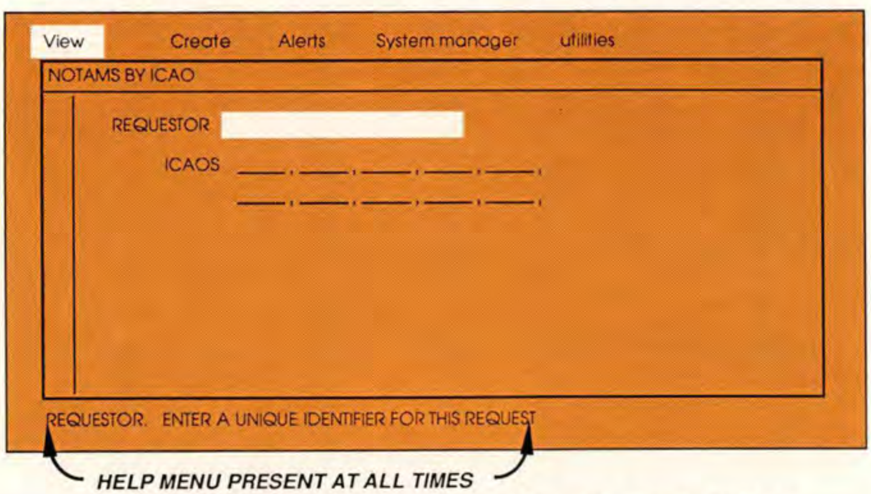
Of course, none of us have ever stood in front of a NOTAM board—copying endless volumes of information for our impending 4,000-mile flight—and loved every minute of the exercise. Even more aggravating is searching the NOTAM board for your information, only to find the ragged edges where one of your fellow airmen decided to take his own personal copy of the NOTAMs with him. AWDS will quickly and neatly solve this problem for you. Each AWDS NOTAM terminal will have a dedicated printer to quickly and conveniently provide the aircrew member with a hard copy of all requested information.

The first installation of an AWDS terminal is scheduled for McGuire AFB, New Jersey, in July 1990. The system will then undergo Follow On Test and Evaluation. While the weather portion of AWDS will become operational by October or November of this year, the NOTAM portion will not become fully operational until February of 1991. This is due to development of the software interface between the FAA and the DOD computer system.

Status Quo 'Til January 1991

Aircrews can rest easy with the "normal" NOTAM system until AWDS is fully operational in early 1991. After implementation of the AWDS system, the concept of operations calls for removal of all "hanging paper" in base operations facilities. A Special Notice Summary for North America will be published and updated every 6 hours, but all other NOTAM products will only be available on request from the AWDS terminal. To facilitate the learning curve, a mobile training team will spend 12-14 days at each facility where AWDS is installed. Additionally, the NOTAM Management Division at the USAF Instrument Flight Center will follow installation with on-site visits to the base operations facilities and to the flying organizations using the new system. Organizations desiring more AWDS NOTAM information prior to installation are encouraged to contact USAF IFC/NM, Randolph AFB, Texas 78150. ■

FIG 1. THE NOTAM TERMINAL WILL PROVIDE QUICK AND SIMPLE ACCESS TO THE INFORMATION THE AIRCREW REQUIRES.



1. Cursor should be on **NOTAMs**. If not, move the cursor to NOTAMs.
   Press **<ENTER>**
   NOTAM BY ICAO data entry screen appears.

2. Type required data.
   Use **<ENTER>** to move from field to field in NOTAM form.
   Use **<BACKSPACE>** to delete incorrect data in a field.
   To return to a previous field, use **<UP ARROW>** on numeric keypad.

   a. REQUESTOR. Type in your identifier (Acft call sign, pilot name, etc).

   b. **ICAOs** Enter ICAO identifier(s) for desired NOTAM locations.

3. After entering last ICAO identifier, press **<ENTER>**.
   All NOTAMs associated with requested ICAO identifiers are displayed.

Once Again, Thanks For Your Support!

AND THE WINNER
FOR THE MARCH 1990
DUMB CAPTION CONTEST
IS . . .

SSgt Evelyn J. Sprehe
AFSSMET/MEMS
Peterson AFB, Colorado

Great going, gang . . . you really put it to those dingbat Dumb Caption Writers. Each month, you have answered their challenge with better and better captions, and this month may be some of the best of all. Not only do we have a problem with the Dumb Caption Writers outrageously moaning and groaning with despair (they're an unruly lot anyway), but also we had to rush two of the judges to the hospital to remove all the stitches in their sides from laughing so hard. And SSgt Evelyn J. Sprehe's entry was the worst (best) of them all so she will be sent our legendary CHEAP LITTLE PRIZE along with the judges' hospital bills (just kidding). It's no joke that we're continually amazed at all the different entries that come in. You people are really special. We offer you some of the honorable mentions (printed below) with the warning they may prove hazardous to your health. Remember, he who laughs last has a lasting laugh, or something like that.

Honorable Mentions

1. You're right!! When Johnny talks, Ed McMahan's lips *do* move.
Capt Ed Reed, AFGWC/WFF, Offutt AFB, Nebraska

2. (R) According to the inventory tag, it's a 1949 model Philco. (L) No wonder we can't get anything but old Milton Berle shows!
Chuck Woodside, SA-ALC/PMR, Kelly AFB, Texas

3. $10,000 for a 5-inch TV. The Pentagon's not going to like this.
SSgt Henry R. Harlow, USAFR, 907 CAMS/MAAA, Rickenbacker ANGB, Ohio

4. Oh! That's why this stuff's not popping. Orville says "This side up."
A1C Teresa Lee and SrA Melissa Brashea, 836 SUPS/CCQ, Davis Monthan AFB, Arizona

5. A caption under the whole picture. "Picture this, if you will. Two people trapped inside of a repair facility forever. Forever trapped in the Repair Zone."
MSgt Brian R. Babcock, USAFR, HQ 349 ABG, Travis AFB, California

6. (L) Wadda ya' mean it growled. (R) I'm tellin ya' sarge, that thing is possessed!!!
Sgt Leo J. Wisniewski V, 366 TFW/MAEV, Mt Home, Idaho

7. One of these days that coyote is gonna catch that darn roadrunner!
SSgt Johnny J. Huereca, 60th FMS, Travis AFB, California

8. I told you, Newell. Mind over matter is a bunch of hooey. It still hasn't moved.
Ron Graves, OC-ALC/MAQCP, Tinker AFB, Oklahoma

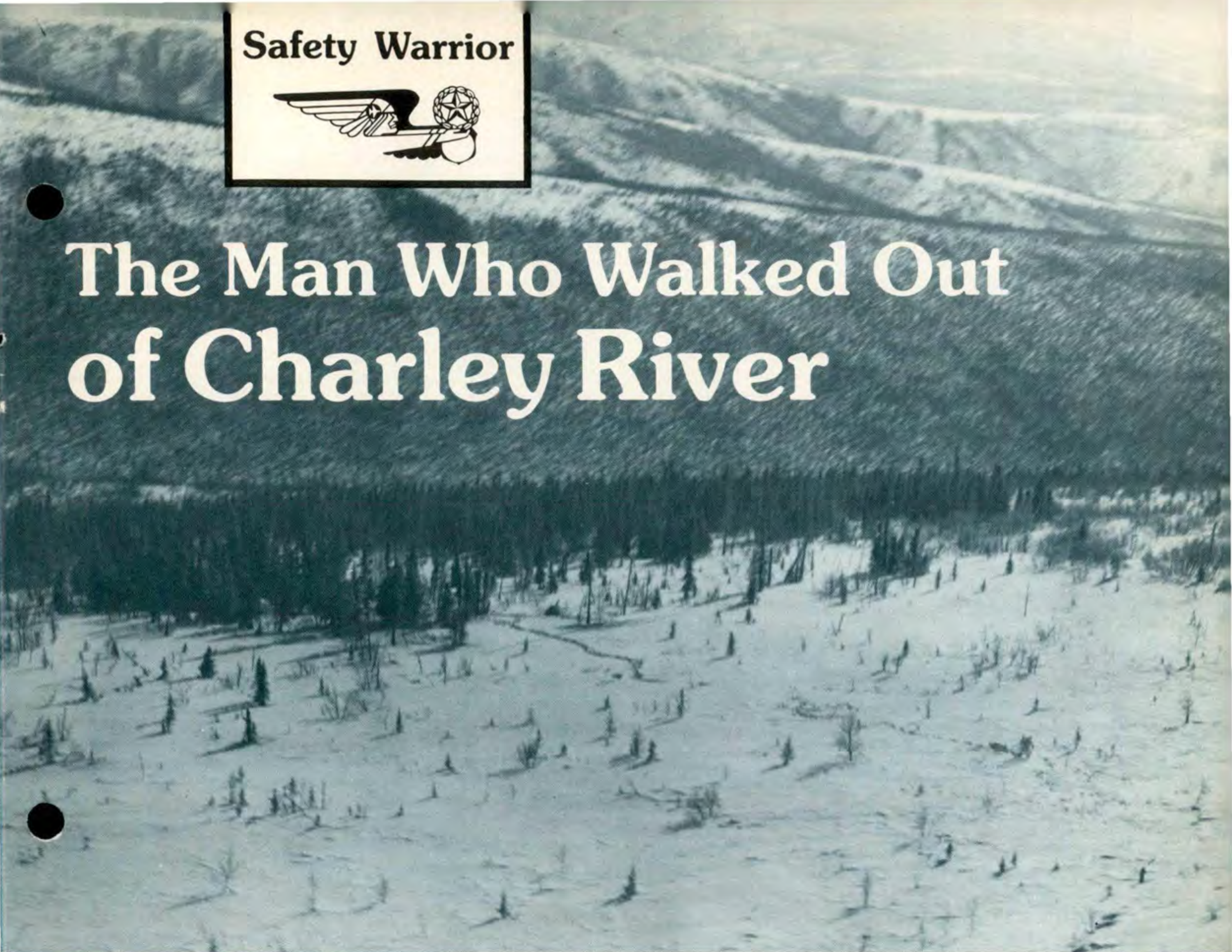
9. (R) See there! Whenever I hit the escape key, two Russian MiGs fly across the page and up off the top margin! (L) Ooooh! We'd better take this monitor back to the repair shop!
Mrs Laura Locke, 21 AGS, Elmendorf AFB, Alaska

10. See, I told you that's what the Chief does after the 3 o'clock meeting.
MSgt Joe Chambers, 33 TFW, Eglin AFB, Florida

Have you heard what's going on with the Dumb Caption Contest? Check it out!

Safety Warrior

The Man Who Walked Out of Charley River



CAPTAIN STEPHEN M. MORRISETTE
21st EMS Project Warrior Officer
Elmendorf AFB, Alaska

■ In the last issue of *Flying Safety*, the story was told of two B-24s that crashed near Eielson AFB, Alaska, in the early part of 1943. The reasons for both crashes were related. Several months later, modified aircraft were flown from Ladd Field to check the effectiveness of the corrective actions.

This is the story of one of those test missions—a mission that ended tragically. Another B-24 crashed. Another four airmen died. This time, however, one man survived. This is the story of that man's incredible 84-day survival ordeal during the winter of 1943-44 only 3 degrees below the Arctic Circle.

The crew began assembling many hours before daybreak. The specially instrumented and equipped B-24D, SN 42-40910, was standing ready on the Ladd ramp. Second Lieutenant Harold E. "Hos" Hoskins was the pilot. First Lieutenant Leon Crane was the copilot. The flight engineer was MSgt Richard Pompeo, and the radio operator was Sgt Ralph Wenz. The crew also consisted of a technical engineer who would monitor the test. He was First Lieutenant James B. Seibert.

The preflight was uneventful, and at dawn, 0940 Alaska War Time (AWT), Hos Hoskins and Leon Crane pulled back on their yokes and "910" climbed into the cold, arctic air. It was then 4 days before Christmas.

The crew headed east. At 10,000 feet, they all strapped on oxygen masks, and Lt Seibert ran his first series of tests. At 1003 AWT, Sgt Wenz called Big Delta and reported their position as 40 miles southeast of Ladd Field (now Fort Wainwright). Another routine radio check was made at 1030 AWT, indicating they were over Big Delta.

At 15,000 feet, they punched through a thin layer of scud. Hos Hoskins then leveled off at 20,000 feet, and Siebert ran a second series of tests. With those tests complete, Hos started looking for a hole in a second deck of clouds. At 1100 AWT, Sgt Wenz made his last radio check with Big Delta. He indicated they were southeast of Big Delta and were flying a random flightpath, staying clear of clouds. continued

Safety Warrior:

The Man Who Walked Out of Charley River

continued

A little before noon, Hos spotted a hole that looked big enough to climb through. He initiated a circling climb within the hole. His goal was to level off above the clouds at 30,000 feet so Seibert could complete the last series of tests.

It was during this circling climb that things started going wrong—fast. *First*, the hole was not as large as Hos thought it was. At, or near, 23,000 feet, the B-24 entered the clouds. Hos and his copilot were now in IFR conditions. *Second*, the no. 1 engine failed. *Third*, the vacuum selector valve froze in the no. 1 position. To summarize what happened, the crew entered the clouds in a climbing bank, the failed engine distracted the pilots, and more significantly, the failed engine, combined with the frozen vacuum selector valve, caused a loss of all vacuum instruments. Results—within seconds, the crew lost situational awareness, and the B-24 entered a spin.

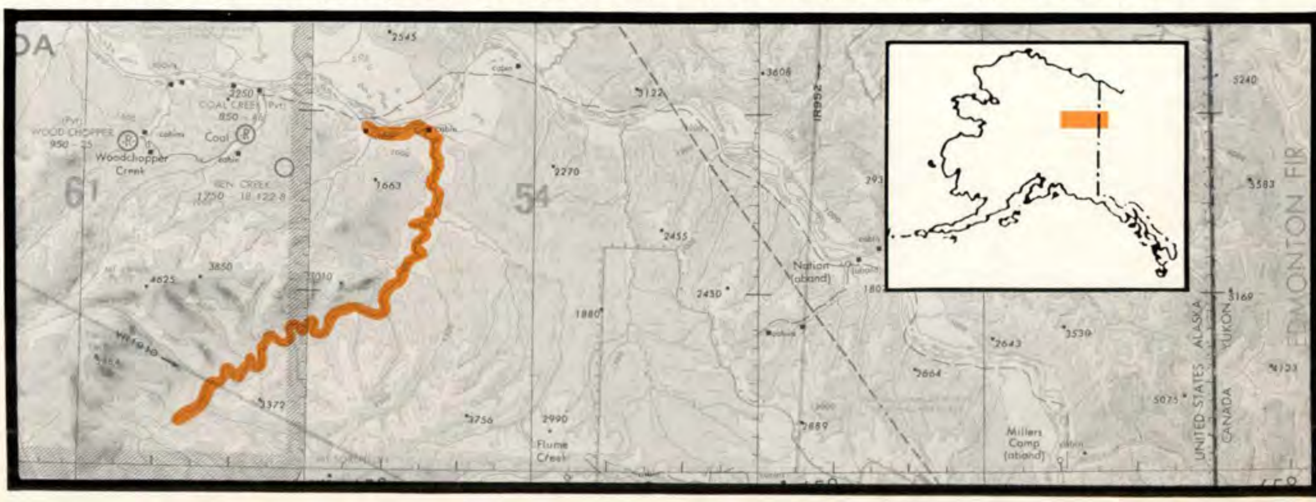
Wenz had time to report an engine had failed and they were in a spin, but did not, or, more probably, could not, report their position. The aircraft broke out of the clouds at about 20,000 feet. Hos and Crane manhandled the controls and recovered from the spin, but the aircraft immediately fell off into a secondary spin in the opposite direction. The two pilots managed to stop the spin a second time, but the aircraft was in a 300-mile-an-hour nosedive.

Crane screamed at Pompeo to open the bomb bay doors. During the dive, something snapped in the tail. Crane remembers it sounded like the report of a pistol. The aircraft suddenly whipped into a nose-up attitude, then stalled and fell off into a third spin. Hos screamed, "Bail out!" Crane hit the bailout button. Hos and Crane stayed at the useless controls long enough to give Wenz and Siebert time to get out. Then Hos yelled at Crane and Pompeo, "Get the hell out!" Pompeo was the first to go out of the bomb bay. Crane crawled aft, took off his mittens, strapped on his chute, and fell out of the bomb bay. As he fell into the deadly, cold air, he remembered seeing Hos in the radio compartment.

The last man to leave the aircraft was the pilot. As Crane descended in his chute, he was able to spot only one chute, and that was above him. That would have been Hos. He watched as the B-24 continued to spin into the side of a mountain. Hos disappeared on the other side of a ridge. Crane landed on a steep-sided mountain face. He could still make out the burning aircraft on the slope above him. He yelled, trying to locate his fellow airmen, but there was no reply. He was alone. He attempted to hike up the mountain to the crash site, but was unable because of the steep grade and deep snow. His training had taught him to stay with the wreck, but he could not get to it. Crane had some tough decisions to make. He knew the choices he made would literally be life-and-death decisions.

Crane took stock of his situation. He knew he was in trouble. He had no food, no sleeping bag, no weapons, and he had left his mittens laying in the aircraft. The folks at Ladd had no idea where he was, and, for that matter, he didn't even know where he was. On the other hand, he had a lot going for him.

The B-24 crashed in a desolate and mountainous area of the Charley River. Even after almost 50 years, our sectional maps mark individual cabins as landmarks. The Charley is only a minor tributary of the Yukon River and had little to offer a downed airman in 1943.



Most importantly, he had no injuries. He was wearing a new experimental down-filled flight suit. As far as survival equipment, he had a Boy Scout knife, two books of matches, a letter from his father, and his parachute.

He correctly assumed there was little or no chance of the rescue team finding him before he died of exposure or starvation. He decided to break with convention and set out to find help for himself and his fellow crewmembers. With that thought, he proceeded downslope to a stream, then downstream. When it got too dark to go any further (about 1600), he stopped to make camp. He lit a fire, using 4 of his 40 matches and his father's letter. He wrapped himself in his parachute and tried to sleep. Before he fell asleep, he noticed he could still see the glow of his burning aircraft. The plane wasn't the only thing burning that night. Several times he woke up to find his parachute ablaze. Other times he woke up from just plain cold and discomfort.

On the first morning of his ordeal, Crane awoke confident he would find civilization if he continued to work his way down river. He traveled with great difficulty. He was already suffering from frostbite. His ungloved hands were bleeding, and he was dangerously chilled. The snow was hip deep in places. The rocks in the riverbed often reduced his progress to nothing more than controlled stumbling. He spent another restless night wrapped in nothing but his parachute.

The next day brought more pain, hunger, and discomfort. On day 3 of his ordeal, Crane made a decision that nearly cost him his life. He changed his plans and decided to wait for help. He made camp. He made several vain attempts to kill some tree squirrels but settled instead for some snow and some frozen moss (which he could not swallow).

The fourth day nearly passed before he remembered it had been Christmas Day! The thought of Christmas dinner only aggravated his hunger. Crane stayed in place for three more nights. The cold was murderous. The cold, combined with no real food intake, was sapping the strength from his body. He knew he had to move. He spent the seventh night in his makeshift camp. He watched spectacular displays of northern lights while he made plans to move out early the next day.

Crane estimated the night temperatures to be -50 during his trek. The few hours of late December daylight gave poor relief from the barren winter environment.

The next morning broke cold and clear, but Crane's thinking was fuzzy. He made another decision—another change—and, again, it nearly cost him his life. Rather than continuing downstream, he decided to head west and try to find the Alaskan-Canadian highway. Crane stumbled and crawled up the western slope of the river valley. He continually lost his direction. At midday, Crane could still see the camp he had left earlier that morning. As he sat exhaustedly looking back down his crooked path, he realized he could not possibly make the estimated 200 miles back to the Alcan highway. He returned to his camp. He realized he had nearly used up the little strength left in his body. He decided to move downriver again the next morning.

On the ninth day of his ordeal, Crane moved downriver again. He spent the entire day stumbling down the river, always hoping to find a settlement or camp around the next bend. Incredibly, at dusk, he saw a manmade structure. It was a tent standing high above the ground on tall poles. It was what Alaskans called a cache. Crane ran for the cache in the gathering darkness. As he approached, he saw a small cabin. Crane entered the cabin. It was just large enough to hold a bed, table, and small wood stove. His life had been saved. He tore open several sacks on the table and found the fixings for hot chocolate and bags of dried fruit. He started a fire and melted snow. He was soon drinking hot cocoa and stuffing himself with raisins. He found a ladder for the cache. In it he found a variety of things including tents, tarps, ropes, tools, and lanterns. He brought the frozen tents into the cabin, laid them on the bunk, wrapped himself up in his chute and tents, and fell asleep.

The next morning, Crane had another breakfast of raisins and hot chocolate. He stuffed his pockets with raisins and set out downstream to find the village he was sure was just around the corner. That assumption would bring him closer to death than he had been so far. He moved downstream all that day and into the night. He couldn't believe such a well-stocked cabin could be so far from a town. By midnight, he realized he was in serious trouble. He estimated the temperature to be -50 degrees. His feet and hands were numb. He could not move his fingers to strike a match. He had to make it back upriver to the cabin! As he retraced his steps, he drifted in and out of

continued

The Man Who Walked Out of Charley River

continued

consciousness. At times, he would awake to find himself wandering away from the stream bed. Near noon, on New Year's day, he made it back to the cabin. He managed to light a fire, then slept hard for the next 2 days.

On the 12th day of his ordeal, Crane awoke rested but feeling very hungry. He returned to the cache to see if there was anything else up there to eat. In the daylight, Crane found burlap sacks full of flour, jerky, beans, dried soup vegetables, tea, lard, rice, and other foodstuffs. There was clothing to include fur mittens! There was a rifle and even ammunition! On the side of one of the crates of supplies was the name and, presumably, the occupation of his benefactor. The label read "Phil Brail, Woodchopper, Alaska."

For the next week, Crane settled into a rather domestic life. He concentrated on treating his frostbite and rebuilding his strength. He mended his clothes and made inventories. He found a 4-year-old calendar and kept track of days by punching the days on the calendar with a nail. One evening, he accidentally knocked the calendar off the wall. As the calendar hit the floor, it fell open to a map of Alaska. Crane was ecstatic! He studied the map for several nights before he saw the town of Woodchopper on the map. It was not until then he realized Woodchopper was where Phil Brail lived, not what he did for a living.

The map was as much of a lifesaver as was the food and even the cabin itself. Crane determined he was on a tributary of the Yukon River, probably the Charley River. He also realized if he was on the Charley River, he was still a very long way from Woodchopper.

Crane decided to make an exploratory trip downstream again. This time, he was better equipped and in much better physical condition. Crane made a backpack from his parachute and carried the rifle. On the 20th of January, he headed out. On the first day out, Crane discovered a second cabin and a derelict canoe. On the second day, he found a third cabin. In this cabin, he found some old mail, again addressed to Woodchopper, Alaska. He also found a sleeping bag. He would not have to sleep in his silk cocoon again.

The next day Crane continued downstream. On that day, he erroneously concluded he was nearing the Yukon River and returned to Phil Brail's cabin. As he walked back upstream, he estimated he would need a 2-week supply of food to make it to Woodchopper. He also decided to wait a few more weeks until the weather improved.

The next several weeks were quite routine (as measured by Alaskan standards). Crane hunted squirrels and ptarmigan. He daily chopped a hole in the ice for fresh water. He was living the very kind of life Phil Brail would have lived if he were there. There was one major difference—one that depressed him a lot. Leon Crane's thoughts were continually drawn to his family. He realized his parents must have given him up for dead.

Another week passed, and Crane decided not to wait any longer. His ammunition was running low, he had heard the river ice crack several times, his strength had returned, and he felt up to the ordeal. Leon made a sled from some boards and a wash tub. He packed it with an estimated 2-week supply of provisions and readied himself for the trip that would either save or end his life.

On 12 February 1944, Crane closed the door to Phil Brail's cabin

for the last time. He laboriously lugged the crude sled through the snow, sometimes hip deep. The sled was much harder to pull than he had figured. He could not, however, carry the 2-week's worth of supplies any other way, so he slowly moved downriver.

One day Crane put his foot through some rotten ice. Within a few minutes, his mukluk was frozen stiff, but his foot stayed dry. Several days later, he nearly lost his life again. Crane fell through the ice and found himself standing armpit deep in the icy Charley River. Scrambling up the snow-covered bank, Crane literally had minutes to live. He reacted quickly. While trembling uncontrollably, he started a fire and stripped to the waist. He started drying his upper garments while stamping around in his frozen mukluks and trousers. Several miserable, long hours later, he donned his upper garments and stripped off his frozen lower garments.

The next day, Crane was moving downriver again. On the 15th day of his trek from the Brail cabin, he found another deserted cabin and in it a very small supply of food. He remained there for 3 days before striking out for the Yukon River again. The temperature during those last weeks of winter was about 25 below (about the temperature when the mucous freezes in your nostrils when inhaling sharply).

Sometime during those last days of winter, the ice cracked again. This time, it was the sled that fell through. Without the supplies on that sled, Crane knew he would probably not survive, so he waded into the hip-deep water to recover his supplies and save the sled. Crane again had to stand naked in front of a fire while his clothes dried. He decided to leave the cumbersome sled and proceed with only a backpack and rifle. It took another 8 days to finally reach the Yukon River!

The next day, Crane found a sled dog trail and followed it until he found a cabin under smoke. There were clothes hanging on a clothes line. There were the sounds of dogs and children and the smell of hot food! As Crane approached the cabin, a rather startled gentleman stepped from the cabin. His name was Albert Ames. Albert took Crane in and introduced him to his wife, Neena, and their three small children.

Albert listened to Crane's incredible story and then explained Crane had walked 120 miles down Charley River, and he was still 30 miles from Woodchopper. Crane also learned he was 250 miles away from Ladd Field. Albert offered to give Crane a ride into town on his dogsled. Crane graciously accepted.

At Woodchopper, a wireless set was used to contact a Wein Airlines bush pilot who was on his way to Circle, a village 40 miles further downstream. Two telegrams were also sent, one to his family and one to Ladd Field. Crane also had a chance to meet Phil Brail. Soon he was in the air again headed for Ladd. The bush pilot radioed Ladd for permission to land at the military base. When the base asked the reason for his request, the pilot (Bob Rice) answered he had Lt Leon Crane on board. After a few moments of silence, in a most unmilitary voice, the operator asked, "Is he alive or dead?"

There was no small stir on base as the word quickly spread Leon Crane was back—alive! One can only imagine the looks on the faces of Crane's fellow airmen as he walked into Base Ops 84 days after his plane crashed. Crane was taken to the flight surgeon's office for a checkup. Crane was in great shape—in fact, he had gained a little weight during his ordeal. There was an emotional reunion with the Base Commander. During this meeting, the commander arranged for a personal phone call back to the zone of the interior (Z.I., now known as the lower 48). Leon spoke to his parents and assured them, much like Mark Twain, reports of his death were greatly exaggerated. He then went to the P.X. and got a chocolate malt.

The very next day, Lt Crane boarded a B-24 and led the rescue team to the crash site. Within a week, ground parties were searching for the other missing crewmembers. They found the remains of 1 Lt Seibert and Sgt Wenz in the aircraft. They apparently were unable to get out of the spinning aircraft. There was never a trace found of MSgt Pompeo or Capt Hoskins.

Bldg 1001 on Ladd Field was named in honor of MSgt Pompeo. Today, Bldg 1001 still stands, but there is no evidence the building once bore the name of the fallen aviator. Leon Crane is still alive, as of this writing, and lives in Philadelphia, Pennsylvania. And so goes the story of the man who walked out of Charley River, an ordinary airman who rose to the ranks of a warrior—a man whose incredible story lives on, if only in the dusty pages of out-of-print books. ■

The remoteness of the crash site and Crane's inability to reach it after his parachute landing left him with very few resources in his lone struggle for survival. He made several serious mistakes which almost cost him his life, but his courage and determination kept him battling against the extreme conditions.

Write A Dumb Caption Contest Thing

As you recall, the United Organization of Dumb Caption Writers of America (UODCWA) was a little put out by our Dumb Caption Contest because you, our loyal and brilliant readers and contestants, keep beating the dumb professional writers and are making them look bad each month.

Well, fans, they're at it again. This month, their President and International Director, Byron Q. Lackluster, has submitted the above caption along with his personal assurances that nobody can possibly top it.

Is he right? We don't think so. This is your chance to shut this yoyo's mouth by showing him new levels of dumb captions he can't even dream of—and possibly even winning our most revered CHEAP LITTLE PRIZE in the process. After all, somebody's got to win. Don't delay. Do it now while you're thinking about it and possibly find your words in print and become the toast of the Air Force.

Write your captions on a slip of paper and tape it on a photocopy of this page. DO NOT SEND US THE MAGAZINE. Use balloon captions for any person in the photo or use a caption under the entire page. Entries will be judged by a panel of dumb humor experts in October 1990. All decisions are relatively final. Also, please remember to put your name and address on the back of your entry. As always, bribes over $100,000 will be warmly received. Bribes of over a $1,000,000 will assure you of a year's winning entries and a whole lot of our personal postcards sent to you from the French Riviera. Thanks for your support.

Send your entries to "**Dumb Caption Contest Thing**" • *Flying Safety Magazine* • HQ AFISC/SEPP • Norton AFB CA 92409-7001

Converting to the F-16

The Falcon's entry into the Air Force arsenal taught us many lessons. . . lessons we need to remember as even newer aircraft are delivered to wings with vastly different missions.

LT COLONEL JOHN DICKINSON
Directorate of Aerospace Safety

■ Life was good. Selected for the F-16 right out of flight school, the young lieutenant was flying with one of the best units in Europe while they converted to the Falcon. He had an awesome party weekend, but our lieutenant wasn't concerned as he was scheduled for only the runway supervisory unit and not for flying on Monday.

He was surprised to get a call, while serving at "mobile," asking if he could fly a BFM mission due to a change in the schedule. Undaunted, he said "yes" in true fighter pilot tradition. The mission was going well. On the last BFM setup of the mission, our lieutenant was positioned as defender. He broke hard for the simulated missile shot but never pulled out of his dive.

Unfortunately, this is not an isolated incident but a typical mishap incurred by the F-16 flying community during its conversion period. Alarmed by this trend during F-16 conversions, we compared mishap histories at the first seven active duty bases to convert to the Falcon: Hill AFB, Utah; MacDill AFB, Florida; Nellis AFB, Nevada; Kunsan AB, Korea; Hahn AB, Germany; Torrejon AB, Spain; and Ramstein AB, Germany.

In conducting our study, we used the 2-year period following

continued

Converting to the F-16

continued

the first logged hour of F-16 time as our conversion period. We then compared this data with the 2-year period preceding the conversion period and the 2-year postconversion period to then identify any differences.

Two years was selected as the conversion period because we felt a converting unit would be minimally affected by PCS moves during its initial 2 years, and we wanted to eliminate as many variables as possible.

Two Groups Identified

What we saw surprised us. Conversion mishap data split the seven bases neatly into two groups: Hill, MacDill, and Nellis (which we will call group A) and Kunsan, Hahn, Torrejon, and Ramstein (which we will call group B). Mishap rates per 100,000 flight hours for our two groups are:

Conversion Mishap Rates

	Group A	Group B
Preconversion	7.09	2.95
Conversion	12.12	9.96
Postconversion	12.54	5.29

Before going on, here are some quick conclusions. There was a surprisingly high mishap rate for group A preconversion. However, those F-4 hours were flown from 1976-1980. The group B preconversion rate is also F-4 derived. However, its time period of 1979-1985 accounts for the lower 2.95 rate.

There is an understandable mishap increase in group A conversion rates as the F-16 was new during this flying period (November 1978-October 1982). During group A's postconversion period (November 1980-October 1984), 10 of the 18 mishaps occurred at Hill AFB. During this time, the F-16's flight control problems earned it the dubious nickname of "lawn dart."

Returning to group B, we are even more mystified by the strong increase in mishaps during the conversion period. Their mishap conversion rate tripled over their preconversion period but still is lower than the group A's conversion.

At this point, it became obvious mishap rates were not telling us all we needed to know. We found help in two areas, mishaps per sortie and mishap causes. We wanted to display the data against something attainable by a converting unit. Operationally, even though flying is allocated by hours, it is the number of sorties a unit can generate that affects its ability to train and fight. Currency requirements are based on sorties and events, not hours flown. We used 20,000 sorties as an obtainable number for an F-16 converting unit during its 2-year conversion period, normalizing the cause rate at 20,000 sorties.

We then looked at individual mishap causes as determined by each investigation. We broke them into categories called operations, logistics, and other. Putting them into a small spreadsheet and comparing them against the sorties flown provides some very interesting results.

Clearly, the majority of causes are due to operations. Interestingly, the ops rate for group A is lowest during its conversion period. The logistic causes also remained fairly consistent between conversion and postconversion. But there really aren't too many surprises in group A. The initial cadre of pilots for any new weapon system is always carefully picked and highly experienced. Plus, we expect any new aircraft to experience a certain amount of growing pain before we work out its bugs.

So why the dramatic increase in operations causes during group B's conversion period, followed then by an even more dramatic reduction during its postconversion? We looked deeper into the actual reasons of the mishap and were even more surprised. Of the 21 ops causes identified during the group B conversion period, 11 involved discipline on the part of a pilot or supervisor—half the total.

The Lessons of History

So what does all this tell us? Does history repeat itself? Can the past foretell the future? Unfortunately, all too often. Based on the mishap experience of four converting F-16 units, if your unit is due to convert to the F-16, you can anticipate an almost tripling of your preconversion mishap rate. You can expect to lose three aircraft during the 2-year conversion period, with 80 percent of the causes being due to operations and 20 percent to logistics. Within your operations causes, 50 percent will be due to breakdowns in discipline by your pilots or your supervisors.

You say your unit will be different? Don't you think every pilot and supervisor at Kunsan, Hahn, Torrejon, and Ramstein said the same thing? You can believe each and every one of them got some very pointed guidance. I know one did. I talked with him for many hours about the hazards associated with converting F-16 units before he went to one of the group B units during their conversion. He took 1,000 hours of prior F-16 experience with him. He is dead now—victim of a conversion mishap. ■

STILL NOT CONVINCED?

Review a sample of the actual preconversion and conversion operations causes for group B and decide for yourself.

Preconversion Period Mishaps

- The pilot applied excessive back stick, and the aircraft entered a right rolling departure from controlled flight.
- The pilot retarded the throttles in the dive, but failed to add power when needed during the recovery, and the aircraft entered the undercast at a very low speed.
- The attacking pilot failed to maintain visual contact with the defender and lost awareness of the spatial relationship of the aircraft.
- The attacking pilot initiated a hard right turn thinking it was tactically sound; however, he did not check his flightpath for conflicts.
- The mishap pilot followed flight lead into the target aircraft altitude block within 10nm without a tally on all aircraft as required by ROE.
- The defending pilot (flight lead) assumed adequate separation would exist, and did not notice the collision situation until the impact was unavoidable.

Conversion Period Mishaps

- Encountering additional clouds between layers, the flight lead inappropriately sent the mishap pilot to fighting wing.
- The mishap pilot was slow in analyzing impending collision course geometry and closure rate while maneuvering his aircraft to achieve missile parameters.
- The mishap pilot did not break off the head-on missile attack at the prebriefed 9,000-foot minimum range.
- The last-ditch evasive maneuver initiated inside 1nm placed the aircraft in a position where safe separation could not be maintained.
- The pilot failed to follow the PAR controller's azimuth instructions, resulting in a displacement which was too far left of the PAR approach course for a safe approach.
- The pilot erred by allowing an excessive sink rate to develop during final approach maneuvering to land.
- The flight evaluator failed to ensure adequate mission planning and preparation were accomplished by the pilot and other members of the flight.
- Supervisors elected to fly an inexperienced pilot on a mission that had significant potential for exceeding his capabilities.
- Exposure to basic instrument training in the F-16 aircraft was deficient.

Cause Category Counts/Rates By Period And Group

Period*	Group**	Sorties	Ops	Log	Other***
I	A	66,264	12/3.62	0/0.00	1/0.30
	B	79,855	9/2.25	0/0.00	0/0.00
II	A	49,989	5/2.00	9/3.60	2/0.80
	B	69,609	21/6.03	4/1.15	1/0.29
III	A	105,309	15/2.80	17/3.23	7/1.33
	B	94,867	6/1.26	7/1.48	3/0.63

* Period I - 2-year period prior to conversion (F-4)
Period II - Conversion years 1 and 2 (F-16)
Period III - Years 3 and 4, postconversion (F-16)
** Group A - Wings with conversion date prior to 1981
Group B - Wings with conversion date 1981 or later
*** OTHER - Includes maintenance, environment, and undetermined causes
RATES - Mishap causes per 20,000 sorties

MAINTENANCE MATTERS

A Slight Oversight

■ During an isochronal (ISO) inspection, an aft turbine support was replaced on one of the C-130's T56 engines. Several months later, during a BPO inspection, the crew chief discovered cracked and nicked turbine blades which required the engine to be removed. Further inspection by the engine shop revealed the inner front exhaust cone was missing 3 of the 13 bolts, and none of the remaining 10 fasteners were safety wired, as required by tech data.

A supervisor had inspected the turbine support during ISO prior to its installation, but failed to notice the technician did not safety wire the 13 bolts. Based on his inadequate inspection, he signed off the red X after the turbine was installed in the engine.

The Air Force has used the seven-level inspection system for more than 35 years. While the system is not fool proof, it has proven to be an effective way to ensure quality maintenance. But for the system to work, supervisors must take the time to make sure the task was properly completed before signing off a red X condition. The cost of this slight oversight was $27,000.

Insidious Instruction

Almost without exception, maintainers who attain their 5-level get a chance to train other individuals. And as we progress to supervisory roles, almost all of us will have the opportunity to choose trainers for our subordinates. Training is an inherent supervisory responsibility. Whether you conduct the training yourself or delegate it, ensuring quality maintenance training is vital to the safe accomplishment of the mission.

Unfortunately, not all trainers and supervisors provide quality training for their subordinates. Here is an example.

As the A-10 taxied into the quick check area, a maintenance specialist noticed fuel leaking from the right engine bay. He alerted the crew chief who then notified the pilot. The pilot performed an emergency shutdown on the right engine. Maintenance personnel discovered a B-nut on a fuel line connected by only a few threads. They tightened the nut to the correct torque, and the leak stopped. As a precaution, the nut was inspected after the next three flights, and the leak did not recur.

A review of the forms revealed the fuel line was installed during maintenance training. Under the supervision of the trainer, the trainee installed the fuel line but incorrectly torqued the B-nut. Not only did the trainer fail to correctly train his student, but he also failed to make a 7-level inspection and even failed to document the maintenance action in the aircraft forms.

The actions of this instructor not only indicated he was a poor instructor but also an unreliable maintainer. The bottom line is—quality training produces quality maintenance. Sometimes it hurts to give up your best people for maintenance training, but it pays off in the (not too) long run.

Back to Basics

Shortly after takeoff roll, both student and instructor pilots heard a muffled bang accompanied by smoke in the T-37's cockpit. When the pilot noticed a loss of thrust and a left engine overheat light, he aborted the takeoff, and the crew ground egressed without incident.

A team of maintenance technicians had no trouble finding the engine tailpipe had separated from the diffuser, causing the loss of thrust and the cockpit smoke. Closer examination of the situation showed a

MAINTENANCE MATTERS

nut on the clamp which holds the tailpipe in place, as well as five other bolts and nuts, had come loose. While the proper fasteners were used to install the clamp, they no longer had any self-locking characteristics.

Unfortunately, this is not an isolated incident. While most maintainers follow the aircraft TO to the letter, they often neglect to follow basic methods and procedures of aircraft maintenance. In this case, the specialist who installed the clamp failed to follow the procedures in TO 1-1A-8 which provides basic guidance for installing aircraft fasteners. This publication requires the prevailing torque to be checked prior to installing a self-locking nut. It also requires a *new* self-locking nut to be installed each time components are installed in critical areas, such as flight control systems, or in and around engines. Getting back to the basics by occasionally reviewing the methods and procedures publications can go a long way toward improving the quality of maintenance and preventing mishaps. (See "Nuts," *Flying Safety* magazine, May 1990.)

More on Documentation

During a go-around following a simulated approach, the crew of the F-111 heard a loud bang followed immediately by the right engine indicating zero rpm. The aircrew recovered using single-engine procedures. This mishap could have been prevented had basic maintenance documentation procedures been followed.

After landing, the aircraft was impounded and turned over to maintenance. The reason for the engine failure turned out to be loss of oil due to a loose oil cooler line. It seems the line had been disconnected to simplify removal of the afterburner fuel control. Because the removal of the oil line was not included in the TO procedures for removing the fuel control, it was not documented and, therefore, not inspected for security after it was reinstalled.

A closer analysis of this mishap, however, shows it could have been prevented had basic maintenance procedures and common sense been followed. Since the TO procedures did not include removal of the oil tube as part of the procedures for afterburner fuel repairs, it should have been documented as a separate maintenance action and entered as a red X condition in the aircraft forms. Had this been done, the tube would have been inspected for security and for leaks before the red X was cleared.

It is important to remember while adherence to tech data is a fundamental rule in the aircraft maintenance business, TOs are written with the understanding the people who use them are trained and experienced in general maintenance procedures. This includes documentation of maintenance actions. Ensuring this happens is a basic supervisory responsibility.

FROM THE FIELD

The Vinyl Solution

During the past 2 months, there have been several cases where maintenance folks failed to detect rags left in the augmentor section of an F-100 engine. One case resulted in severe damage to the engine; the other incident, the loss of an aircraft. It is common and accepted practice, when working in the augmentor section, to use rags as a means of preventing FO. Unfortunately, rags can be difficult to control and, as such, are subject to being inadvertently left in places where they become a FOD hazard.

After reading the reports of rag-caused FOD, the maintenance people at the 33 TFW, Eglin AFB, Florida, came up with a fool-proof way of preventing FO in the augmentor section of their engines without the use of elusive rags. They designed what they appropriately call a "standardized FOD catcher."

Instead of cloth, the FOD catcher is made of bright yellow vinyl material and has an outrageous 8-foot red tail which hangs from the engine nozzle. Printed on the tail is "REMOVE BEFORE ENGINE START." This device has proven to be extremely effective and challenges even Murphy to miss it during the pre-engine run or preflight inspection. ■

OPS TOPICS

I May Be Old, But Not That Old

■ Bad backs are for old folks, right? Not exactly. A young fighter pilot discovered bad backs aren't just for the grandparents.

The F-16 pilot had been enjoying the 4 v 4 mission when he took a break to check out the cockpit. When he looked up to find the other element, he twisted slightly to get a better view. With the aircraft in sight, he pulled almost 5 Gs and immediately felt a twinge of pain in his back. The pain disappeared for the rest of the flight, but returned when he climbed out of the jet.

The flight surgeon confirmed there was a small muscle strain in the lower back. Getting all twisted up before you pull Gs may cause you to stay all twisted up after you pull.

"Thanks, Lead"

Remember way back when, during the formation preflight briefing in pilot training, the flight leader said you would be put on the upwind side for landing? Did you think the upwind side was to make for a sharper formation landing in front of all your buddies? After all, how much wake turbulence could a little jet create? The wake turbulence you had to watch out for was caused by heavies and jumbos.

Buzzzzz! Wrong answer. A fast-jet driver recently taught himself how bad the turbulence from flight lead could get. Just prior to touchdown, the jet started a roll which the pilot quickly stopped with aileron. The landing was continued, but a whole lot of lights were now shining.

The crew chief spent the next few days replacing the right horizontal tail, all because the jet tried to land on the downwind side of lead. Winds were 30 degrees off the runway heading at 11 knots. Little jets and light winds can still add up to big trouble.

Who's Calling?

"Who's on first?"

"Who is."

"I thought you said you knew who's on first."

"I do."

"O.K. Who's on first?"

"That's right!"

This famous comedy bit about baseball players with odd names has been around for a long time. Recently, confusion over who was supposed to receive tower's instructions resulted in a not so funny close encounter.

The Air Force heavy had landed at a busy civilian airfield on the right, parallel runway and exited at the left high-speed taxiway. The crew held short of the left parallel runway for clearance to cross. Because the taxiway was 45 degrees to the runway, they could not visually clear the runway.

Out of all the radio calls at the field, the crew finally heard "...cleared to cross the inside runway." The Air Force heavy crew acknowledged the clearance and when they reached midway across the runway, they could finally look toward the approach end.

A civilian Boeing 737 was bearing down on them on its takeoff roll. The 737 rotated in time and passed 300 feet over

OPS TOPICS

the startled heavy crew.

When all the nerves were settled, the reasons for this near catastrophe were clear. The Air Force crew was preoccupied with arrival procedures and failed to devote enough attention to the numerous radio calls. The taxi instructions were issued to another civilian aircraft but the heavy crew, hearing the last part which they were expecting, thought the instructions were meant for them. Finally, the civilian aircraft receiving the taxi instructions had a much stronger transmitter which totally blocked the Air Force transmission.

Situational awareness can mean more than arrival routings and airfield layouts. It should also cover the rest of the fliers who are operating in your vicinity.

The Best of Intentions

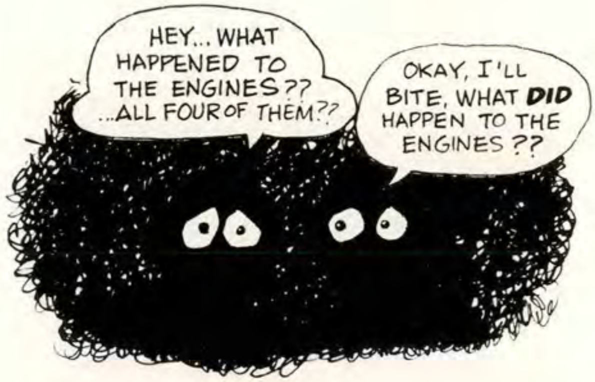
System safety is frequently misunderstood, but its value to the mission should never be underestimated. The following incident illustrates the need to thoroughly examine the effects of best intentioned modifications.

To prevent a plastic cap from becoming FO in the throttle quadrant of C-130s, a hole was drilled in the middle of the cap and a chain attached with a bolt to secure it to the instrument panel.

While on a run-in for an airdrop of a 3,750 pound training platform, the crew went through all normal procedures, including leaving the plastic cap on the release button. As the Herc's rear doors and ramp moved into position, the extraction parachute deployed and pulled the platform out—some 5 miles short of the DZ.

The crew left the cap on until everyone had a chance to look at it. They discovered a combination of the nut on the bottom side of the cap and a split side, which allowed the cap to fit further down over the button, caused the button to be depressed enough to automatically release their load.

System safety doesn't have to be confined to the development phase of aircraft. It can, and should, be a part of the continuing effort to make aircraft better able to accomplish the mission.



Anything on the Radar?

Just when you thought there was nothing left in the sky to surprise you, they give you a trip to Anchorage. Last December, a Boeing 747 was descending to 25,000 feet near Anchorage, Alaska, when it entered a dark cloud which on-board radar indicated was no problem.

Almost immediately upon entering the cloud, all four engines quit. Most crews would be more than surprised to find themselves piloting a 600,000 pound glider. Two lifetimes, eight attempts, and 12,000 feet lower, engines 1 and 2 restarted and the glide was arrested. Leaving the cloud, engines 3 and 4 were finally restarted after numerous attempts.

Following the emergency landing at Anchorage, maintenance took a borescope look at the no. 1 engine and pronounced all four engines were little more than expensive junk. The rest of the airplane was also severely damaged from small particles which are nearly as hard as a steel file.

Why didn't the radar pick up the ash cloud from Mt. Redoubt? Simply put, the particles in a volcanic ash cloud are much smaller than your average water droplet, and the radars on most aircraft just aren't designed to pick them up.

Is there any way around the problems of volcanic ash clouds? Yes. Fly around every area where volcanic activity has been reported. And don't trust your radar to make up for a lack of preflight planning. ■

Captain
Vernon B. Benton

Captain
Jeffrey K. Beene

Captain
Robert H. Hendricks

Lt Col
Joseph G. Day

96th Bombardment Wing
Dyess AFB, Texas

■ Shortly after the completion of a low level training route, the crew's B-1B lost the no. 2 hydraulic system. This resulted in some flight control degradation, loss of normal gear extension, and reduced braking effectiveness. The crew returned to base for the emergency landing but when the alternate gear extension system was activated, the nose gear remained up and locked. The crew climbed back to altitude to work this new problem, but the main gear would now remain down for the duration of the flight, as there is no way to retract gear without the no. 2 hydraulics.

The strip alert tanker was launched, and a second tanker was readied. The B-1B took on 80,000 pounds of fuel, the pilot occasionally having to use afterburner to overcome the drag of the main gear. The crew made several attempts to reset the alternate extend system and also made two touch-and-go landings in unsuccessful attempts to jar the nose gear loose. The decision was made to divert to Edwards AFB, California, in preparation for a possible nose gear up landing, something never before attempted in the B-1. The structural and aerodynamic implications of a landing of this type were unknown.

During the flight to Edwards, after conferring with engineering experts, the crew attempted to "jumper" cannon plug connections with safety wire and a paper clip in an attempt to bypass possible malfunctioning relays. When their attempts failed, the decision was made to go ahead with the nose gear up landing on the dry lake bed. The crew dumped fuel to reduce gross weight, swept the wings to 20 degrees, and moved the center of gravity to the aft limit to keep as much weight off the nose as possible. After touchdown, the aircraft commander smoothly flew the nose onto the lake bed. The crew quickly shut down all four engines and allowed the aircraft to skid to a stop.

The outstanding teamwork and airmanship demonstrated by this crew prevented a potential disaster and saved a valuable combat aircraft. WELL DONE! ■

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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 Mishap Prevention Program.

CAPTAIN

Patrick J. Hartman

Louisiana Air National Guard
159th Tactical Fighter Group
New Orleans, Louisiana

■ Captain Patrick J. Hartman, Instructor Pilot, was flying an F-15 on a unit mission, while operating out of Gulfport Airport, Mississippi, as part of a unit deployment exercise, when he heard a muffled explosion and felt the aircraft shudder. The right engine compressor had failed resulting in an uncontained engine fire. The right engine fire light illuminated, and Captain Hartman immediately shut down the affected engine, discharged the fire extinguisher, and started a turn toward the recovery base now 50 miles away. Looking back, he saw fire still coming from the top of the aft fuselage. A chase aircraft also observed fire and smoke coming from burn-through holes on the top and bottom of the aft fuselage.

The fire continued for about 1 minute and then extinguished. Captain Hartman noted the control augmentation system (CAS) had dropped off line and would not reset degrading his control authority. He performed a controllability check and discovered the right flap would not extend due to fire damage. Properly analyzing the situation, he skillfully maneuvered his crippled aircraft using a single-engine, no-flap, CAS-off approach to a successful landing averting additional damage to the aircraft.

Captain Hartman's expert flying and flawless execution of emergency procedures during a complex emergency situation prevented a potential loss of life and saved a valuable combat aircraft. WELL DONE! ■

Some flyers think they own the airspace . . .

and maybe they do! Watch out for them!