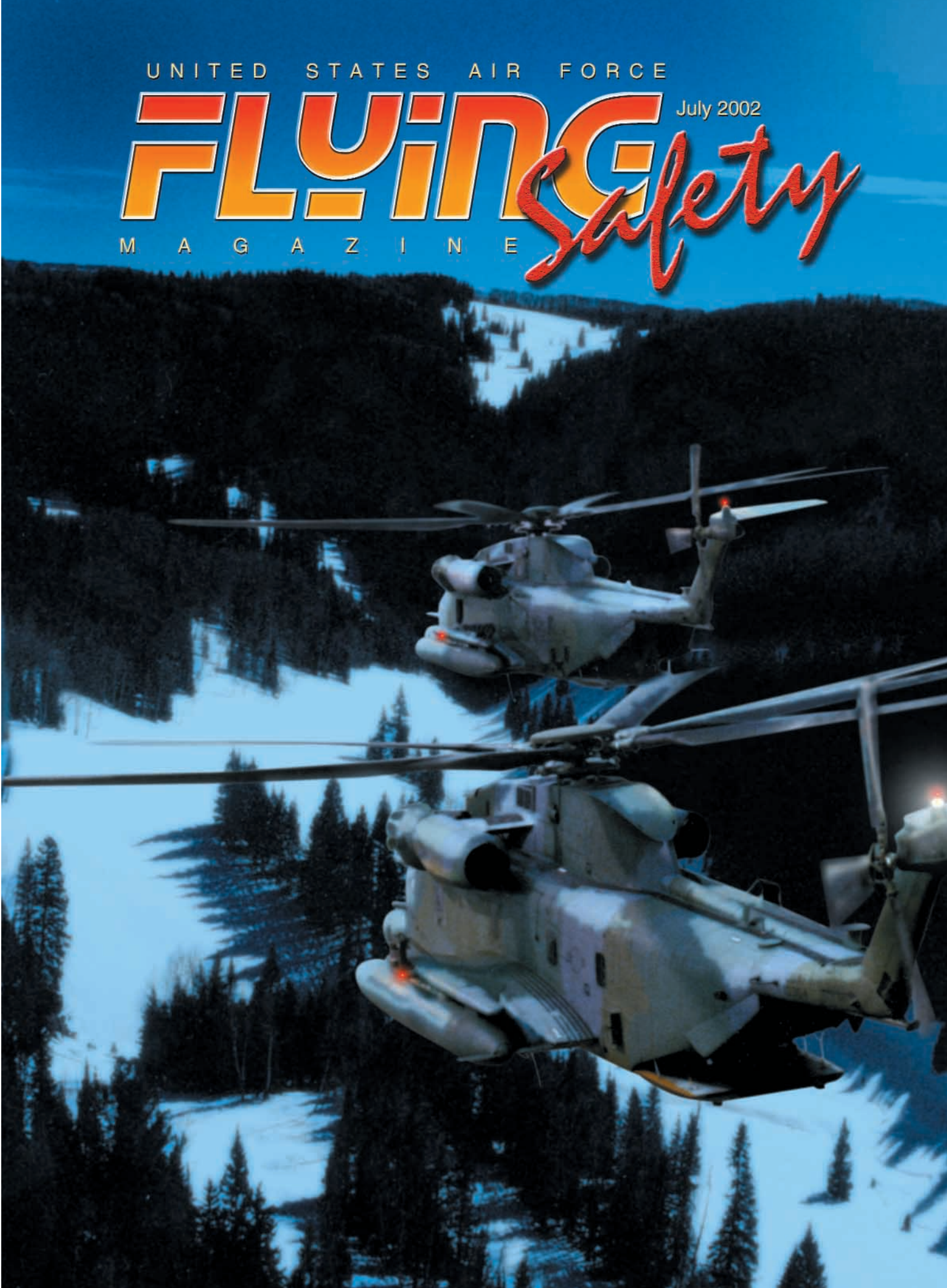
UNITED STATES AIR FORCE

FLYING Safety

MAGAZINE

July 2002



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UNITED STATES AIR FORCE
FLYING Safety
MAGAZINE

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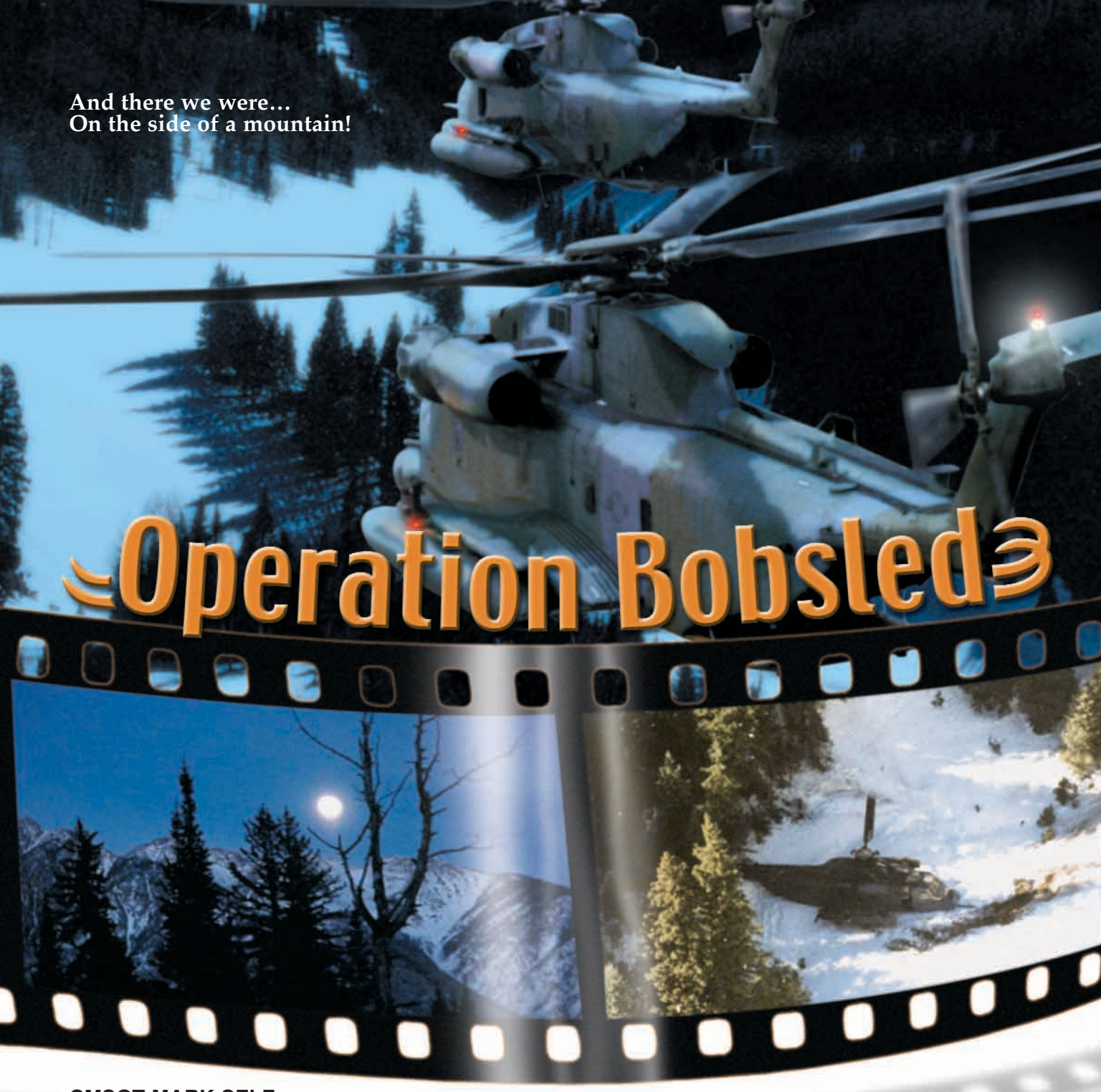
HELICOPTER CONNECTIONS

Courtesy ASRS *Callback* #257, January 01 NASA's Aviation Safety Reporting System

CALLBACK has published stories in past issues about aircraft that took off with a tow bar or tail stand attached. Here's a similar report filed by the pilot of a helicopter air ambulance flight:

I was going to move the aircraft to the airport so it could be hangared from the approaching severe thunderstorm. The aircraft has several orange electrical cords used to power the medical equipment and cellular telephone. I walked around the aircraft, untied the rotor blade and observed the orange cords lying on the ground. I started the aircraft and took off for the airport and returned to the hospital due to the thunderstorm. I missed one of the cords plugged into the aircraft and it became tangled in power lines on approach (over) the hospital. No damage to the aircraft occurred.

The incident was caused by the urgency to move the aircraft due to severe weather.... I also started the aircraft without the assistance of the other crewmembers, as they were busy. All of these factors caused me to miss the cord going in the right rear door of the aircraft.



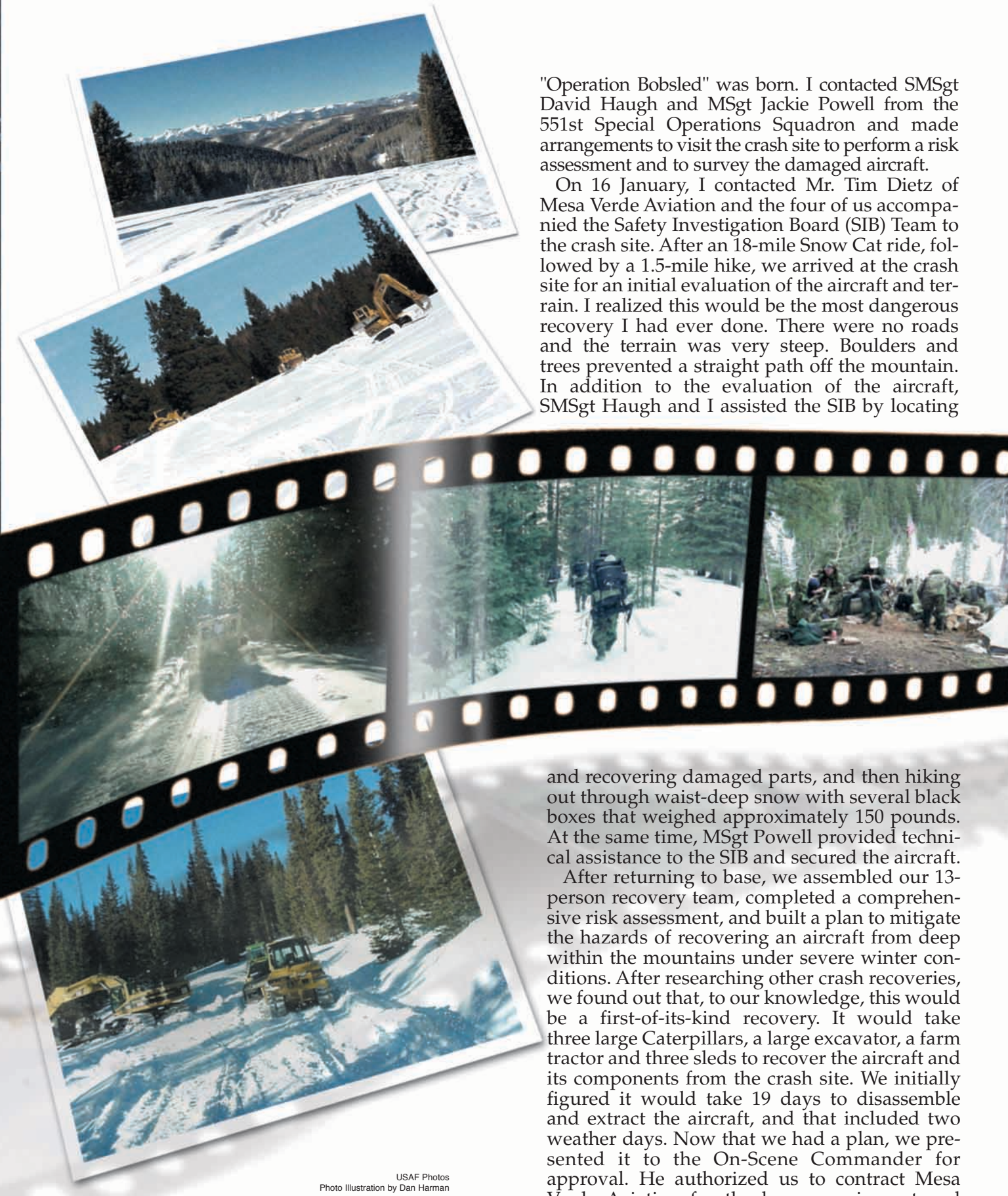
And there we were…
On the side of a mountain!

Operation Bobsled

CMSGT MARK SELF
58th Operations Group
Kirtland AFB, NM

During the early hours of 10 January 2002, two MH-53J helicopters were on a search and rescue mission to find and recover two injured personnel from a small-engine aircraft that had crashed deep within the Rocky Mountains. After locating the downed aircraft approximately 18 miles from Durango Mountain Resort (DMR) Ski Area, the two aircraft were on approach to the crash site when something went drastically wrong. One of the rescue aircraft crashed only seven-tenths of a mile from the original crashed aircraft, and that's when our mission began.

On 10 January, the Group Commander tasked me with the recovery of the downed aircraft. I had recovered four other aircraft, so I built several recovery options after receiving aerial photos of the crash site and the condition of the aircraft. There was only one way to bring out the aircraft, and that was overland. It was clear from the photographs that the aircraft was salvageable, and great care would have to be taken to recover the aircraft intact from the high-altitude, rugged mountainous terrain. I came up with the idea of a huge sled; thus



USAF Photos
Photo Illustration by Dan Harman

"Operation Bobsled" was born. I contacted SMSgt David Haugh and MSgt Jackie Powell from the 551st Special Operations Squadron and made arrangements to visit the crash site to perform a risk assessment and to survey the damaged aircraft.

On 16 January, I contacted Mr. Tim Dietz of Mesa Verde Aviation and the four of us accompanied the Safety Investigation Board (SIB) Team to the crash site. After an 18-mile Snow Cat ride, followed by a 1.5-mile hike, we arrived at the crash site for an initial evaluation of the aircraft and terrain. I realized this would be the most dangerous recovery I had ever done. There were no roads and the terrain was very steep. Boulders and trees prevented a straight path off the mountain. In addition to the evaluation of the aircraft, SMSgt Haugh and I assisted the SIB by locating and recovering damaged parts, and then hiking out through waist-deep snow with several black boxes that weighed approximately 150 pounds. At the same time, MSgt Powell provided technical assistance to the SIB and secured the aircraft.

After returning to base, we assembled our 13-person recovery team, completed a comprehensive risk assessment, and built a plan to mitigate the hazards of recovering an aircraft from deep within the mountains under severe winter conditions. After researching other crash recoveries, we found out that, to our knowledge, this would be a first-of-its-kind recovery. It would take three large Caterpillars, a large excavator, a farm tractor and three sleds to recover the aircraft and its components from the crash site. We initially figured it would take 19 days to disassemble and extract the aircraft, and that included two weather days. Now that we had a plan, we presented it to the On-Scene Commander for approval. He authorized us to contract Mesa Verde Aviation for the heavy equipment and operators to assist with the recovery, and he coordinated with the US Forest Service for authorization to extract the aircraft via sled.

continued on next page

The planning stage would be critical to the aircraft recovery due to the austere location. Safety and environmental preservation were our primary concerns. We would have to go into the site from DMR. That meant we would have to go up the ski slope prior to the resort opening in the morning, and could not depart until the resort closed at night. Mitigating the hazards of the recovery, I coordinated with the local airport for an emergency medevac aircraft, should anyone get injured. Then we reviewed satellite imagery and aerial photos to select possible extraction routes. We knew that all extraction routes would have to be hiked, because the deep snow might hide large rocks and ravines that could be impassable.

USAF Photos
Photo Illustration by Dan Harman

Next, we reviewed all the technical orders to see what tools and equipment we would need to carry in with us. After building our list, we went through all the steps for disassembling the aircraft to ensure we had not missed anything. We knew that if we forgot anything, we would have no way to go back and get it, because of the aircraft location. We looked at what tools we would need, because all tools would have to be hand-carried into the site. That meant each member would have to backpack in about 100 pounds of tools and personal equipment the first day. The rest of the heavy equipment could be brought in on the sleds once we selected the extraction route.

Since most of our crew had never worked in severe winter conditions and none of us had performed maintenance at high altitude, we developed a safety briefing to bring the crew up to speed on hypoxia, hypothermia, dehydration, frostbite and basic mountain survival skills. This was necessary because of the location's remoteness, the potential for rapidly changing weather and our limited ready access to medical care. Finally, we built the disassembly plan, outlining a daily plan so that everyone would know what was going on. We also divided the operation into major tasks and identified all notes, cautions and warnings. Our system experts identified the things that could potentially go wrong, and then we developed our primary and alternate plan for each task. We conducted briefings covering our planned maintenance, safety and weather. At the end of each workday we accomplished a hot wash and planned the following day's work.

On 9 February, we arrived at the aircraft to start the recovery. We re-briefed the entire team on the whole recovery operation. Before the start of each job, we would brief what the task was. Then we would discuss the operation as it progressed. At all times, at least two safety observers were present to ensure everything went according to plan. During this time we would hike over 25 miles through waist-deep snow, searching different routes. When anyone left the group we required them to travel in groups of two. On two occasions, I had to leave the group to meet with the contractor and the forest service. I would brief the team on my route and return time. In addition, I carried a cell phone for emergency contact. The disassembly phase was perfect! Why? Because safety was strictly enforced, and all risks were mitigated through planning and utilizing all safety equipment, plus strict adherence to technical orders.

Next came the extraction phase. This would be the most dangerous phase of the recovery, because of where the aircraft was and moving the 42,000-pound aircraft over the steep, rugged terrain. Mr. Dietz and his team cut the skid trail to the aircraft and arrived at the site on Day 8. The 20-mile extraction route we selected only required the removal of about 120 trees.

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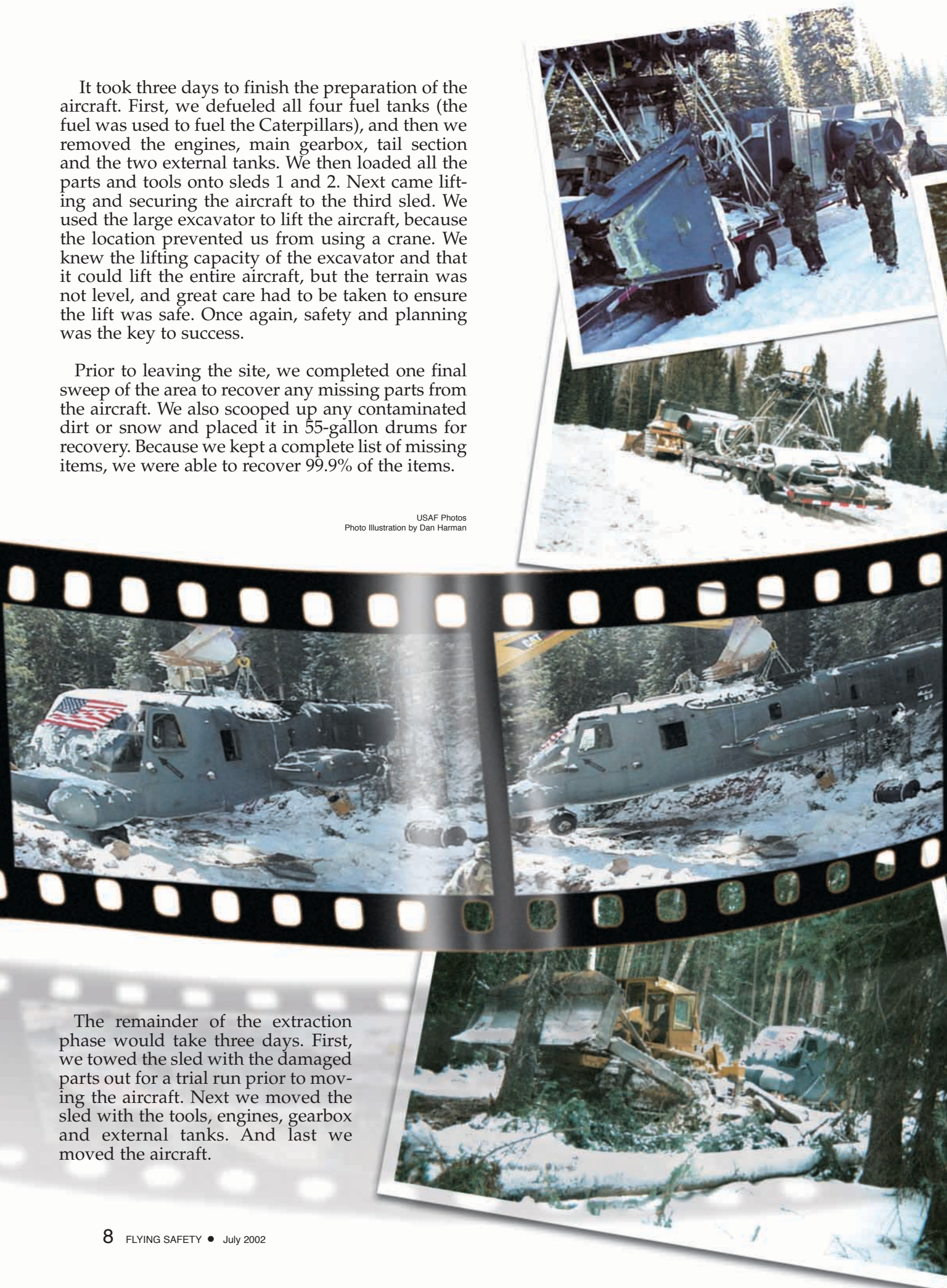
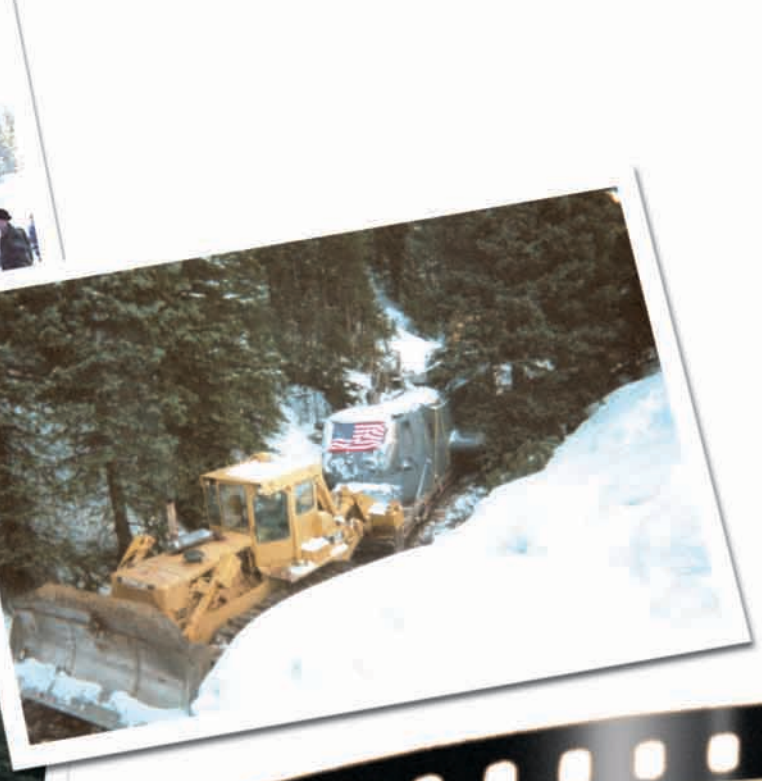
It took three days to finish the preparation of the aircraft. First, we defueled all four fuel tanks (the fuel was used to fuel the Caterpillars), and then we removed the engines, main gearbox, tail section and the two external tanks. We then loaded all the parts and tools onto sleds 1 and 2. Next came lifting and securing the aircraft to the third sled. We used the large excavator to lift the aircraft, because the location prevented us from using a crane. We knew the lifting capacity of the excavator and that it could lift the entire aircraft, but the terrain was not level, and great care had to be taken to ensure the lift was safe. Once again, safety and planning was the key to success.

Prior to leaving the site, we completed one final sweep of the area to recover any missing parts from the aircraft. We also scooped up any contaminated dirt or snow and placed it in 55-gallon drums for recovery. Because we kept a complete list of missing items, we were able to recover 99.9% of the items.



USAF Photos
Photo Illustration by Dan Harman

The remainder of the extraction phase would take three days. First, we towed the sled with the damaged parts out for a trial run prior to moving the aircraft. Next we moved the sled with the tools, engines, gearbox and external tanks. And last we moved the aircraft.



Because of the snow, side angles and steep grades the aircraft would have to cross, this would be the critical phase and had a high probability for disaster. Even though we had made a practice run with the other sleds, the one thing we could not simulate was the aircraft's sheer size, 57 feet long, and the aircraft would be top heavy. The aircraft was so heavy going up the steep mountain that it took two large D-800 Caterpillars hooked in tandem to move it. When going downhill, we would hook one Caterpillar in front and the other behind to act as a brake. We stopped and assessed every grade change and adjusted the Caterpillars as necessary. Finally, at the end of the third day of extraction, the aircraft and all its parts were safely off the mountain. It took several more days to trans-load and prepare the aircraft for the cross-country trip on a flatbed trailer to the depot at Cherry Point NAS, NC.

Operational Risk Management at its best! Identifying the hazards, eliminating the ones you can and mitigating the rest through planning, reassessing, flexibility, safety and adherence to tech data. All the planning and thought by the team ensured "Operation Bobsled" was successful and a blueprint for future recovery operations.

Editor's Note: CMSgt Mark Self was the Maintenance Superintendent of the 58th Operations Group at the time of this incident and was the maintenance lead for the recovery operation. He is currently assigned to 51st Operations Group, Osan AB, Korea.

"Aviate, Navigate, Com

CAPT DANIEL HAYENGA
87 FTS
Laughlin AFB TX

Decision Time: Do I go through the "light rain," or do I divert?

I am your typical military pilot—I joined the military not to become a general, but to become a pilot. And like any professional pilot, I learn from my mistakes and try to learn from the mistakes of others. There are a few times in my career that I can say I learned something that will carry me the rest of my life. But my biggest lessons came when I wasn't flying for Uncle Sam.

In the month before Thanksgiving 2000, I went to San Antonio, Texas, to get a single-engine rating added to my civilian license. This included a few flights in a Cessna 172 and a quick checkride. Then, for insurance reasons, I did an instrument checkout in a simulator. Now, I have about 2000 hours; 750 in a KC-135, 900+ as a T-38 instructor and ten in a Cessna 172. I was ready for a cross-country.

My trip was planned from San Antonio to the northeast corner of Arkansas, with a fuel stop in Texarkana, Ark., on Thanksgiving Day. The forecast called for ceilings 800-1000 feet with the tops at 6000 MSL, increasing to approximately 8000 MSL on our route, and no hazards forecast. I planned to climb to 9000 feet and cruise the whole way with no problems. My stopover had marginal VFR in the forecast, so I expected my final vectors to be in the clear. Even with my limited experience, I was not worried about VOR approaches with ceilings that high.

The first hour and a half went as planned. The family was asleep and I was getting to enjoy my one true passion outside my family—flying. But as we flew to within 100 miles of Texarkana, I saw a building cumulus directly in our line at 20,000-ish feet and climbing. Now using good CRM, I started asking Houston Center and Flight Service if they were painting any weather in our line. The most they were showing was light rain showers. To complicate things, the sloping cloud deck beneath us was higher than expected. About 30 miles before we hit the cumulus, we went IMC. Lesson 1.

I continued to ask in vain for information from Flight Service and Center. Center asked if I could take a higher altitude in an attempt to get VMC, but after looking at my outside air temperature (34° F) and the droplets of rain on the windshield, I decided against it.

Decision Time: Do I go through the "light rain," or do I divert? One look at my precious cargo, and my decision was made.

I started to revert to habit patterns from military flying, which would both save me and cause me problems. I looked at the chart and found my nearest suitable alternate where I knew I could get lodging and fuel was Dallas Love, and I requested a vector direct. I started the turn with the airplane

HQ AFSC Photo by TSgt Michael Featherston
Photo Illustration by Dan Harman

trimmed and looked down to pick up an approach plate. When I looked up, I had overturned the heading by 60 degrees. Lesson 2.

Now for some added stress: We were getting bounced around pretty good. My one-year-old son was crying and not looking so good. My daughter, four years old, was getting antsy and complaining about feeling sick. My wife was alternately paranoid about the turbulence and my children throwing up, and telling me in no uncertain terms that she was *not* enjoying this "great idea" of mine.

For the next hour, I was trying to put this little airplane on the ground safely. When we finally arrived at Dallas, the weather was 500 feet and one mile visibility. I did my first ILS in a non-military plane that has an instrument crosscheck like a T-37, and had a rough time of it. If the airplane didn't move so slowly, I don't think I would have made it on the first try. Lesson 3.

When we landed, it was raining hard. I pulled into the closest FBO and quickly worked to get the family unloaded and into a warm, dry building. Then when I was finished with them, I took care of myself. I told them I had to go to the bathroom and excused myself. I stood in the bathroom for ten minutes trying to calm myself down. I was literally shaking and had to wash my face a couple of times to stop sweating. That was without a doubt the worst flight of my life, and all because I got target fixation. I was flying into challenging weather in an unfamiliar airplane…and I was carrying my children, who were just going to see their grandparents.

Like I said earlier, the lessons I learned on that flight will last a lifetime, and I am pretty sure I can take them anywhere.

The first has to do with my expectation of changing weather on a flight. The typical sortie in a T-38 is around one hour. My flight that day was going to be over three hours. A lot can change with the weather in three hours. I found out that the amended forecast (after I took off) called for light to moderate rain showers along my route, which covered Arkansas and Louisiana, with tops around 25,000 feet. We were seeing the beginnings of that build-up. Checking the weather more often while airborne will make your trip a smoother one. I have become a firm believer in "go ugly early;" it means you land with more gas and more options.

The second lesson is that habit patterns from one airplane don't always transfer to another. When I looked down to pick up that chart, my internal clock was based on T-38 time. The turn rate in a 172 is significantly faster than I am used to for a 30-degree turn. Re-hack the internal clock in a new airplane. Perform tasks not directly related with aviating when you are stable in level flight. The order is "aviate, navigate, communicate" for a reason.

My third lesson was that my crosscheck didn't work worth a damn in this airplane. In the T-38, altitude is the biggest problem. In a 172, it is heading. There were times on the ILS that I would look away for just a few seconds and I was 30 degrees off heading. My altitude and VVI didn't wander as much, and luckily, because of the slow approach speed, I didn't go that far from the desired course. Get a couple of hours of "instrument time" in a new airplane with different speeds and crosschecks before you have to do it for real. Simulators are OK but nothing has more fidelity than the real thing.

For the rest of the weekend we went to CAVU destinations. I needed a vacation from my vacation.

Checking the weather more often while airborne will make your trip a smoother one.

Bottom line: They can help you do your job better.

Aviation Psychologists: A USER'S MANUAL

Illustration by Dan Harman

MAJ TRACY DILLINGER, BSC
Chief, AF Aviation Psychology
HQ AFSC/SEFL

Are you at a base with a medical facility? If you are, the chances are good you have a base psychologist. These folks are doctoral-level clinical psychologists. Many of them have specialty training in aviation psychology, accomplished at Brooks AFB in the Aircraft Mishap Investigation and Prevention course (AMIP). Some have other aviation psychologist experiences such as with the Army through their aviation psychology course; some are civilian pilots and others have gained experience in aerospace medicine assisting in assessments to return to fly, stress management, etc. With that in mind, let's look at what they have to offer.

You may ask, "So, why should I know anything about aviation psychologists?" Well, for many reasons, the main one being that a psychologist with specialized training in aviation psychology is a good resource if you are an FSO, a Squadron Commander, or in some other level of Wing leadership. Psychologists can help the FSO with class B/C and other types of local investigations that look at human factors. They can brief to the wing on safety day (those quarterly meetings get dull, don't they?). They can assist the flight surgeons with recommendations for aeromedical dispositions. They can help with mishap investigation interviews. They can teach good interviewing skills. Many have experience in survey development *and* analysis. They can help eliminate/rule out the presence of human factors as Safety Investigation Board (SIB) consultants. And they can provide education on group dynamics. They know about critical incident stress management (CISM) (AFI 44-153) and they know good referral sources for CISM services. Bottom line: They can help you do your job better and contribute another important perspective to investigation and prevention efforts.

Where do you find these people? There are several options. First, the Life Skills Center can tell you who is "on staff," and you can talk with them directly about their experience and training. Also, HQ AFSC, MAJCOM safety and MAJCOM medical officers are getting better gouge on who in the Command is a trained aviation psychologist consultant (to go out on SIBs).

And there are some things that *you* can do. Get to know these folks, if they are on your base. You can help them get operational experience, learn the "lingo," and understand how a squadron really works. Take them out to the flightline, introduce them to the maintainers, the aircrews and the aircraft that you know so well. The operational perspective you provide will make them more useful for your local safety programs. Work with them, grow them, utilize them—it can make a difference in the days to come.

USAF Photos

THE PERFECT MISHAP

MAJ ANDREAS K. WESEMANN
A Flight Commander
3d Flying Training Squadron
Moody AFB, GA

Cold drops of sweat beaded up on my forehead. The other T-6 instructor behind me talked slowly on the radio. The gear handle was placed down, but there were no gear down indications—nothing! Only a red light indicating that the gear door was not closed. A chase aircraft was directed to rejoin, and it verified that the inboard gear door was partially down. Slowly, my worst fears were realized. The newest aircraft that the Air Force was flying—still with the "new car" smell—would have to be intentionally landed gear-up. Despite two hours of troubleshooting and burning down gas, it was inevitable. As the aircraft came in on the final approach, the engine was shut down. An eerie silence ensued as Tail 32 became a glider. The aircraft touched down about 1000 feet down the runway and skidded to a stop about seven feet off center. In a shower of sparks, the propeller mustached itself outward. I slowly stood up, and checked my binoculars once more. I was glad that I was in the Runway Supervisory Unit (RSU) and not in the mishap aircraft!

It was the perfect mishap—not that it was preventable, or that the instructor pilots were able to counter the malfunction, but that every aspect of Operational Risk Management (ORM) was put into place and functioned flawlessly. Using the 5-M methodology (Man-Machine-Method-Management-Medium) I will show how in the space of about three hours, an aircraft malfunction became the "perfect mishap."

Background

A T-6A aircraft experienced a gear malfunction five minutes into a Continuation Training (CT) sortie with two instructors on board. Using a chase ship, they confirmed that they had a gear door partially extended, and then proceeded to the high pattern to troubleshoot. After almost two and a half hours of flight, efforts by the crew proved to be fruitless in lowering the gear. Upon the consultation and recommendation of many agencies, the mishap crew performed a flawless intentional gear-up landing.

Method: Operational Risk Management

Two main factors were analyzed using ORM over the previous several months in the 3d Flying Training Squadron. First, in a Continuation Training meeting last June, squadron leadership had the instructors brainstorm possible scenarios for the most likely mishap. The two items highlighted as the most likely were an engine malfunction and a gear malfunction. Several instructors noticed that one checklist directed an Emergency Gear Extension in Step 6—an irreversible step—and another checklist stated that attempts to recycle were advisable, and that it would be better to land gear-up than in some partial configuration. We all agreed that this section of the T-6A checklist was not well written, and that with good hydraulic pressure we would not advise blowing down the gear.

Second, good training was given to all instructors for the new tandem cockpit design for our side-by-side experienced

continued on next page

USAF Photos

instructors. We held many CT meetings where defensive techniques were discussed and how we would handle emergencies from the backseat. Briefings were given by Navy T-34 instructors familiar with the tandem cockpit environment as to how to handle emergencies from the rear cockpit. We also prepared ourselves on what to expect when we shut an engine down, using a recent engine shutdown experience at Randolph AFB.

RESULT: Proactive use of ORM prepared the mishap crew as well as the RSU crew for the mishap.

Machine: The Brand-New Raytheon T-6A Texan II

The mishap aircraft had been picked up from the factory several months prior to the mishap, and had flown without any major malfunction. All of the maintenance was properly performed and documented. The aircraft was on initial takeoff, and thus had a full load of fuel. With a full load of fuel, the mishap aircraft was able to fly for over two and a half hours while the mishap crew, ground personnel, supervisors and others attempted to troubleshoot and solve the problem. When the crew attempted to lower the landing gear on the first overhead pattern, they got an unsafe gear indication—no green lights, a red light in the handle and one gear door light on. The aircraft gear lighting system gave the proper indications for the malfunction, and the engine and all other systems performed as advertised. The chase aircraft had just taken off and was able to stay airborne for over two hours as well.

RESULT: Plenty of time to troubleshoot the malfunction, and the luxury of a similar chase ship.

Man: Dual Aircrew, Both Qualified Instructor Pilots

Both crewmembers were fully-qualified instructors in the T-6A. Both were also handpicked initial cadre, due to their experience as Air Education and Training Command instructors. The Front Cockpit (FCP) instructor had over 1993 total hours and 140 hours in the T-6A. The Rear Cockpit (RCP) instructor had over 2441 total hours and 92 hours in the T-6A. Both had adequate crew rest and nutrition, and both were prepared

to fly. The chase ship crew had similar flying time, experience and duty day.

RESULT: Highly experienced crewmembers were current, qualified and proficient in the aircraft.

Medium: Environmental Conditions Were VFR

The weather was "severe clear." Light winds, clear blue sky, and no turbulence. There was one additional aircraft in the pattern, also on initial takeoff on a pattern delay sortie. The aircraft was operating in the newly created Cypress Pattern—the RSU-controlled pattern. This gave additional assistance that would not be available with a tower-controlled pattern. The mishap crew had instant confirmation about their configuration, and three instructors looking in the checklist and Dash-1 for information about their problem. Within minutes, the RSU controller had the second aircraft rejoin the mishap aircraft in the high pattern, while the Supervisor of Flying (SOF), tower, squadron leadership and base operations were informed on the emergency aircraft. There were no helicopters or other aircraft in the pattern at the time of the mishap.

RESULT: No environmental factors affected the mishap.

Management: RSU, Squadron Supervisor, Supervisor of Flying and Raytheon Engineers

The RSU controlled Cypress Pattern at the time of the mishap. The RSU was operating a Class B RSU since there were no students flying. The controller was a previous RSU Instructor Controller, and was receiving his initial checkout and qualification in the T-6A pattern. Therefore, there was an extra individual in the RSU—the upgrade controller. The RSU observer was a former Wing Flight Safety Officer (FSO), and familiar with what should be recorded for the mishap report. The deputy group commander was flying in the chase aircraft with the group FSO, providing expert guidance and information to the mishap crew. The SOF was also a highly experienced T-6A instructor. Within minutes of the mishap, the squadron supervisor, who was also the squadron Director of Operations (DO), had the local maintenance personnel from Raytheon under an aircraft looking at possible solutions to the problem. Shortly thereafter, the engineers at the Beech Aircraft plant that designed the T-6A gear system were also underneath an aircraft on the assembly line with their plans in hand to attempt to find a solution to the problem. In every position that day, individuals were well prepared to expeditiously handle their responsibilities. Group and squadron leadership were in key positions making decisions and providing oversight.

RESULT: Management was prepared, and executed an outstanding performance as a team to manage the mishap. Management was not a factor in the mishap.

Conclusion

Given the choice—which we know we never have—we would have preferred to review our mishap response in a Major Accident Response Exercise (MARE). However, this day, the crew, the aircraft and everything else came together in perfect coordination, better than any MARE. Base agencies, including the SOF, fire response, base operations, and others all stood up to the plate with near perfection. Following the mishap, all of the major players sat down together for a "hot wash," but found very little that we would have done differently. The only problem was that we could not solve the problem and get the gear down, and the aircraft had to land with the gear retracted. But even then, the aircraft flew fine, skidded for only about 1000 feet and came to a stop. The crew egressed the aircraft, and was met by all of the appropriate agencies.

Given all that, and the fact that the aircraft has since been repaired and is currently flying, it's as close to the "perfect mishap" as we could have wished.

USAF Photo by TSgt Mike Buytas

USAF Photo by TSgt Manuel Trejo

USAF Photo by SSgt Jeremy T. Lock

USAF Photo by TSgt Scott Reed

US Army Photo by Kevin P. Bell
Photo Illustration by Dan Harman

COMBAT ORM

MAJ PAUL GALLAHER
HQ AFSC/SEFF

Since the beginning of the War on Terrorism, the military has had a rash of mishaps. Of note are the high numbers of Controlled Flight Into Terrain (CFIT) mishaps. Most of the mishaps have involved airlift and helicopter-type aircraft. These mishaps have occurred in various MAJCOMs.

Why have our CFIT rates gone up? A common thread in these mishaps is a lack of effective wartime Operational Risk Management (ORM). Whether conducting a Search and Rescue (SAR) operation, a landing at a high altitude LZ or night operations into unfamiliar environments under low illumination, flight crews continue to fly good airplanes into unintentional contact with Mother Earth.

Many flight crews seem to have the attitude that "We're at war; all risk is accepted." Really? If we are adhering to tactics that protect us from MANPADs or small arms fire but collide with the ground, destroying the aircraft, how is that successful? Being tactically sound does not include doing things with a high degree of risk to thwart a threat that presents a lower degree of risk.

Units need to ensure their wartime ORM process incorporates both effective tactics and risk management techniques. ORM is still a relatively new process, especially in the combat environment. If your risk management process is more restrictive when flying a daytime local trainer at the home-drome than it is for a combat or combat support mission, then you probably need to overhaul your process. Here are a few items to consider when developing an effective wartime ORM process:

- Is there effective leadership oversight on crew makeup and matching the right crews/pilots to the right mission?
- Is navigational chart data recent and accurate? Are obstacles CHUMed on the charts?
- Have we been training the way we intend to fight or are we trying out tactics for the first time in a combat zone?
- Are we adhering to the mission we flight-planned? If not, what are the risks of deviating (i.e., terrain, threats, fuel management)?
- Do pilots/crews have adequate time to plan the combat mission, or are we flying combat missions with the same amount of mission planning as a home station trainer?

• If flying into a contingency field, what are the concerns: airfield lighting, runway available, realistic threats, air traffic control, published approaches?

• Is there any air traffic control in the area to be flown? If so, do the controllers speak English fluently?

• What are the weather patterns in the AOR? Does the pilot/crew have experience flying in those particular weather patterns?

This short list of examples should get leaders and aviators thinking about their combat mission risk management. There are obviously other issues that can and should impact your risk management processes. This could include somato-sensory inputs such as hair standing up on the back of your neck, the ol' "pit in the stomach," or the ever-popular "gluteus-crunch." If something doesn't feel right when you are flying a mission, it is incumbent upon Air Force aviators to take the appropriate action to prevent a mishap.

Here's the bottom line: Obviously there are times when accepting more risk on a sortie is warranted, but we need to ask a few questions before saying "Can do."

1. What are the risks to this particular mission?

2. How are the risks quantified? "We're at war, so all risk is acceptable" is the wrong answer. (After a recent Class A mishap during a contingency mission, one interviewed crew said they thought risk levels on similar missions were at the "ridiculous" level. If so, why did they continue to fly the mission?)

3. If risk levels are high, who decides to accept the risk? This goes back to a key principle of ORM: Accept risk at the appropriate level. Most squadron commanders would rather be awakened in the middle of the night to discuss a mission prior to launch than get the, "We've-had-a-Class-A" call. That's why they get that CC pay.

4. Are we accepting more risk in the name of tactics when the threat is not realistically present? Getting the most accurate and recent intel and tactics information is incumbent upon every crew when planning the mission.

"We're at war" is no excuse for omitting ORM from your crosscheck. ORM is vital, even—or especially—in combat.

USAF Photo by SSgt Shane Cuomo

USAF Photo by TSgt Cedric H. Rudisill

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USAF Photo by SSgt Shane Cuomo

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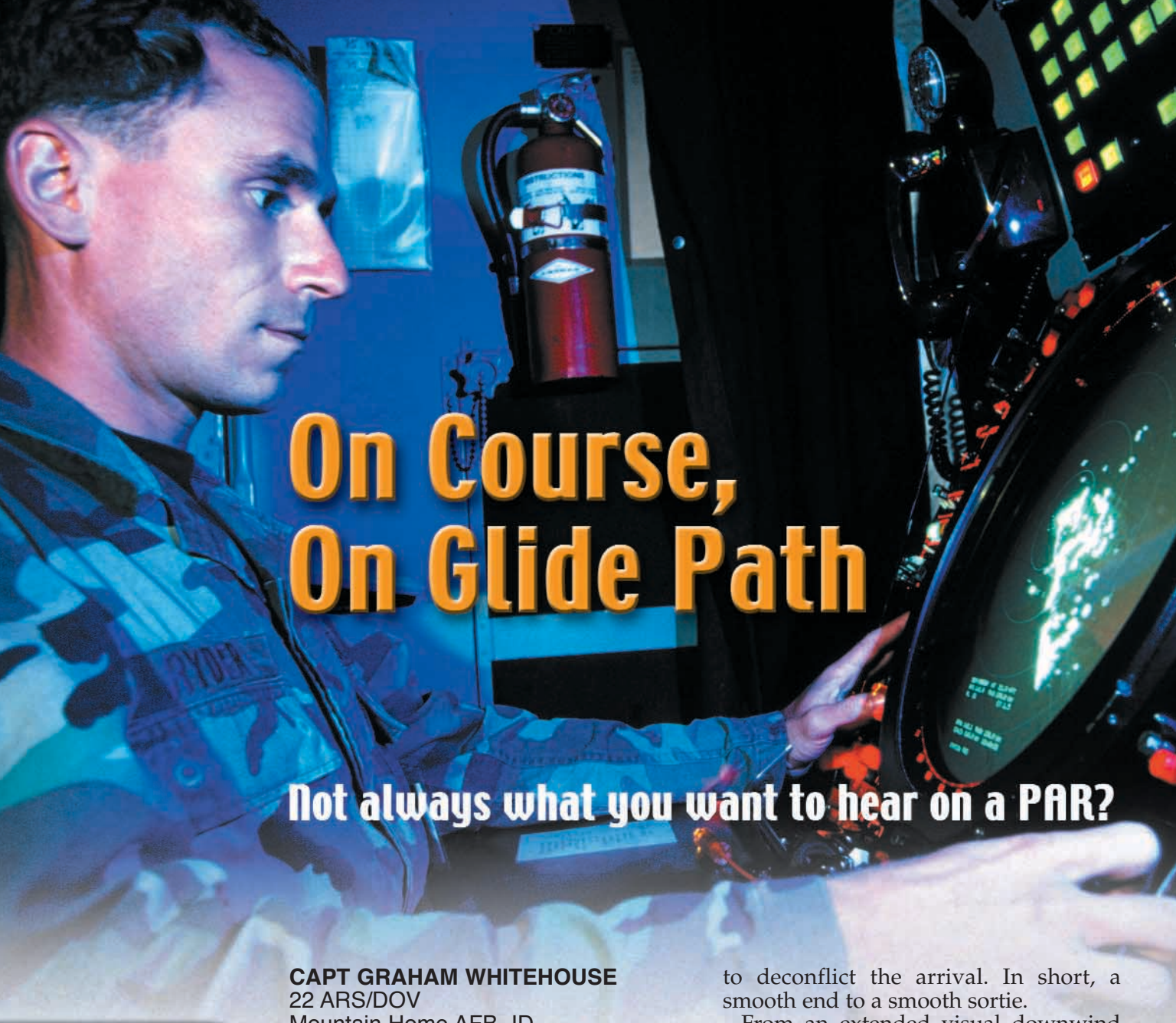

On Course, On Glide Path

Not always what you want to hear on a PAR?

CAPT GRAHAM WHITEHOUSE
22 ARS/DOV
Mountain Home AFB ID

It wasn't long before things started looking a bit strange.

My crew and I were recovering our KC-135 into Nellis AFB after participating in a rather uneventful Red Flag sortie on the Red Air side. It was mid-afternoon, the skies were clear, descent checklist complete, and Nellis was landing Runway 21, which meant we wouldn't have to do the aggressive noise-abatement arrival procedures they require for Runway 03. The last of the fighters were just landing, and there was only one other aircraft to get sequenced behind before what I planned to be a visual straight-in to a full-stop landing. I recognized the traffic's call sign, Hydra 37, as another of my squadron's tankers which had been refueling Blue Air. There would be no problem matching speeds to deconflict the arrival. In short, a smooth end to a smooth sortie.

From an extended visual downwind we picked up a vector for sequencing behind the other tanker. Around this time, ATC called to see if we could do a PAR approach for them. Knowing how rarely Nellis grants instrument approaches, I figured they must be making the request for controller training. "Sure, we can do that," I said. PARs are pretty hard to get these days, and anyway, the radar controller probably needed the practice. ATC set us for about a 15-mile base to final.

I quickly re-briefed the approach to include the PAR mins, descent rate and lost comm procedures. "This time," I told the crew, "I won't have the ILS displayed on my HSI, and that way I won't be tempted to cheat the controller's instructions." And that was pretty much all it

USAF Photo

took to get ready for the PAR approach. Wasn't it?

I began configuring the aircraft with gear down and flaps at 30 degrees, the intermediate setting we normally use until we put in full flaps at glideslope intercept. We got turned to final and performed the standard controller/aircrew communications ("Do not acknowledge further transmissions, fly heading 203…"). Before long, the controller instructed us to begin descent, which caught me a little off guard, but I chalked it up to my not having flown a PAR approach in…how long had it been? Six months? A year? I called for full flaps and lowered the nose to pick up the glide path.

It wasn't long before things started looking a bit strange. We were being told that we were "on course, on glide path," but it still didn't look right. The runway was abnormally far off to the left side (OK, I was cheating out the window), and we looked low to me. Twelve DME now, I saw. Oh well, that'll give the controller plenty of time to recover, I thought. I knew there was steeply-rising terrain off this end of the runway, but I wasn't too concerned because the weather was totally clear and I had the ground in sight.

"On course, on glide path" continued to be the guidance we heard from the PAR controller, which is always what I like to hear. Still, it felt uncomfortable. I'd been slowly shallowing my descent, but we now looked really low, and we weren't any closer to the runway centerline than we had been a minute ago. This controller really needs practice, I thought. But enough was enough, and I decided to level off until we intercepted a more normal glide path.

"On course, on glide path" were still the words from ATC. How can that be? I thought. I looked at the DME (7.5 from the field) and the radio altimeter read 730 feet. *730 feet?!* What am I doing that low way out here? I looked out the window and there was now a small mountain between me and Runway 21 Right, although I could barely make out the approach end of 21 Left. We'll continue visually, I thought.

After another minute or so of flying level at 700 AGL, still "on course, on glide path" according to the controller, and correcting towards the approach end, I called the controller: "We've been level for the last three miles or so, and you're calling us on the glide path. I think you need to recalibrate your equipment. We'll take over visually from here." The controller acknowledged and handed us off to tower.

As we lined up with the runway, we saw Hydra 37 on landing rollout. "Maybe the controller was looking at the wrong airplane on the scope," my copilot suggested. Is that even possible? I wondered. A call to RAPCON after we landed confirmed that this was indeed what had happened: The PAR controller had mistaken the preceding tanker for us, and since Hydra 37 was following the course and glide path to the same runway (although on a visual approach), it looked like they were following the controller's instructions. The watch supervisor promised me he'd look into the situ-

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730 feet?! What am I doing that low way out here?

ation and take whatever remedial action was necessary.

It was only then that the full gravity of the situation struck me: If we hadn't been VMC, they could have vectored us right into the ground, and they wouldn't have known it was even happening until after our ELT started going off.

I began reviewing the approach in my head and recognized a few things I could have done differently that would have helped me recognize the problem earlier. They are:

1. *I didn't back up the PAR with another instrument approach.* Full-scale glideslope and/or course deflections would have been hard to ignore or write off to poor controller proficiency. Besides, AFMAN 11-217V1 (*Instrument Flight Procedures*), while not quite requiring a backup approach, strongly suggests the use of one in case of lost communications. If I still wanted to avoid "cheating" on the PAR, I could have had the copilot monitoring the ILS. This brings up the next point.

2. *I didn't set limits of what deviations I would accept ahead of time*. It's hard to quantify course and glide path discrepancies visually, but once there's an IAP to look at it becomes a lot easier. One dot left or right of course or below glide path, for example, or no lower than the MDA/step-down altitudes for non-precision approaches, would have kept me out of trouble. Once I found myself approaching those limits I would then transition to the backup approach, make the necessary corrections, and tell the controller what I was doing. One reason why I didn't think of that ahead of time is:

3. *I didn't fully brief the approach when it was given to us*. Sure, it was clear and a million, and I was familiar with the airfield and the surrounding terrain. This fact certainly kept me from flying the jet into the rocks this time, but habit patterns are what will keep us alive when the weather's down to mins and there's no room for error. By looking at the approach ahead of time I could have figured out approximate altitudes and DMEs to use as targets. I would have recognized that the "begin descent" call was too early. Even had I been flying to a radar-only airfield with no other NAVAIDs or instrument approaches, I could have used the FMS as a backup (which in our plane also includes a vertical nav function similar to an ILS glideslope) to maintain maximum situational awareness.

4. *I disregarded the warning signs I did have, and was too willing to put my fate in the hands of the PAR controller*. The first cue should have been that I wasn't prepared for the "begin descent" call. I thought I was just behind the jet, but in fact it was too early to descend. Also, although it soon became obvious that we were neither on course nor on glide path, I figured this was just due to the controller being out of practice, or maybe this approach was designed differently because of the terrain off the approach end. In fact, I already knew that precision instrument approaches have to be aligned with the runway heading, and if they can't meet terrain clearance criteria then they just don't build a precision approach there. Finally, if you ever see a mountain between you and the airfield on an instrument approach, it's a good sign that something has already gone wrong.

If you ever see a mountain between you and the airfield on an instrument approach, it's a good sign that something has already gone wrong.

Obviously a few other factors would have to have been present in order for our situation to turn really serious. The weather being down near minimums is the obvious one, and in that case perhaps ATC would have handled their sequencing and radar identification differently. Even if the weather had been poor, maybe our Ground Proximity Warning System would have clued us in early enough for us to recognize what was happening and go around. Nobody I know, though, ever wants to be in a position where they have to find out just how good that GPWS really is. Besides, one thing we learn as aviators is that it's our job to be proactive, maintain SA and be responsible for the safety of our aircraft and crew. We can't rely on outside people, whether they're ATC, maintenance or the folks who design our avionics, to do those things for us.

My crew and I came away from the experience with a new appreciation for the extent to which we routinely put our trust in other people outside the jet to do what's right for us, and a better sense of where and how we should place limits on that trust. In the future I'll trust that people will do their jobs correctly, but I'll also have established boundaries to remain within, and a plan for how to recover when those boundaries are exceeded.

Pick 'Em Up, Put 'Em Down...

Photo courtesy of German Air Force

SMSGT SUE KEISTER
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92nd Air Refueling Wing
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Those of us who can remember our first day of basic training probably do not have fond memories of this phrase. Yet this phrase has been commonplace in the KC-135 Tanker community for almost 40 years. Each time a KC-135 needs to refuel a probe-equipped receiver aircraft such as all U.S. Navy and most NATO and foreign air service aircraft, the Boom to Drogue Adaptor (BDA) kit must be *put up* on the air refueling boom.

When the mission is over the BDA must *come down.* Sounds simple, right? Unfortunately, it takes maintenance crews around two hours to complete the aircraft configuration change each time this has to happen. In addition to this, when the KC-135 has the BDA kit installed it cannot refuel USAF aircraft equipped with an Air Refueling Receptacle (ARR). This means if an aircraft has to refuel a probe-equipped aircraft in the morning and a receptacle-equipped aircraft in the afternoon, there is going to be a very busy maintenance crew "putting it up… and taking it down."

There are other disadvantages to using the BDA kit. The kit consists of a hard metal basket attached to a stiff nine-foot hose. This leaves the receiver aircraft with a very small refueling window. In-flight refueling is inherently a potentially dangerous operation, but add turbulence, darkness or a new receiver pilot to this equation, and the danger of the receiver aircraft making contact with the drogue in ways neither the tanker nor receiver ever intended increases greatly. For these reasons, many receiver pilots refer to the BDA as the "Iron Maiden," and most do not like the idea of having to refuel against a KC-135 because of it. Most Navy pilots will tell you that, short of a bad weather night aircraft carrier landing, refueling with the BDA is the most difficult thing they do.

Funding was made available in 1996 to modify 20 KC-135R Tankers to a Multi-Point Refueling System (MPRS) configuration by installing a MK32B-753 Air Refueling pod on each wingtip to increase operational capability and safety. The modification of all 20 aircraft is nearing completion, with scheduled delivery of the last aircraft in April 2002. The refueling pod contains a 74-foot hose with a flexible paradrogue attached to the end of the hose. Once the hose and drogue is trailed out of the pod it is well behind the KC-135, and it provides a much larger, and safer, refueling window to the receiver aircraft as well as allowing two aircraft to be refueled at once.

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Many receiver pilots refer to the BDA as the "Iron Maiden."

Photos Courtesy of Boeing Aircraft Co.

Lost hooks could cause drogue instability.

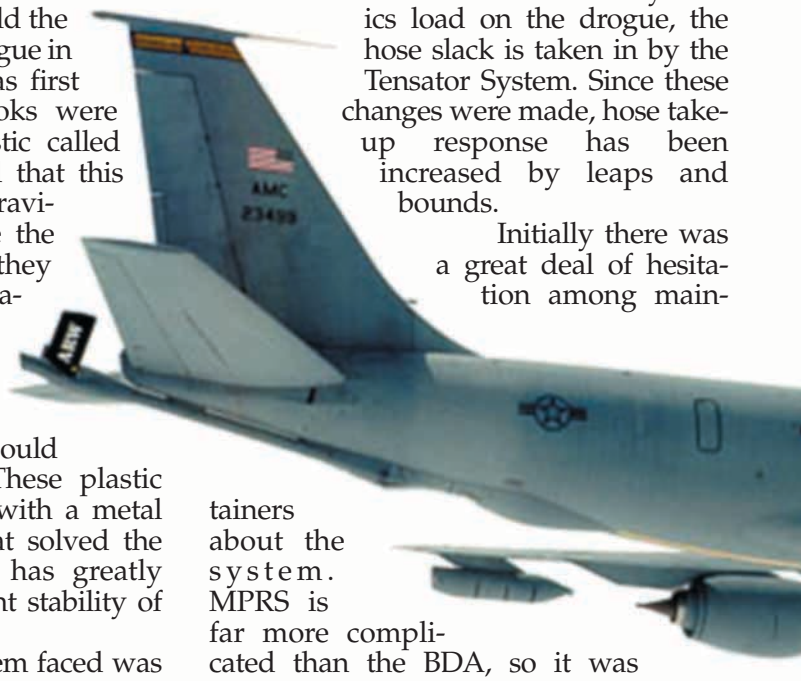
There were some initial problems after the new MPRS system was operationally introduced in 1997. A team of engineers, logistics specialists, contractors and field unit representatives were assembled to analyze and correct the problems. Within the past 18 months the causes of the problems have been determined, and corrective actions are either in place or will be within the next year.

The first problem addressed was the drogue itself. Each drogue has 84 hooks that hold the para-wing portion of the drogue in place. When the system was first put into service these hooks were made from a Dupont plastic called Hytrel™. It was discovered that this plastic was susceptible to ultraviolet degradation that made the hooks brittle, and when they reached the sub-zero temperatures seen at operational altitudes they were easily broken. This was a FOD hazard to the receiver aircraft, and the lost hooks could cause drogue instability. These plastic hooks have been replaced with a metal hook and retaining clip that solved the problem. This one action has greatly enhanced safety and in-flight stability of the drogue.

Another problem the system faced was inadequate hose take-up response. Aerodynamic forces keep the hose and drogue fully trailed behind the pod, but when a receiver aircraft contacts the drogue and pushes it in towards the pod, the pod needs to take up the slack in the hose, and this was not happening properly. If the hose slack is not taken up when the receiver makes contact with the hose, the hose may/will create a large bend that can make contact with the receiver aircraft. The hose can also then be violently whipped around by the KC-135's wake and damage the receiver.

The team determined the best course of action was to beef up the hose take-up system, known as the Tensator System, by adding an additional Tensator and other hardware to keep the system functioning properly. The Tensator System previously used five motor springs to take up the hose slack, so a sixth motor spring was added to increase the take-up force.

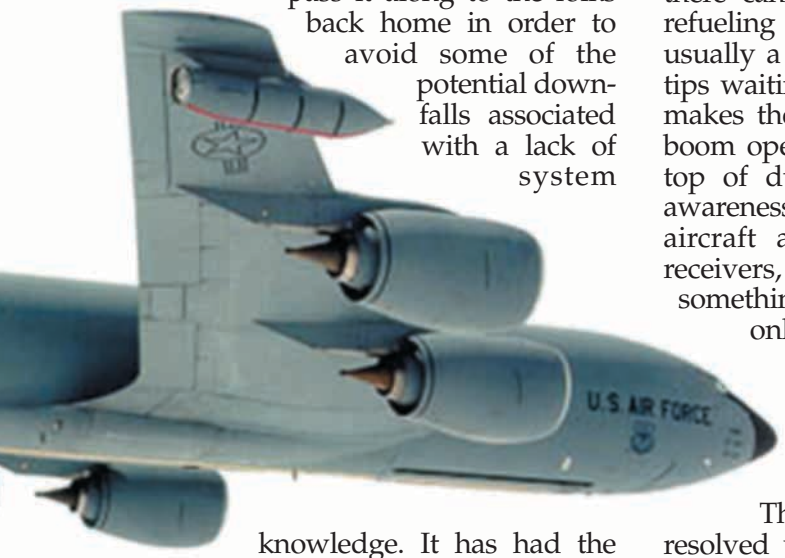
The tensators are basically a set of big parallel springs that are put under tension as the refueling hose is unwound. This tension allows the refueling basket/hose to follow receiver movement fore and aft. The tensators actively dampen any slack or hose whips as they develop, thus protecting the receiver and tanker components from damage. There are now six of these springs developing a total of up to 270 pounds of force that is trying to pull the hose back into the pod. So when the receiver aircraft pushes into the drogue and overcomes the aerodynamics load on the drogue, the hose slack is taken in by the Tensator System. Since these changes were made, hose take-up response has been increased by leaps and bounds.



Initially there was a great deal of hesitation among maintainers about the system. MPRS is far more complicated than the BDA, so it was feared that it would be more labor intensive for maintenance personnel to keep operational. To some extent this is true, as there are more inspection requirements. The extra efforts are more than offset by the amount of time saved by not having to install and remove a BDA each time there is a drogue mission. Three qualified technicians can install or remove both MPRS pods on an aircraft in six hours or less. Once the pods are installed, they can stay on, because the centerline air-refueling boom can still be used to refuel USAF aircraft. In fact, the KC-135R with MPRS is now routinely refueling with both the centerline boom and MPRS pods on the same mission. This has proved to be the greatest asset of the system in today's joint operations environment.

Right now the main concern for maintenance personnel is interpreting the system's technical data. All of the data is available, but it is presented in a method unfamiliar to mechanics who are used to working on a 40-year-old aircraft. The

technical data was essentially a commercial manual with an Air Force number assigned to it. It is written in a manner that assumes the maintainer already has a fair amount of knowledge of the system. Early on in the systems development, Boeing, the MPRS Program Management Office at Wright-Patterson AFB, and HQ AMC/LG recognized this issue. They identified points of contact at each MPRS base to work alongside the contractors and engineers while the system was under development. This enabled an initial cadre of maintainers at each base to learn a great deal about the system and pass it along to the folks back home in order to avoid some of the potential downfalls associated with a lack of system knowledge. It has had the additional benefit of keeping lines of communication open between the maintainers in the field, the program managers and the engineers, so any possible system deficiency is quickly addressed and corrected. There are questions that still need to be answered by engineers from time to time but now we know who to ask, and there are "faces with names" when we talk with each other. There is also a weekly teleconference to report weekly MPRS activity, so there is valuable crosstalk of relevant issues between all parties. Before long, MPRS maintenance will be routine and looked at as just another maintenance activity.



In-flight refueling is an inherently risky undertaking under the best circumstances. Several aircraft hurtling along at 400 miles per hour, in close proximity, while passing a highly volatile fuel between them is asking for something to go wrong. However, it is an operational necessity and has become routine over the past 40 years. The MPRS system greatly reduces the safety risks associated with in-flight refueling of probe-equipped aircraft because it increases the refueling envelope of the receiver. Refueling now occurs at a much greater distance from the KC-135 than it did with the BDA installed.

In some areas MPRS can be a double-edged sword. For example, it appears as if the boom operator only needs to trail the hoses out and watch the receiver pilots do all the work. Nothing could be further from the truth. When using MPRS, the boom operator's work is doubled. They must keep track of the receivers' position and amount of fuel off-loaded. Besides, there can now be two receiver aircraft refueling at the same time, and there are usually a few more aircraft off the wing tips waiting to refuel. All of this activity makes the operation very hectic for the boom operator. There is a lot to stay on top of during refueling, so situational awareness is paramount. Refueling two aircraft at once is a benefit for the receivers, but it doubles the risk that something could go wrong. Right now only the most experienced boom operators are being qualified on the system, and they must complete two check flights before they are cleared to operate the system alone.

There are other minor issues to be resolved with MPRS, but the system is functioning properly and is now in service with units at RAF Mildenhall, UK, Grand Forks AFB, ND, McConnell AFB, KS, and Fairchild AFB, WA. Among the issues left to correct are weak switch covers on the pod control panel at the boom operator's station, and airflow just aft of the pod, which can cause hose and drogue oscillations at high tanker gross weights while flying at slow speeds. Once again, corrective actions have been identified and will be implemented within the next year to ensure optimum system performance. The overall benefits of MPRS are being met, and the operational capability provided to the customer has enhanced the safety of an inherently dangerous operation.

Editor's Note: SMSgt Keister is the Standardization Evaluation Boom Operator for the 92nd Air Refueling Wing and TSgt Nelson is the Aircraft Hydraulic Systems Instructor assigned to the 92nd Logistics Support Squadron.

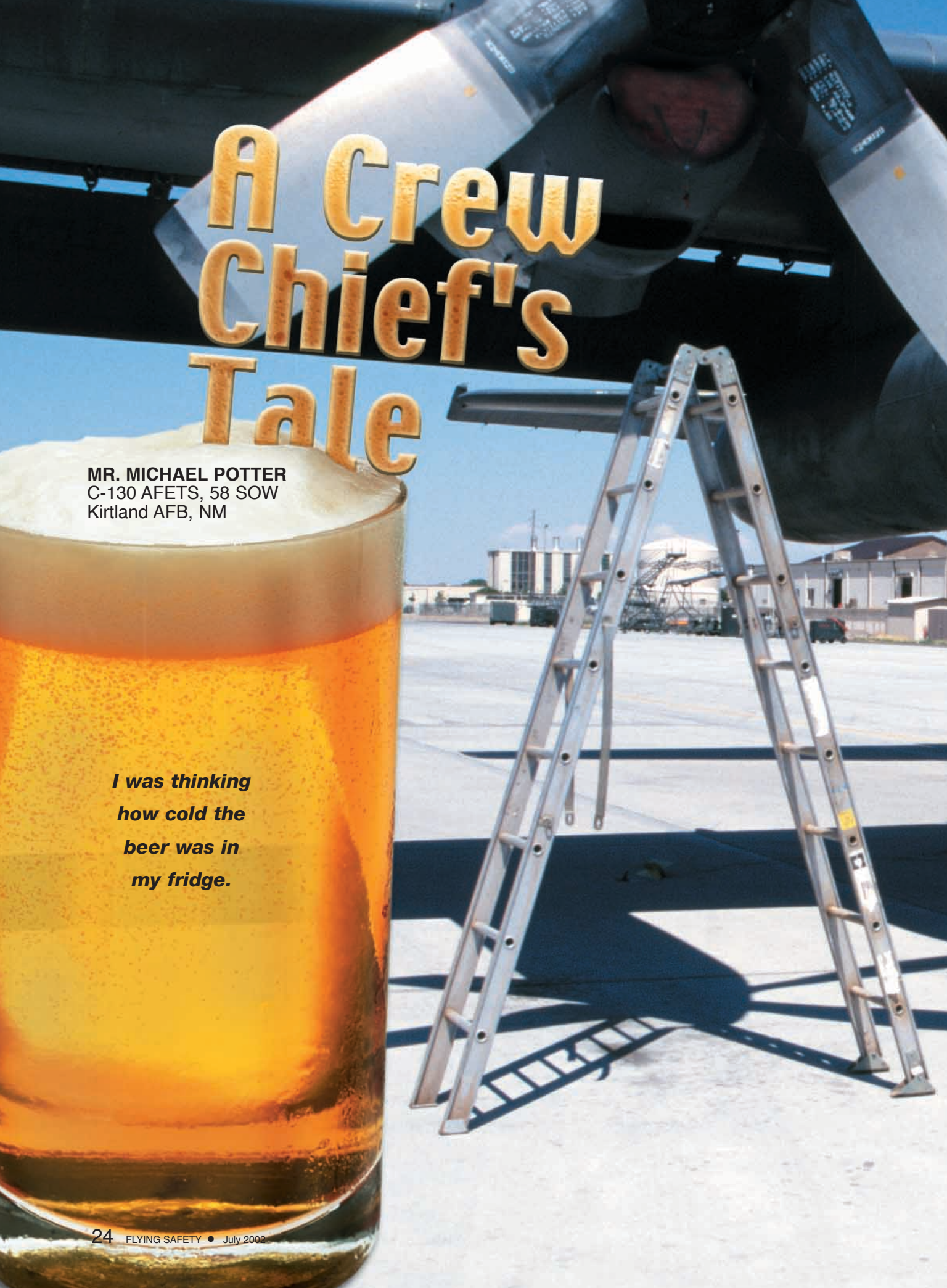
When using MPRS, the boom operator's work is doubled.

USAF Photos by SrA Ebony Pierre

Center Photo:
Courtesy of Boeing Aircraft Co.

A Crew Chief's Tale

MR. MICHAEL POTTER
C-130 AFETS, 58 SOW
Kirtland AFB, NM



I was thinking how cold the beer was in my fridge.

The ladder beat me to the ground and I landed on top of it.

HQ AFSC Photo by TSgt Michael Featherston
Photo Illustration by Dan Harman

Late one evening, after arriving back at home station from a five-day Joint Air Tactical Trainer filled with 10-hour flights, I went to put my C-130 to bed and check the engine intakes and exhausts while installing the intake plugs. Wouldn't you know it, the crew chief ladder (the old style with two horizontal folding arms that attach to the opposite side with "D" rings) I had been nursing along for the past two months finally gave up the ghost. The BLANKETY BLANK thing lost its last horizontal support and the closest maintenance stand was at least two parking spots away. So, being the quick-thinking person that I am, I just stood the ladder up and said a quick prayer, hoping the ladder would not fold up or unfold when I was at the top. Well, the first three motors and the last exhaust inspection went well. Then came my near-fatal error.

I stood the BLANKETY BLANK ladder at the last intake, grabbed my flashlight in one hand and the intake plug in the other and started climbing. I was thinking how good it was to be home, and how cold the beer was in my fridge. When I got to the third rung from the top on the ladder, I could just see into the intake and started looking for the usual stuff, birds, loose rivets, FOD damage, etc. (Remember, this ladder looks like an A without the cross bar, and the top is hinged from 0 to 180°.) Finding nothing interesting to look at, I started putting in the intake plug. It, of course, was as well-used as the ladder, and it was being obstinate as well. I then put one foot up on the second from the top rung (a major no-no in the maintenance world) to get more leverage to pound the dang intake plug into place. Thinking to myself, "*Got it, phew*." Now hook up the bungee cords and beat feet for a cold one. One little problem, though: The effort to get the plug in had caused the ladder to lean onto two opposing feet, with me at the top. The ladder, of course, had about enough of my bad language being directed at it, and therefore, decided it was time to go on a work stoppage.

It opened up to the full-open position, leaving me eight to 10 feet above it and moving down toward it, and the ground, at what seemed like terminal velocity. Fortunately for me, the ladder beat me to the ground and I landed on top of it, contacting it with one knee (*that* was painful). I immediately jumped up and looked around to make sure no one saw my dance with the ladder, or the trapeze act that had just been performed. The expediter truck was still across the flightline, and no one was near (what a relief). Lucky for me I finished the day with only a limp and no broken bones. I finished closing up the aircraft and waited for the truck to pick me up, so I could finally get that cold one.

That ladder didn't last much longer, as it was sent to where all broken ladders go—the ISO Hangar. Just kidding. Remember, we are only as safe as the equipment we use. Next time I made sure I had the right equipment for the job.

Editor's Note: The following accounts are from actual mishaps. They have been screened to prevent the release of privileged information.

SEE AND AVOID!

We share the skies with our civilian counterparts, but don't you just hate it when you are minding your own business and the next thing you know a civilian aircraft crosses your path? Here are a few examples of what has happened, and how "See and Avoid" has prevented serious mishaps.

T-1 Low-Level

A T-1A was on a low-level flight and had just begun a gradual descent from 1500 to 500 feet. Halfway through a turn the Instructor Pilot (IP) saw a red, single-engine, high-wing Cessna-type aircraft pass underneath the aircraft. The IP estimated it passed *200-300 feet* below them. The Cessna was not squawking and the Traffic Collision Avoidance System (TCAS) did not provide any alerts.

So what happened? There are several small, uncontrolled civilian airfields within 15 nautical miles of the area the T-1A was operating, which is over sparsely populated oil fields. The civilian aircraft was also not in radio contact with Air Traffic Control (ATC), and due to the type of airspace it was in, was not required to be. In this case, the investigators could not find anyone to blame. Investigators believe that because the low-level route was fairly new, the civilian pilots in the area did not realize it was now in use. The Air Force was lucky the T-1A pilots were able to "See and Avoid."

Another T-1 Times Three!

This unfortunate crew had a really bad day and experienced *three* separate near misses on the same out-and-back mission. The first incident occurred as they were conducting an approach at the "out" location. As they were two miles outside of the initial approach fix they witnessed a civilian aircraft cross directly in front and approximately *300 feet* above them. They did not get a TCAS alert, and Approach painted no traffic in the area. In this case the civilian aircraft was flying Visual Flight Rules (VFR), outside of Class C/D airspace and not squawking. Therefore, separation could not be guaranteed between the Instrument Flight Rules (IFR) T-1 and the VFR civilian aircraft.

The second close call came when the aircraft was flying another approach, and while being vectored at 3000 feet. The crew had a TCAS resolution advisory for traffic within one mile and 50 feet below and climbing! The crew queried the controller, who observed the aircraft and informed them that the traffic was VFR, behind them, and was climbing to 2500 feet. The pilot reported that TCAS showed the aircraft climbing to 2800 feet, while the controller stated he showed 2600 feet for the VFR traffic. Unfortunately, the civilian pilot had overshot his assigned altitude. The controller then advised the T-1A pilot to climb to 3500 feet as another conflict was developing. The VFR traffic kept things interesting on this out-and-back, so far!

Now, on to the third and fortunately last incident. As this fateful crew climbed out from their final approach and checked in with Approach Control on the instructions they were previously given, they were cleared to 8000 feet and issued their IFR clearance. Unfortunately for this crew, the IFR

clearance was to the wrong airfield. After the crew and ATC straightened things out, they were given clearance to a heading of 240 and a climb to 15,000 feet. Moments later the altitude was changed to 12,000 feet. As the crew passed 7000 on their way to 12,000, TCAS once again provided an advisory on traffic within 1000 feet and 1-2 miles. The crew acquired the aircraft visually and once again talked to Approach Control. Come to find out, the civilian aircraft was on an IFR flight plan and a 090 heading, climbing to 7000. When the T-1 turned to their new heading they lost the separation standards, and the aircraft passed within *900 feet* and .89 miles of each other.

All said and done, this crew landed uneventfully back at home station to a lot of HATR paperwork. Luckily, they were still around to fill it out. Overall assessment? The area they had chosen for their out-and-back was a highly congested VFR traffic area, with a civilian flight school within ten miles of the field they had chosen. Make sure you keep your heads up and eyes open to avoid those visitors to your area, and really think about where your out-and-back can take you.

Almost A Heavy Hitter

A C-17 was coming in on final approach and approximately 20 miles from the field on radar vectors they saw a Cessna 172 taking evasive action to avoid them. They were given no warning by Approach Control, and Approach Control only had a primary target with no altitude. One note of interest is that ATC only gives advisories on primary targets, workload permitting. The bottom line, the airspace is Class E and no one really did anything wrong. Both pilots had their heads up and eyes open to avoid being a statistic, so "Good on ya." Bet that Cessna pilot had a large pucker factor as they evaded the C-17!

No Rules Broken Here Either

Here is another incident when no one was in the wrong, but came close enough to cause concern for these F-16 pilots. A two-ship formation of F-16s were on an ILS approach 15 miles from base, when a Cessna Centurion passed *500 feet* above the second F-16.

The details? This was at night, in Class E airspace and the Cessna was VFR and in contact with the tower, which had advised him about the F-16s. Tower had also informed the F-16s about the Cessna, which had leveled off at 6500 feet. The Cessna stayed at 6500 until it had passed the first F-16, then started a gradual descent. The second F-16 was in his descent from 6300 to 5700. The Cessna pilot was maneuvering for another runway that crossed the F-16s approach corridor. Lucky for us, they saw each other and the cards were in our favor. As mentioned above, no rules were broken, but this was the fourth like-incident at this field in four months. Is this a hazard? How busy is your airfield? “See and Avoid!”

Formation Work Plus 1

A T-37 formation was doing some work around 9500 feet, when as they were making a series of turns they noticed a civilian aircraft in front of them on a collision course. Wisely, the IP stopped the turn and turned the formation away from the civilian aircraft. The aircrew estimated they missed the aircraft by *400 feet* and the aircraft was at the same altitude.

Another case of the civilian aircraft not being in radio or radar contact with ATC. Both aircraft were in Class E airspace and it was technically legal for the civilian aircraft to fly through the military operations area (MOA). For our civilian friends, it is an excellent idea to avoid MOAs unless you are in radar or radio contact with an ATC facility. We have too many close calls when you visit without calling first.

Who’s Calling Who?

A KC-135R was executing its assigned climb-out procedure after a low approach, and then the old reliable TCAS indicated traffic at 2300 feet as they passed through 2000 feet. The crew acquired the aircraft visually and executed a rapid climb to miss the aircraft. It was estimated that they missed the aircraft by *300 feet* both laterally and vertically. Not much distance for a KC-135!

Here is a case of a civilian aircraft that was cleared to cross the Class D airspace as two 135s were practicing their approaches. FAA 7110.65M *Air Traffic Control* states: "In Class D airspace each person must establish two-way radio communications with the facility providing air traffic services before entering the airspace and thereafter maintain those communications." The two KC-135s maintained the radio traffic, but the civilian aircraft did not say anything after receiving the initial clearance. Compounding the issue was that the KC-135 on approach was under Ground Control Approach (GCA), while the other two aircraft involved were under tower control and therefore using different radio frequencies. Another fine example of keeping eyes open and TCAS technology helping us avoid a potential catastrophe. As long as our highly trained aircrew, military and civilian, keep their eyes open we will only have HATRs and not Class A’s!

Editor's Note: The following accounts are from actual mishaps. They have been screened to prevent the release of privileged information.

Safety Sense Says...

Support equipment is there to help us perform our duties, and unfortunately many times it bites back when not handled properly. We need to ensure we use the equipment and safety gear provided to ensure we don't become another statistic on the injury charts.

AGE 1 — Finger 0

Two workers were loading AGE onto a flatbed trailer in support of a deployment. Worker one was driving a forklift with a pintle hook attachment on the tines, and worker two was hooking things up. They were using the forklift as the prime mover, due to the tongue of the rolling stock being too high for the normal transporter. After they had the equipment on the flatbed and were unhooking it, worker two was having a hard time with the cotter pin for the pintle hook. He asked worker one to lower the forklift tines and the trailer's tongue, but unfortunately he forgot where he had placed his fingers. Worker two's left middle finger was between the pintle hook attachment and the trailer tongue, and as things moved, it pinched his finger in between the pintle hook and the trailer tongue, causing a fracture. Safety Sense says: "Know where your fingers are at all times or walk around with funny-looking fingers!"

Generator Set Wins The Bout

This worker must have thought he had spent enough time at the gym when he took on this MEP Generator. He was working as a corrosion shop augmentee where he had received a safety briefing when he started work. During the brief he was informed of the two-man policy for moving large pieces of support equipment. The worker was then directed to move the heavy generator from the painting shop to the AGE shop to ready it for return to the flightline. Now, the generator is a four-wheeled, towable power unit weighing in at a measly 4300 pounds, and is equipped with a manual rear braking system. To add to the worker's problems, the painting facility was built above the normal level of the adjacent buildings. Therefore, a six-foot ramp with an approximately 30-degree angle was built to facilitate equipment installation and removal. Do you see why there is a two-man policy for moving heavy AGE at this facility?

Now, this enterprising individual proceeded to push the unit out of the building *by himself*. The unit had the towbar facing into the building, putting the brake lever on his left. As he pushed the unit out, the unit took on a mind of its own and made a right turn toward the building. He attempted to stop the unit by running alongside and setting the manual parking brake, which he did successfully. However, due to the weight of the unit and its momentum, the unit traveled an additional three feet before it stopped. Unfortunately for the worker, it rolled over his left ankle before it stopped. Cost to the enterprising

individual and the Air Force for not asking for help? 14 days of convalescent leave to recover from surgery to repair the multiple fractures to his ankle. Hindsight is 20/20, but when the support equipment weighs approximately 21 times your weight, it is best to seek help *before* you get into the ring.

Dash-60 Provides Facelift

Most of us know the old reliable Dash-60 power units have a spring-loaded tongue to move it around with. As such, we know that if you let it, it will rearrange your face or other body parts for you. Unfortunately, this worker forgot that lesson from his AGE training. As he was pushing the tongue down to attach it to the tow vehicle, he lost his grip. The tongue, doing what it was intended to do, sprung back. Since the worker had his face over the tongue, he received a face-full of metal under pressure. Fortunately for the worker, all he received was a bunch of cuts and a sore mouth. Remember, Safety Sense says: "Do not place any part of your body in a situation that could cause you injury and ruin your God-given good looks!"

Watch That First Step

A C-5B was placed in a hangar to facilitate troubleshooting and repairing a right wing overheat detection discrepancy. The hangar was selected because there were stationary wing stands available that would ease the maintenance. Three days later, the aircraft was fixed and the O-Dark-Thirty shift was tasked to remove the aircraft from the hangar. During the tow preparations it was discovered that one of the fuselage panels still required installation. Four workers were dispatched to install the panel and the stands that had been previously stowed were unstowed.

Now, in this case there are 38 slides per side for the fixed-wing maintenance stands. The local LG policy letter states that *all* stand slides will be deployed and pinned prior to *any* maintenance. How many slides did they use this early morning? How about only the eight that were in the direct area of the one panel they needed to install? How many of us can say we haven't done that? Without all the slides properly installed, a four-foot by 30-foot hole existed between the aircraft and the stands, creating a large fall hazard. Was the supervisor using good operational risk management in this situation?

As they installed the panel, the unfortunate worker took a step backwards from the work area and fell 22 feet to the ground below. The aircraft tried to help slow his fall, as he left scuffmarks from his boots and clothing on the side of the aircraft. He landed face-first on the concrete below and missed, by inches, a concrete footing for the stands. As a result of the fall he sustained serious injuries that put him on 16 days convalescent leave.

What could have prevented this incident? How about knowledge of local policy, *following* local policy and/or supervisors taking a greater role in risk management? What do you think could have been done to prevent this mishap?

Another Case Of "Watch That Step"

Here is another example of watching your step, especially when it's wet. An F-15 had just been returned to the TDY alert facility after being washed at a northern location. The worker went up the aircraft boarding ladder to finish the task of removing all the tape and covers that were installed. As he came back down the ladder after finishing the task, he lost his footing and fell approximately eight feet to the concrete floor below, breaking his left wrist on impact. Cost to the Air Force: 26 days of convalescent leave and lost productivity from this experienced staff sergeant.

No matter what the situation, watch what you are doing, and take the time to do it right without getting yourselves hurt. We all can relate to the times we lost our footing on a ladder and nothing happened, but it only takes once. By the way, when was the last time you took a good look at the anti-skid protection on your ladders?

I Wasn't Performing The Task

Here we have a case of one worker working and another watching, and guess who got hurt? The workers were installing a cover on a circuit breaker panel using a battery-powered drill and a new screw bit to install the screws into the prefabricated holes. The screw heads were the type that would take either a standard screwdriver or an Allen wrench. The worker chose the standard bit, and the one he selected was about half the size of the slot in the screw head. Is this the standard hand tool policy we maintainers are taught from tech school to infinity?

As the worker was installing the screws, the bit got caught, broke, flew through the air and struck the non-working worker in the eye. Guess which one of the two people involved was wearing the proper personnel protective equipment (PPE)? The worker using the drill was wearing his PPE; the other worker was not, as he was five feet away. It always pays to be extra cautious if you are near someone else who is performing a task that has the potential for flying objects. Safety Sense says: "If you aren't going to help do the work, go away.

USAF Class A Flight Mishaps

FY02 Flight Mishaps (Oct 01-May 02)

20 Class A Mishaps
7 Fatalities
12 Aircraft Destroyed

FY01 Flight Mishaps (Oct 00-May 01)

11 Class A Mishaps
4 Fatalities
11 Aircraft Destroyed

14 Oct	♣	An HH-60 crashed into a river while flying a low-level training mission.
17 Oct		An F-16CG was severely damaged following an aborted takeoff.
25 Oct		An F-16C departed the runway after landing.
02 Nov	♣	An MH-53 crashed while performing a mission.
05 Nov	✶	An F101 engine undergoing Test Cell maintenance sustained severe fire damage.
12 Dec	♣	A B-1B crashed into the ocean shortly after takeoff.
21 Dec	♣✶	A C-141B sustained a collapsed wing during ground refueling operations.
30 Dec	♣✶	An RQ-4A Global Hawk unmanned aerial vehicle crashed while returning to base.
08 Jan		A C-17 was damaged during landing.
10 Jan	♣	An F-16C crashed during a surface attack training mission.
10 Jan		An MH-53J crashed during a search and rescue mission.
17 Jan	♣♣	Two A-10As were involved in a mid-air collision. Only one pilot ejected safely.
24 Jan		An MH-53 crashed while performing a mission.
25 Jan	♣✶	An RQ-1 Predator crashed on landing.
31 Jan	♣	A T-37 crashed during a training mission. The two crewmembers suffered fatal injuries.
02 Feb	♣	A C-21 crashed while landing. The two crewmembers suffered fatal injuries.
12 Feb		An F-15 was severely damaged due to an engine fire.
13 Feb	♣	An MC-130P crashed during a mission.
18 Mar		An MH-53 crashed during landing.
20 Mar	♣	An F-16 crashed during a training mission and the pilot did not survive.
10 Apr		A KC-10 experienced FOD damage to an engine. (Upgraded to Class A 08 May 02)
15 Apr	♣	An F-16 crashed into the sea during a training mission.
22 Apr	✶	An F-22 suffered a birdstrike that severely damaged the right engine.
30 Apr	♣	An F-15C crashed during a test mission. The pilot did not eject.
15 May	✶	A B-2 suffered major damage when a main landing gear collapsed.
18 May	✶	An RQ-1 Predator crashed returning from a routine mission.

- A Class A mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.
- Reflects only USAF military fatalities.
- "♣" Denotes a destroyed aircraft.
- "✶" Denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Ground" mishaps that are shown here for information purposes.
- Flight and ground safety statistics are updated frequently and may be viewed at the following web address: http://safety.kirtland.af.mil/AFSC/RDBMS/Flight/stats/statspage.html
- **Current as of 28 May 02.**

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The Aviation Well Done Award is 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 Joseph N. Daley
357th Fighter Squadron
Davis-Monthan AFB, AZ

Capt Daley distinguished himself by safely recovering a $9-million A/OA-10 after experiencing nearly complete loss of his flight controls. On Wednesday, 18 October 2000, Capt Daley departed Davis-Monthan AFB for Whiteman AFB as number two of a four ship, on the first leg of a squadron deployment. About 60 miles out from Whiteman, Capt Daley noticed some stiffness in the flight controls. He realized that he had lost all aileron control and had only nominal elevator control. The situation worsened, and Capt Daley could not move the control stick left or right, and had only limited movement fore and aft. To control the aircraft he used elevator and aileron trim in addition to the rudders, since they were the only flight controls that were working normally. In an attempt to regain control, he applied as much left stick as possible to try to free the binding. After approximately 25 attempts, the stick suddenly popped left, the ailerons moved, and the aircraft began rolling left. However, when he tried to move the stick back to the right to counter the roll, the stick would not move past the neutral. To reestablish level controlled flight, Capt Daley had to apply full right rudder and full right aileron trim. With his fuel quickly diminishing, he opted for a shallow straight-in where flight control use would be at a minimum. On a ten-mile final, he configured the aircraft and lowered the nose to a 3.5-degree glidepath. Approximately two miles out, he applied back stick pressure, but again the stick would not move aft of neutral. The only way to break the descent was to use pitch trim and add power. Low on fuel, he continued the approach, further shallowing his approach to a 2-degree glidepath. Understanding that he could accept a maximum of 600 feet per minute descent at landing, he continued the approach with a 300-400 foot-per-minute rate of descent. At touchdown he did not attempt to flare the aircraft, choosing instead to accept the firm landing rather than risk over-controlling the aircraft with the threat of becoming airborne again. He masterfully flew the crippled aircraft to touchdown in the first 1,000 feet as planned, right on the centerline. To further complicate matters, as the wheels touched down the right strut deflated. Capt Daley immediately compensated and quickly slowed the aircraft, taxied clear of the runway and shut down.

Capt Daley's superb airmanship, calm demeanor, and quick decision making saved the United States Air Force's valuable combat asset, prevented the potential loss of a fighter pilot, and avoided the potential catastrophic loss of civilian personnel and property.

Illustration by Dan Harman