UNITED STATES AIR FORCE

# FLYING Safety

MAGAZINE

SEPTEMBER 1999


# Welcome Home!

UNITED STATES AIR FORCE
FLYING Safety
MAGAZINE
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# THE ISSUE:







Cover photo by SSgt Andrew N. Dunaway, II

# FSYnotams

ROUTINE
R 101409Z JUN 99
FM HQ USAF WASHINGTON DC//XO//
TO NGB WASHINGTON DC//CF/XO//
AFRC/ROBINS AFB GE//CC/DO//
ALMAJCOM//CV//

INFO FT BELVOIR VA//USAASA//
HQ USAF WASHINGTON DC//XOW//
UNCLAS
SUBJECT: CONUS MILITARY AIRCREW INFORMATION SERVICE (MAIS) AVAILABLE FOR USE BY AIRCREWS (INTERNET ADDRESS: WWW.MAIS.AFWA.AF.MIL)

1. THIS MESSAGE ANNOUNCES THE AVAILABILITY OF THE MILITARY AIRCREW INFORMATION SERVICE (MAIS) FOR USE BY MILITARY AIRCREWS. MAIS IS A WEB-BASED FLIGHT WEATHER AND NOTICE TO AIRMEN (NOTAM) CAPABILITY FOR ACTIVE AND RESERVE AIRCREWS TO USE TO RAPIDLY UPDATE THEMSELVES ON FLYING WEATHER FOR FLIGHT PLANNING AND IS DESIGNED TO HELP FACILITATE THE FLIGHT WEATHER BRIEFING PROCESS. HOWEVER, MAIS IS NOT INTENDED TO REPLACE AIRCREW FLIGHT WEATHER BRIEFINGS. MAIS IS CURRENTLY AVAILABLE FOR USE IN THE CONTINENTAL UNITED STATES (CONUS) AND WILL BE EXTENDED TO PROVIDE A WORLDWIDE CAPABILITY BY AUG99.
2. CURRENT CAPABILITY.
A. MAIS PROVIDES MANY OF THE BASIC WEATHER PRODUCTS NEEDED TO PLAN AND EXECUTE A MISSION, BUT CANNOT COVER EVERY POSSIBLE SCENARIO. THUS THE AIRCREW SHOULD OBTAIN A WEATHER UPDATE TO CLARIFY THE WEATHER PRODUCTS PROVIDED ON MAIS. THIS IS ESPECIALLY IMPORTANT DURING CHANGING OR SEVERE WEATHER SITUATIONS.
B. MAIS SATISFIES THE INTENT OF AFI 11-202, VOL 3, GENERAL FLIGHT RULES, 1 JUN 98 AS A MILITARY SOURCE OF WEATHER INFORMATION. A CONCEPT OF OPERATIONS (CONOPS) AND A LISTING OF AIR FORCE WEATHER (AFW) UNITS TO CALL FOR ADDITIONAL WEATHER INFORMATION IS POSTED ON THE MAIS WEB PAGE. A BACKUP OR REMOTE USE CAPABILITY IS ALSO PROVIDED VIA A TOLL-FREE (1-800) DIAL-IN SERVICE (NUMBER PROVIDED ON REQUEST). TO PRESERVE SYSTEM SECURITY, USERS WILL BE PROVIDED SEPARATE IDENTIFICATION CODES AND PASSWORDS FOR THE MAIS SYSTEM AND THE DIAL-IN ACCESS SYSTEM.
C. MAIS PROVIDES "STANDARD" WEATHER ALPHANUMERIC AND GRAPHICAL INFORMATION PLUS A FULL SUITE OF SATELLITE AND RADAR IMAGERY WITH ANIMATION. NOTAM SUMMARIES AND HOURLY UPDATES ARE PROVIDED BY ICAO DIRECTLY FROM THE FAA FACILITY AT HERNDON VA. SPECIALIZED FORECASTS (E.G., RANGES, AIR REFUELING, LOW LEVEL OPERATIONS, ETC.) ARE NOT YET AVAILABLE, BUT ARE PLANNED AS A FUTURE

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# WINNING THE BASH "WAR" IN PANAMA

## Combating the bird strike hazard with a special radar

USAF Photo by MSgt Perry J. Heimer

The challenge is great. Countless millions of raptors and songbirds use Panama as a navigation and feeding route, soaring on the thermals and updrafts created along the Pacific coast.

**LT COL KEVIN S. C. DARNELL**
24 OSS/CC
Howard AFB, Panama

As the 24th Operations Group commander, Col Dave Scott, said in the middle of the fall 1998 bird migration season, "It's a war out there."

Thanks to tower, civilian bird dispersal technicians and base augmentees, a ramp coordinator, and pyrotechnics on the flightline, by the end of November the war had been won. No damaging bird strikes, either on the field or in the critical approach and departure paths. But to explain how this happened, let me take you back to July 1998 and describe the risk control measures we instituted, including the key to our BASH Program—incorporating a modified marine radar to detect birds both on and near the runway.

In the summer of 1998, we started planning for the North America to South America bird migration, and reassessing our actions to mitigate the risk. From past experience and Smithsonian ornithological data, we were very much aware that from October to late November, Howard is essentially "attacked" by migratory birds who use the Panamanian isthmus to navigate to South America.

The challenge is great. Countless millions of raptors and songbirds use Panama as a navigation and feeding route, soaring on the thermals and updrafts created along the Pacific coast. Counts over the airfield have been recorded as high as 200,000 per hour. This threat is in addition to the constant presence of vultures, egrets, pelicans, and gulls native to Panama. An active, well-orchestrated defense was in order.

### Improving Our BASH Program

Howard has always had a strong BASH program. Pyrotechnics and culling are mainstays. And it shouldn't go unsaid that Civil Engineering support was crucial to clear and drain grassy, low-lying areas to remove feeding and nesting places.

Yet we found a variety of improvements to make. First, we redesigned a SID on the south departure to avoid Venado Island where vultures tend to hover on thermals in large numbers. The offset nonprecision approach still goes directly over Venado Island, but the ILS comes straight in, so crews are advised to use it whenever possible.

As the migration season approached, we trained personnel from across the base in bird dispersal and gave them copies of our airfield schedule. These augmentees were not only crucial to manning the program, but their support showed the entire base understood the danger and was ready to contribute to the solution.

We added a senior NCO/rated officer position to our bird dispersal teams who we call RAMPCO (for ramp coordinator). While the SOFs handle support for their deployed assets, our RAMPCO ensures a safe airfield environment by orchestrating the actions of our civilian bird dispersal technicians, Base Operations, Tower, and 24th Wing augmentee personnel. This includes stationing personnel at both ends of the runway during migration season and aggressively dis-

persing birds.

We also expanded our interior bird exclusion zone to cover the visible areas off the ends of the runway. Our interior exclusion zone represents areas where the bird dispersal team can attack birds with sirens and pyrotechnics. Because we can get at the birds here, there is a zero tolerance policy for large birds. Even though we have limited ability to disperse birds a mile or two off the approach and departure ends of the runway, it is part of our BASH team cross-check to scan the flight path before every takeoff or recovery.

We call these expanded areas the "Bird Critical Zone" (BCZ). With the BCZ, we may elect to operate with birds in the vicinity of the airfield, but the BCZ focuses our detection on the critical departure and arrival regions. Because of differences in operating characteristics of prop and jet aircraft, we can accept some bird activity near the exclusion zone as long as we are aware of it and have the approval of the appropriate SOF.

### Better Eyes for Spotting Birds: Modified Marine Radar

In addition to internal improvements to our control measures to accomplish the mission safely, our most significant enhancement in last fall's BASH program was the inclusion of a prototype radar specifically designed to detect migration streams and larger birds. We latched onto a rare chance to host a research team from Clemson University. Dr. Sid Gauthreaux had been at Howard the previous fall looking at ways to tune the tower D-BRITE (GPN-20) radar to detect birds. While there was some success, terrain and backscatter along the tree line made the radar unsuitable for air traffic control when configured to look for birds.

Dr. Gauthreaux was invited to return to Panama, under the sponsorship of the DoD Partners in Flight Program. He accepted, and we arranged shipment of his equipment—a 3,000-pound trailer—to Howard. We established his team at the alternate tower (old runway supervisory unit) on the field and ensured they would have 24-hour access. We integrated them into our BASH team as a working element, responsible to the RAMPCO to assess migratory activity that might pose a threat to flight operations.

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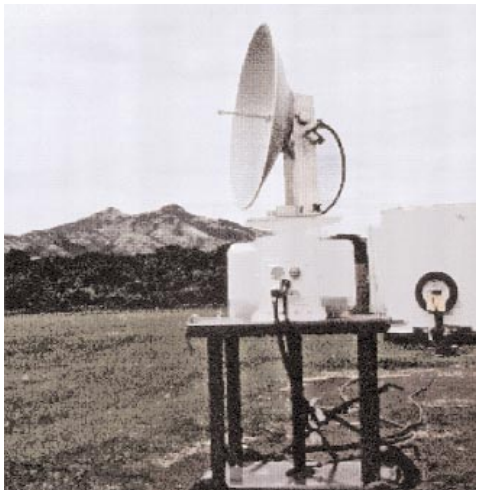
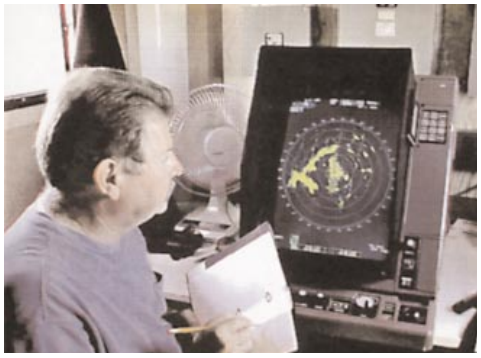
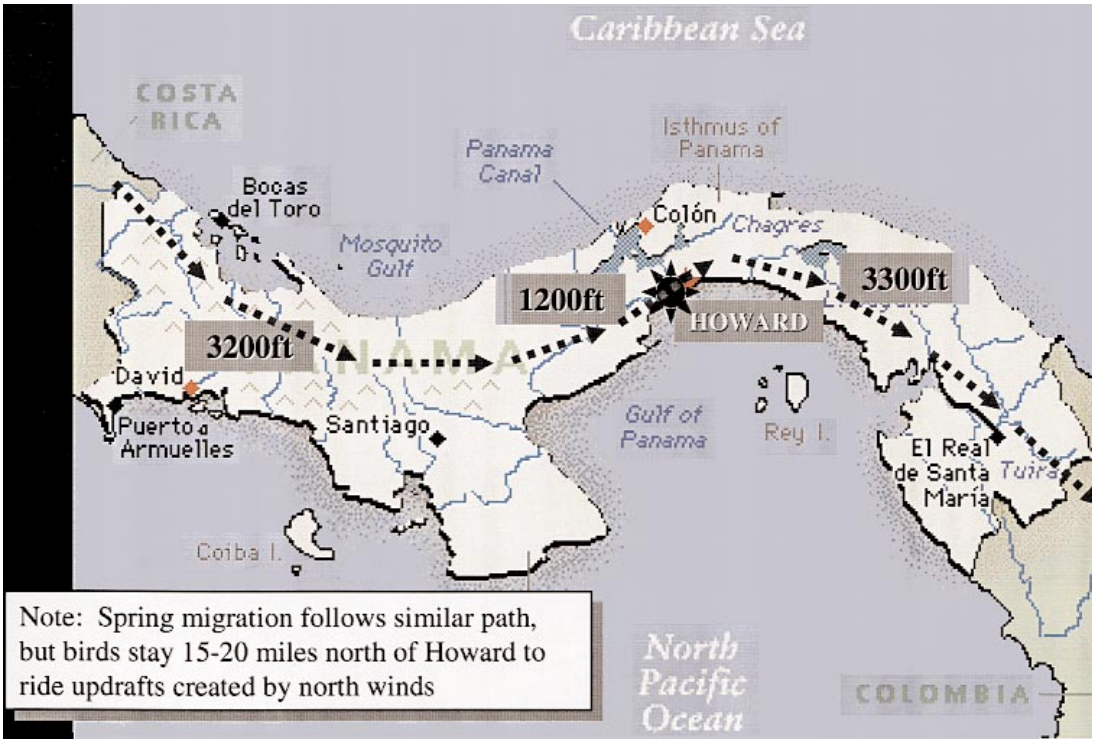
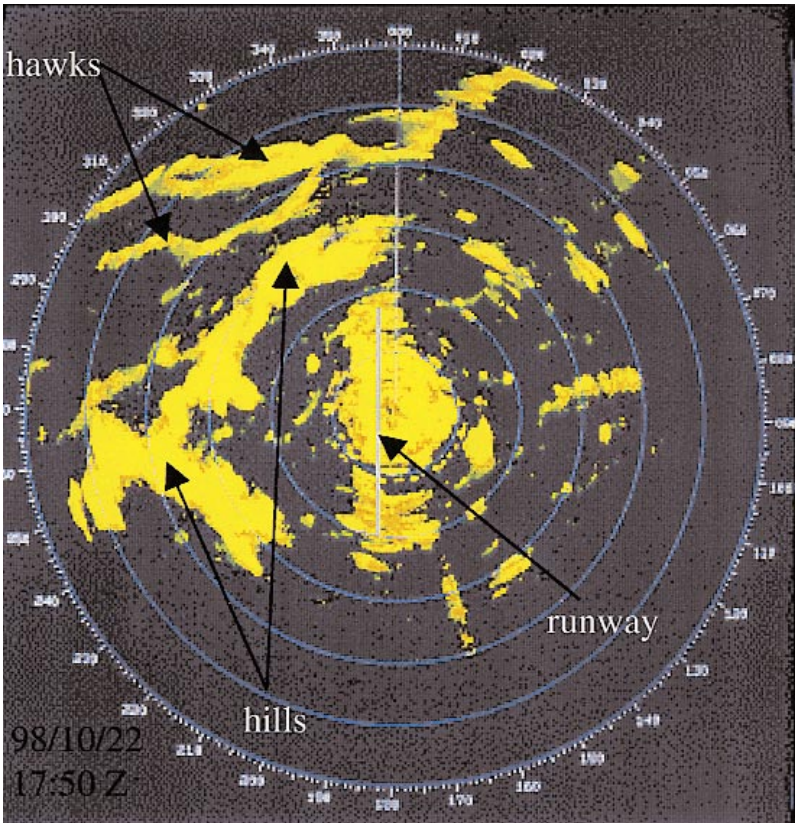
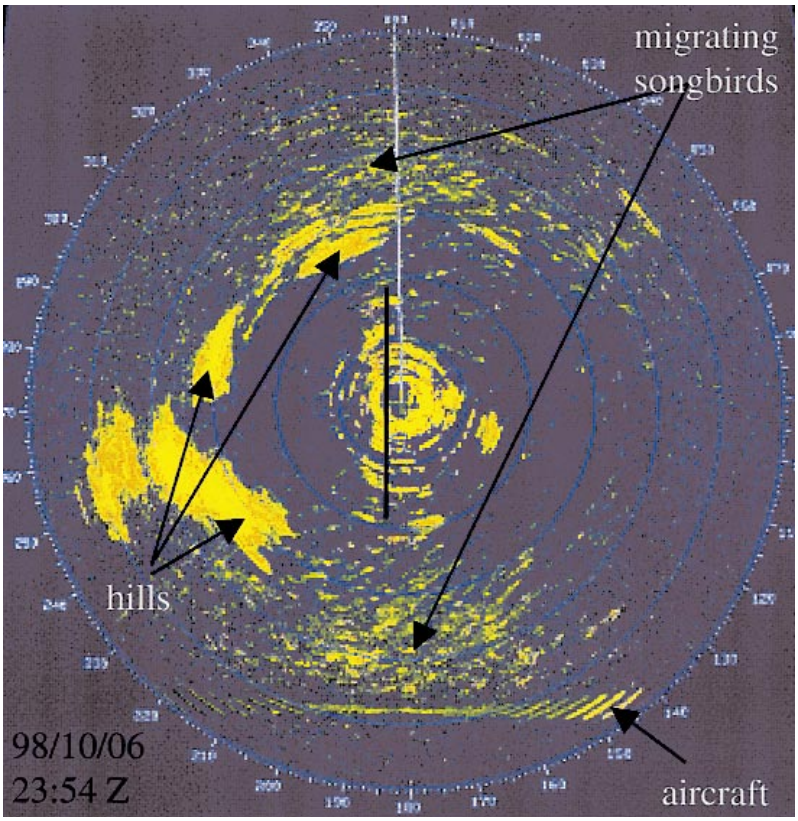







The prototype modified marine radar Dr. Gauthreaux brought to Panama this time was an attempt to overcome the deficiencies of the GPN-20. Unlike the D-BRITE monochrome display, the marine radar has a color Doppler system, allowing one to easily distinguish targets and see track history trails in different colors.




The prototype modified marine radar Dr. Gauthreaux brought to Panama this time was an attempt to overcome the deficiencies of the GPN-20. Unlike the D-BRITE monochrome display, the marine radar has a color Doppler system, allowing one to easily distinguish targets and see track history trails in different colors. Using some relatively straightforward tuning techniques, the researchers could easily see individual medium- and large-sized birds and migration streams. Using basic trigonometry, they could also estimate the altitude of the birds by adjusting the 3-degree beamwidth radar.

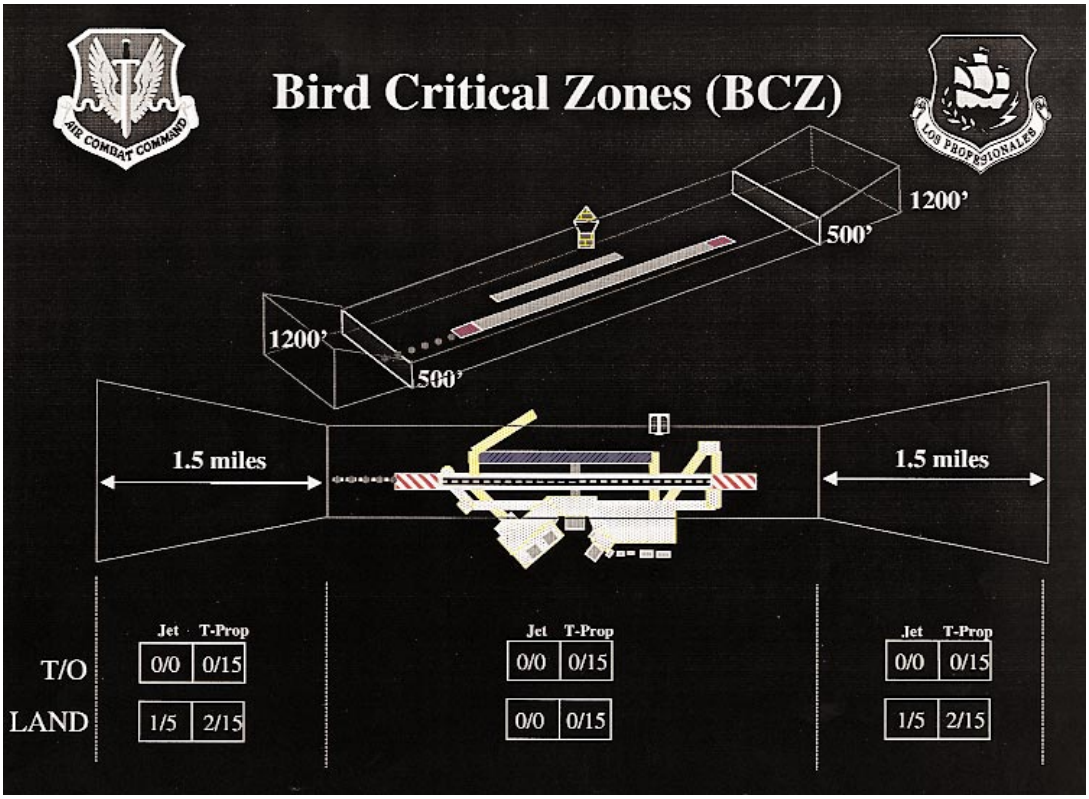
The results of the tests and the positive effects on our BASH program were outstanding! The Clemson team identified birds before they could be seen over the field, giving us advance notice we never had before. The radar told us where the migratory birds were massing, which allowed us to switch active runways or delay flights to avoid the concentrations. Dr. Gauthreaux also determined an early evening migration pattern (the birds were thought to be on the ground after sunset) and a later evening feeding behavior. (See accompanying photos.) Both were crucial data points for our safety responses. And Dr. Gauthreaux is credited with a "save" by providing timely information that held an F-16 departure until after a stream of birds had dissipated.

The addition of "eyes" beyond the perimeter fence was a great improvement. We see this as a tremendous initiative for a base like Howard, where migratory and year-round birds create a very real threat to property and lives every day. The ability to "see" individual larger birds around airfields will be invaluable.

## NEXRAD

We should distinguish this prototype system from the other more widely known bird radar initiative. The Next Generation Doppler Weather Radar (NEXRAD) systems now in service nearly everywhere in the United States are being used to identify movements of large flocks of birds. Using radar to identify flocks of birds started as a research and conservation effort, but it does have some significance to military aviation.

Partners in Flight works to reverse the decline in populations of geotropical migratory birds. While this might seem at odds with a BASH Program, in fact conservation helps forward military aviation. When birds become endangered, they enter a legal status that adversely affects our ability to build air-




fields and conduct training. Also, radar detection of bird patterns can assist in designing safer training routes—and may have combat applications in selecting ingress routes to targets. But while NEXRAD can pick up the movement of large masses of birds, the prototype marine radar has a more "tactical" application. Dispersal teams and ATC can react in real time to the threat posed even by individual birds.

Our vision of the future of bird radar programs involves two distinct systems. NEXRAD use for bird movement detection and forecasting is well underway and is even being posted on the Internet. This NEXRAD information can be used to schedule missions away from bird threats and to advise crews prior to flight. We see this as part of a mission-planning or preflight briefing.

In contrast, the modified marine radar sys-

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As most of you know, Howard AFB is set to be turned over to the Government of Panama at the end of 1999, in compliance with the 1977 Carter-Torrijos Canal Treaty. Our fear was that the success of our fall BASH program might go unrecorded. To prevent that, we've briefed CO-MACC, AFSC/CC, 12AF/CV, and the MAJCOM Flying Safety Conference to ensure the results of Howard's fall BASH program are not forgotten.

## FOR THE BIRDS?

The typical routes for migrating birds "heading south for the winter" cross the Caribbean over Cuba and also pass through Mexico and Central America. You probably don't need a map of the region to determine that wherever they start from, they all come through Panama, and most will pass directly over Howard in the fall.

Taking a closer look at the Panama section of the fall migration, the birds will pass over the base as they follow their instinctive path along the southern coast. Only when the wind blows unseasonably from the north will the birds move inland (as we normally see in the spring migration). It's also important to note that the birds fly at essentially "pattern altitude" (1,000 feet AGL) as they cross Howard.

The migrating birds come in all sizes, from tiny songbirds to hawks weighing a couple of pounds. And we have large numbers of egrets and soaring vultures year-round, giving our BASH teams plenty to do.

As the 24th Wing commander, Col Greg Trebon, has said, we could avoid all BASH risk by simply not flying—but that's not an option. We have to maintain our capability to conduct critical airlift and counterdrug missions for US Southern Command. And while we did prudent scheduling to avoid the heaviest periods of bird activity, our Operational Risk Management approach had maintaining mission capability as its bottom line. We had the opportunity to prove that when hurricane Mitch struck Central America. From November until well into the new year, we assisted two JTFs and the people of the region, with over 5.6 million pounds of relief supplies passing through Howard in the weeks following the worst disaster to hit Central America in 200 years.

tem tested at Howard demonstrated a focused, real-time capability to protect crews on *departure* and *arrival*. We believe this radar system could be readily adapted, using small computer technology, to allow an air traffic controller to assess the bird state. The system we envision is simple and cheap. In our inquiries, we determined the entire radar system cost to be well under $50,000.

**"The Bottom Line"**

To summarize, the modified marine radar tested last fall was an impressive adaptation of existing technology. We gained new knowledge into our bird threat, and we made important safety decisions based on that knowledge which paid off in a mishap- and damage-free period.

As most of you know, Howard AFB is set to be turned over to the Government of Panama at the end of 1999, in compliance with the 1977 Carter-Torrijos Canal Treaty. Our fear was that the success of our fall BASH program might go unrecorded. To prevent that, we've briefed COMACC, AFSC/CC, 12AF/CV, and the MAJCOM Flying Safety Conference to ensure the results of Howard's fall BASH program are not forgotten. Taken in context with other bird detection efforts, this is another piece of technology to dominate the BASH "battlefield." We could be on the edge of a revolution in BASH safety. ✈

(The author wishes to acknowledge Dr. Gauthreaux and his wife, Carroll Belser, for the photographs used in this article and for their devoted work to enhance flying safety at Howard AFB and elsewhere.)

## FSM NOTAMS...

continued from page three

ENHANCEMENT.
D. MAIS ALSO PROVIDES POINT AND CLICK WEATHER DATA ACCESS, A ROUTE OF FLIGHT BRIEFING OPTION, AND A PRINT CAPABILITY. A FORMAL RECORD OF A WEATHER BRIEFING IS ONLY MADE WHEN THE AIRCREW REQUESTS A "WEATHER BRIEFING PACKAGE."
E. SYSTEM FUNCTIONS. MAIS PROVIDES FOUR BASIC FUNCTIONS: PREVIEW NATIONAL AND REGIONAL WEATHER, INPUT SPECIFIC ROUTE INFORMATION, CUSTOMIZE INDIVIDUAL PREFERENCES, AND PROVIDE FEEDBACK.
(1) PREVIEW. THE USER CAN VIEW NATIONAL OR REGIONAL SATELLITE AND RADAR IMAGERY WITH OVERLAY AND ANIMATION OPTIONS. OTHER WEATHER DATA LIKE TERMINAL OBSERVATIONS, FORECASTS, AND ADDITIONAL GRAPHICS ARE ALSO AVAILABLE.
(2) ROUTE. MAIS OFFERS AN INTERACTIVE ROUTE PLANNER SO USERS CAN ENTER, SAVE, AND EDIT ROUTES FOR MISSIONS. THE AIRFIELD DISPLAY CAN BE CUSTOMIZED (I.E., DISPLAY ONLY MILITARY AIRFIELDS WITH RUNWAYS OVER 8000 FEET) USING THE OPTION FUNCTION UNDER PREFERENCES. ONCE THE ROUTE IS FINALIZED, MAIS PROVIDES A MANUAL OR AUTOMATED BRIEFING OF THE ROUTE WEATHER AND NOTAM INFORMATION.
(3) PREFERENCES. MAIS IS PERSONALIZED SO EACH USER CAN SAVE THEIR OWN PROFILE (TYPE AIRCRAFT, ETC.) AND OPTIONS FOR ROUTE INFORMATION, MAPS, AND OTHER DESIRED INFORMATION.
(4) FEEDBACK. USERS CAN PROVIDE FEEDBACK ON POSSIBLE ENHANCEMENTS OR CURRENT LIMITATIONS TO SYSTEM MANAGEMENT PERSONNEL VIA THE WEB PAGE.
F. QUESTIONS. AN ON-LINE HELP FUNCTION PROVIDES ASSISTANCE FOR SYSTEM USE AND DEFINITION OF TERMS. SYSTEM SPECIFIC QUESTIONS CAN BE DIRECTED TO THE AFWA OPERATIONS CENTER TEAM CHIEF AT DSN 271-2586 OR COMMERCIAL (402) 294-2586.
G. HQ AFWA/XO WILL MAINTAIN A 30 DAY ARCHIVE OF "WEATHER BRIEFING PACKAGE" REQUESTS. IN CASE OF AN AIRCRAFT MISHAP, HQ AFWA/XO WILL PRESERVE THE ALPHANUMERIC, GRAPHIC, AND IMAGERY DATABASES AS OUTLINED IN AFMAN 37-139, RECORDS DISPOSITION SCHEDULE AND AFI 91-204, SAFETY INVESTIGATIONS AND REPORTS.
H. A NEW USER CAN OBTAIN A USER ID AND PASSWORD FROM THE MAIS WEB PAGE VIA NIPRNET OR THE INTERNET AT WWW.MAIS.AFWA.AF.MIL. PROCESSING A PASSWORD NORMALLY TAKES LESS THAN A DAY.
3. SYSTEM REQUIREMENTS. THE USER MUST POSSESS A PC OR LAPTOP WITH AT LEAST A 100 MHZ PROCESSOR, 16 MB OF RAM, VGA MONITOR, AND A 28.8 KPS MODEM. IT SHOULD OPERATE MICROSOFT WINDOWS 3.1 OR WINDOWS 95 AND A WEB BROWSER EQUIVALENT TO NETSCAPE 4.04 OR INTERNET EXPLORER 4.0 OR LATER VERSIONS.
4. FUTURE ENHANCEMENTS. IMPROVEMENTS WILL BE HIGHLIGHTED UNDER A "WHAT'S NEW" BANNER ON THE WEB PAGE TO KEEP USERS INFORMED.
5. IF YOUR STAFF HAS ANY QUESTIONS, PLEASE HAVE THEM CONTACT OUR POC: LT COL HAROLD ELKINS (AF/XOWP, DSN 426-4390, ELKINSH@PENTAGON.AF.MIL). THANKS IN ADVANCE FOR HELPING US GET THE WORD OUT ON THIS NEW AND USEFUL CAPABILITY. BEST REGARDS. ■

# Analysis of a Runway Incursion

USAF Photo by MSgt Perry J. Heimer

**MR. WILLIAM L. KASSINOS**
88 OSS/OSAM
WPAFB, OH

It was morning on what was to be a beautiful early spring day at Base X. Since it's Sunday, the airfield would normally be relatively quiet, but it's a Reserve Unit Training Assembly weekend, so activity in and around the airfield is unusually busy. Aerial Port Squadron personnel are involved in a mobility exercise, operating on the east ramp, and were tasked to load an aircraft parked on the west ramp. Conversely, Maintenance Squadron personnel from the west ramp are involved with maintenance activity on a C-141 aircraft in a borrowed hangar across the airfield on the east ramp. Consequently, the normal routine is now broken because personnel are working in areas not totally familiar to them, and located in between are two active parallel runways. If you're starting to get the feeling that something is about to happen, read on because you're right on target.

At approximately 0740 local, tower controllers are busy conducting routine, daily radio and recorder operational checks. This day will prove to be somewhat different than the norm. Each radio frequency is checked to ensure all radios are in good working order and that the audio is being captured on the Tower's recording system. Something now happens to set in motion events that could have led to a disaster. At the completion of the checks, the controller overlooks the fact that the Tower Talk Group land mobile radio, the frequency which controllers use to manage vehicle movement on the airfield, was inadvertently left in the OFF position on the console. This unknowingly and silently negated the controller's ability to hear transmissions directed at the Control Tower on this frequency.

The stage is set, and it's time to play out the scenario, putting activities in motion. At 0819, local Aerial Port personnel are en route to the west ramp. Using the call sign Ramp 2, a small convoy composed of three vehicles including a van, a 40-ton loader, and a 10-ton forklift roll down the taxiway. Armed with a hand-held Saber III portable radio, they stop at the intersection of the runway and taxiway and call the Control Tower on the Tower Talk Group for approval to cross the active parallel runways.

Almost simultaneously on the other side of the runways, Maintenance Squadron personnel are en route to the hanger on the east ramp. Their cadre includes two AGE tractors towing maintenance stands. Using the call sign Mike 5, they use the same type radio to call the Tower for permission to cross as they approach the runways. Their call on the Tower Talk Group is made approximately 30 seconds after Ramp 2 initiated his call to the Tower.

Do you have a clear picture? Can you guess what will happen in the next few minutes?

The distance and airfield topography be-

continued on next page

Almost simultaneously on the other side of the runways, Maintenance Squadron personnel are en route to the hanger on the east ramp. Their cadre includes two AGE tractors towing maintenance stands.

tween the two groups of vehicles prohibits visual contact. Both are wanting to cross the runways, only distinguishable from each other by a "LEFT" or "RIGHT" runway identification. Don't forget, the Control Tower is NOT monitoring the frequency.

Over the next 6 minutes, both groups engage in multiple attempts to contact the Control Tower on the frequency. Later playback of the Tower tapes revealed extremely poor audio transmission quality on the part of both Ramp 2 and Mike 5. As is human nature, after several futile tries, we'll guess that patience runs out, anxiety sets in, a sense of urgency over mission needs prevails, or simple poor judgment takes over. Struggling to make sense of the poor quality audio over the frequency, both Ramp 2 and Mike 5 mistakenly begin to believe they're talking to the Control Tower. In reality, Tower tapes revealed they were actually talking to each other. Now perceiving that the long-awaited *clearance* to proceed across the active runways has been given, they acknowledge and begin to cross, almost simultaneously from opposite sides. Fortunately, there were no aircraft operations as the 5 vehicles and 13 people meandered out and across the runways, thus avoiding a possible catastrophe caused by one of the largest runway incursions ever witnessed by mankind, if not the largest.

Fortunately, there were no aircraft operations as the 5 vehicles and 13 people meandered out and across the runways, thus avoiding a possible catastrophe caused by one of the largest runway intrusions ever witnessed by mankind, if not the largest.

What can we learn from this incident? After analysis of the tapes and an in-depth debrief of the incident conducted by the Airfield Manager, attended by all involved parties and their senior leadership, the following was identified:

Statements taken from both vehicle operators revealed they both understood they had received Control Tower approval prior to crossing the runways. Needless to say, the expression on their faces was indeed priceless as it became clear to them the Control Tower was not even monitoring the Tower Talk Group at the time of the incident.

However regrettable, the situation in the Tower cab did not CAUSE the incursions. The breakdown in communications capability in the Tower cab over the Tower Talk Group and general lack of controller attentiveness while monitoring activity on the airfield are minor contributing factors to this incursions. Human error caused the communications problem, but it could just as easily been radio failure. If the vehicle operators involved followed proper procedures, the incursions would not have occurred.

The Saber III hand-held radios used in this incident are good radios, but operators need to understand hand-held radios are low-wattage devices and not as effective as a vehicle mobile radio because of higher power output. To further reduce their capability, the normal antennas that come with the hand-held radios were replaced with smaller profile antennas, known as "rubber duck" antennas. Although aesthetically pleasing, these antennas are not as effective, thus contributing to the poor transmission quality as a possible contributing factor. It's not known if low battery power was also a factor in this situation as well.

Both operators involved in the incursions used improper and poor radio procedures. This is viewed as the primary reason the violation occurred. Some examples follow:

- ❏ Neither operator identified himself as having multiple vehicles in the request for permission to cross the runways.
- ❏ Neither operator heard anything over the radio that would have positively identified a conversation taking place between themselves and the Control Tower. Both operators made assumptions as to whom and what was heard over the radio. If in doubt, NEVER assume!
- ❏ Both operators indicated reception of garbled transmissions over the radio, but did nothing to correct the situation and took no action to call anyone else to conduct a radio check.
- ❏ Other personnel in the vehicles, excluding the actual radio operators involved, were not paying attention as the situation played out. They contributed nothing and failed to question whether the Control Tower gave permission.
- ❏ Radio operators indicated they either heard or expected to hear the word "CLEARED" from the Tower controller to indicate they could proceed. They were not generally aware that controller verbiage for vehicle movement on the airfield never includes the "C" word.

While Base X had an excellent flightline driving record, with no airfield incursions documented in the last 3 years, there is always room for improvement. Base X's next edition of the flightline driver's training video will include or further clarify points which came to light during the investigation and debrief. In addition, Control Tower managers reviewed and updated their equipment-checking procedures to ensure man-made communications outages do not occur again. ✈


Official USAF Photo

# Flight Control Guillotine

**AMS2 PATRICK J. VAN ELZEN**
Courtesy *Mech*, Apr-Jun 99

(We here at the AF Safety Center see dozens of mishap messages per week. The mishaps described range from the most serious—those involving loss of life or an aircraft—to those that make us scratch our heads and wonder "Why would someone take a chance like that?" The answers usually go something like "We were trying to make an on-time launch," or "I was trying to finish up as quickly as I could, because I had three other jets to work." More data for the mishap statisticians.

It's been a while since we've seen any mishaps that involved someone being injured while working around flight control surfaces, so take a well-deserved bow. *Congratulations* to you supervisors for applying Operational Risk Management principles and ensuring your folks do the job safely. *Thanks* to you trainers who have taught your troops the right way to do the job and lead by example. But most of all, *Well Done* to you troops who maintain your aircraft, ground support equipment, test equipment, and tools so well. You understand that "safety" is an integral part of good maintenance, not an impediment.

Now, here's a cautionary tale from our friends in the US Navy. Remember the lesson, and don't let you or your folks get in a position where they could become a mishap statistic. Keep 'em flying safely! —Ed.)

A near miss with an FA-18C rudder changed my attitude about taking shortcuts.

Our supervisor ordered another sailor and me to change a horizontal-stabilator actuator—a routine removal and replacement that I'd done many times. After installing a new hydraulic actuator, we needed to op check the system. Bringing the engines on-line would give us enough hydraulic pressure to operate the flight controls.

Before the low-power-turn operator started the engines, we held a thorough brief to make sure everyone knew what to expect. We especially covered safety procedures before anyone touched the first switch in the aircraft. After the brief, the operator brought the engines on-line. With hydraulic power applied, we checked the horizontal-stabilator actuator by starting the built-in tester (BIT) unit. We looked at the stabilator's alignment and tested the Hornet's backup flight-control mode. That's when we checked to see if the leading edge of the stabilator lined up with a specific rivet on the skin of the aircraft. This Hornet needed a large adjustment.

**Had my reaction been a split second slower, I would have lost both arms just below the elbow.**

The backup mode's mechanical linkage has a lollipop (bolt and nut assembly) for adjusting alignment. To reach the lollipop, I climbed on the aircraft and walked back between the vertical stabilators. I signaled the plane captain, who was standing in front and to one side of the nose, that I wanted to make an adjustment. He signaled the turn-up operator to keep his hands out of the cockpit to make sure none of the flight control surfaces were moved. After several adjustments, I finally got the stabilator aligned.

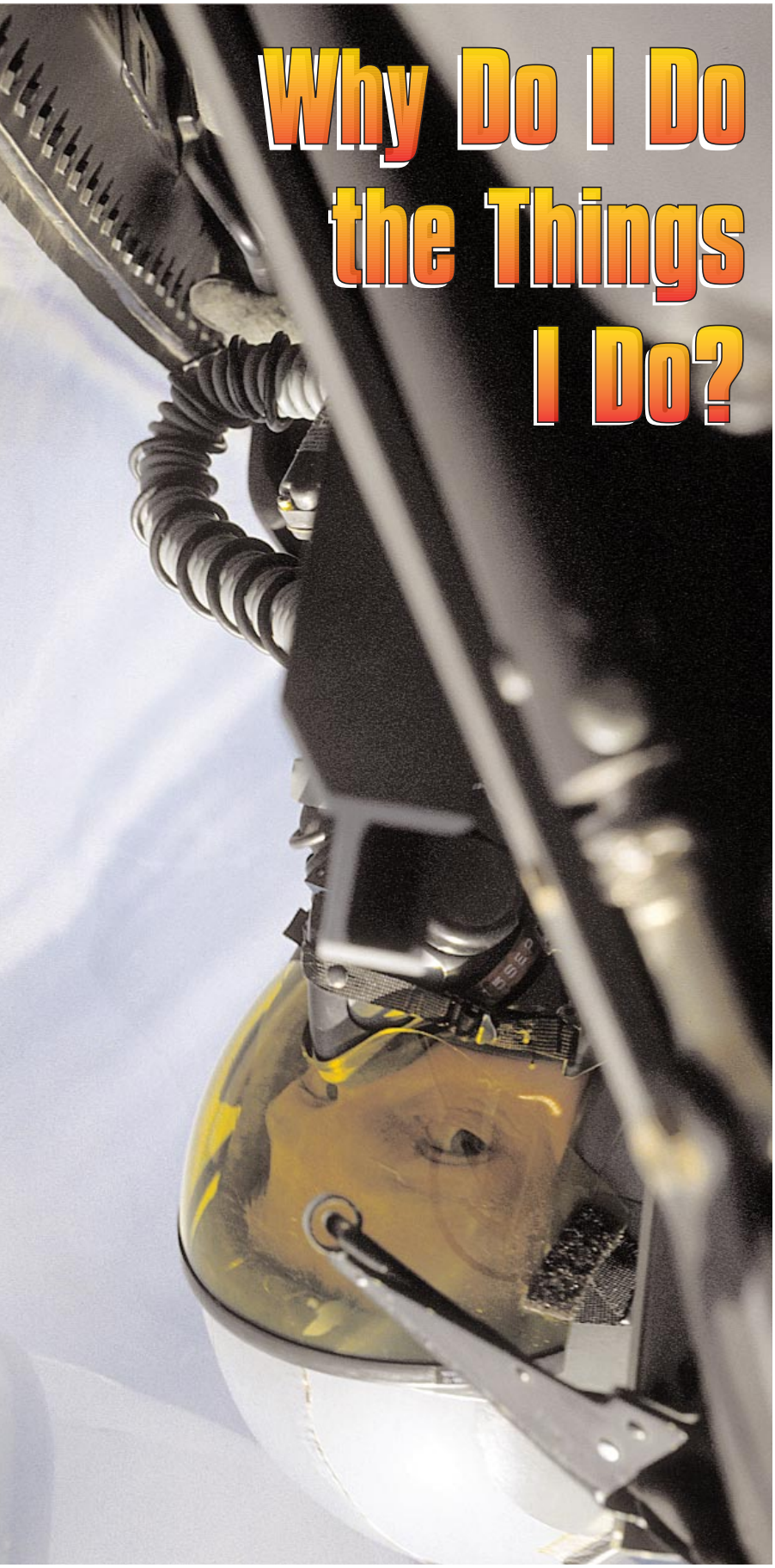
Next, we checked the switching valves to ensure hydraulic pressure would be available in case of an engine failure. Then we shut down No. 1 engine. In my haste to finish the job, I reached down past the offset rudder under the vertical stabilizer and tried to insert a cotter-key through the lollipop while hydraulic power was still on the jet. I didn't notice my squadronmates beside the jet trying to warn me of my mistake; I had placed myself in real peril.

In the FA-18, as hydraulic power slowly bleeds off, the flight controls often cycle without command. Now was no exception. The rudder suddenly struck my right arm, and I immediately pulled my arms out of the actuator-access panel. Had my reaction been a split second slower I could have lost both arms just below the elbow.

In my haste to finish rigging the airplane, I hadn't told the plane captain what I was doing. That simple mistake could have ended my naval career and left me disabled for life.

Don't take chances with machinery. If a hydraulic system and its flight-control mechanisms have a little life left in them, keep your hands to yourself. ✈

# Why Do I Do the Things I Do?



USAF Photo by SrA Jeffrey Allen

**CAPT GORDON N. GOLDEN**
Directorate of Aerospace Safety
*Aerospace Safety*, Dec 80

There are times in our lives where perceived role and peer pressure become so strong that we are not able to objectively view our own actions and their impending results.

Somewhere, some time ago, maybe it was in Introduction to Sociology, I heard it said, "The way we think and act is the result of the sum total of our experiences and our environment." Personally, I think we are not puppets of our environment. However, when you step back and look around, maybe there is some truth to the "product of our environment" theory.

An observation was made several years ago in the civilian community about the number of flying physicians involved in light aircraft mishaps. It seems that doctors as a group were involved in light aircraft mishaps way out of proportion to their numbers. The analysis finally centered on the doctors' perceived role. They could *never* be wrong. In a doctor's daily dealings involving life and death decisions, if he ever started to doubt that the actions he took were right, his psyche would not survive, the pressure and self-doubt would be too great. Therefore, all doubt about his professional actions was eliminated for survival.

This defense mechanism became a part of the individual's personality and was integrated into all of his thought processes. This "I can't be wrong" defense mechanism translated into aircraft mishaps usually as a corollary to the "get-home-itis" syndrome. Once the decision to fly to a destination was made, the pilot physician would press on despite deteriorating weather, which was the usual scenario of a mishap. You see, once he had made the decision to go, he had to continue; it was part of his role.

"Well, that's a great piece of information," you say, "but how does that apply to me?" Macho Man has been a part of the pilot's image from the beginning of aviation. The word "pilot," especially if prefaced by "fighter," instantly conjures up the picture of a daring young man and his flying machine with his scarf trailing in the breeze. The image literally oozes danger, excitement, and adventure. It's part of the role we play as pilots.

A pilot has to have self-confidence and a certain degree of aggressiveness or he won't make it as a pilot. The I'm-the-best-aviator-

who-ever-raised-a-gear-handle attitude helps us maintain our individuality and makes us think for ourselves to a certain degree. That's one part of the environment we move in as Air Force pilots, the superior skill and cunning pilot role we all emulate.

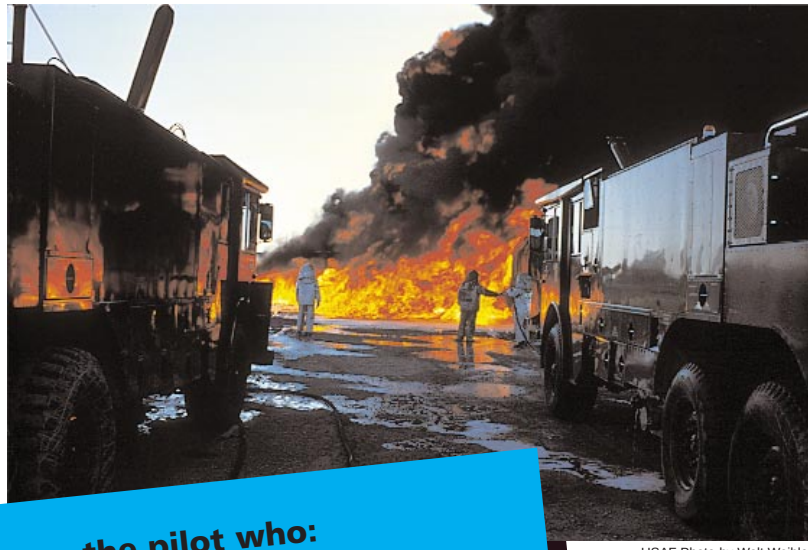
Another part of our environment is peer pressure. Peer pressure is something we have all experienced in varying intensities throughout our lives. We usually conform to the group norms if we want to be accepted by the group. New pilots in a fighter squadron probably experience one of the more intense peer "pressure-cookers" that our society has developed.

A new fighter pilot (low time in that particular aircraft) comes into a squadron able to safely fly the aircraft and basically qualified to perform the mission, yet not long after this "new guy" arrives at the unit, he discovers he will have to prove himself before he will be accepted into that particular group of the brotherhood of fighter pilots. Nobody, even a new guy who has not had time to gain proficiency, wants to be labeled the squadron "grape" or be a long-time resident of the bottom slot in the top gun competition.

The stage is now set. We have a fighter pilot with a strong self-image (possibly stronger than his abilities warrant) who is sorely tempted to press his self-established limits to gain the admiration of his squadron mates or avoid humiliation at their hands.

There's no problem with striving to improve ourselves, but when there is a mismatch between our perceived limits and our actual abilities, look out!

Take a look at a few indicators of this mismatch between perceptions and abilities. Some have figured in lost aerospace hardware and pilots.



USAF Photo by Walt Weible

**Have you ever seen the pilot who:**

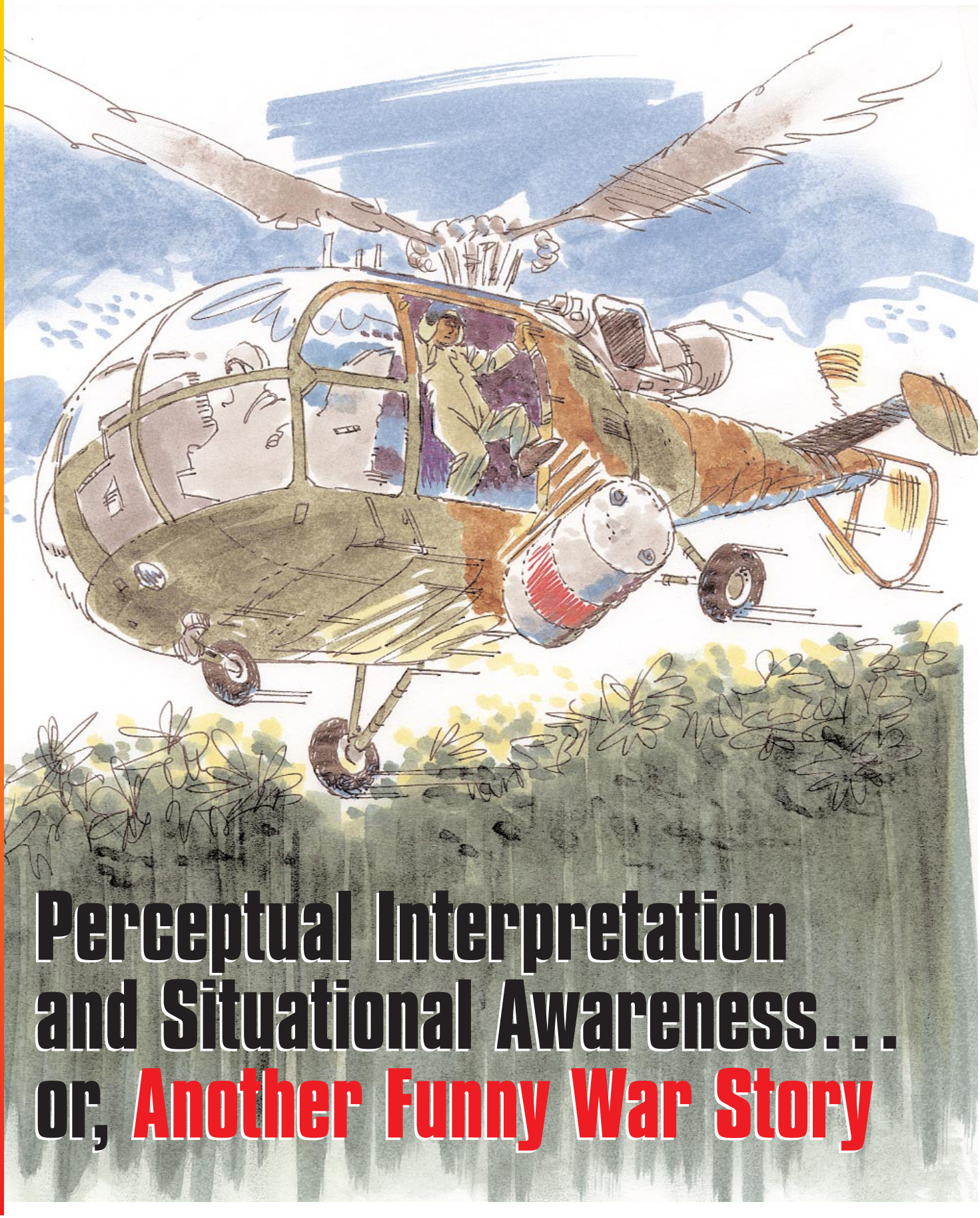
- ❑ Won't knock off an engagement, no matter what, until he gets a shot?
- ❑ Will do anything to keep from getting shot in an engagement?
- ❑ Overshoots half his rejoins after takeoff trying to set a new squadron record?
- ❑ Consistently fouls on strafe passes?
- ❑ Charges the refueling boom to the point that the boomer gets jumpy?
- ❑ Continues the low-level mission in deteriorating weather?
- ❑ Tries to salvage a poor roll-in on a bomb pass?
- ❑ Takes a broken airplane for fear of being called a weenie?
- ❑ Calls "Judy" on a low, slow target with the gear horn blowing in the background?
- ❑ Flies an alternate mission when he's not really prepared?

Did you see anybody you know? Did you see yourself?

We're all responsible for the problem:

- ❑ The new guy who's pressing his limits.
- ❑ The IP or flight commander who sees a gap between a pilot's abilities and his actions and doesn't say anything about it.
- ❑ The training officer who throws everybody into the top gun competition as soon as they walk through the door.
- ❑ All the guys in the squadron who ping on the new pilot every time he makes a false move.

Training for a tactical mission is by nature competitive, but the emphasis has to be put on increasing unit combat effectiveness, not personal prowess. If we can switch emphasis to the unit as a whole and help the new guy get up to speed instead of putting him through a trial by fire, maybe we can reduce some of our overcommitment losses. ✈



# Perceptual Interpretation and Situational Awareness... or, Another Funny War Story

**LT COL LEX ROCKY HEEMSTRA**
Staff Officer Flying Safety
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The need to fill in the gaps is a natural phenomenon with the average human being. We don't like gaps and will fill them any way we can. Psychologists often display segments of "Pac-Man" in a circle, and we tend to see a star or some other recognizable form according to our experience.

How does this affect aircrew? Do we tend to fill in gaps when there is no other information just so we can retain our feeling of comfort in a tense or high workload situation? Think about it. It has most probably happened to you, and more than likely, when you had the least experience. Of course, the less your experience, the more vivid your imagination so as to fill in those gaps.

The best incorrect interpretation of perceptual information and total loss of situational awareness was once related to me by a very experienced helicopter pilot. However, at the time of the occurrence, his experience was near-on nil.

The story goes back to the mid seventies. A young Angolan helicopter pilot was tasked to drop a drum of fuel somewhere in war-torn Angola. At the time, the country was in total chaos. Government forces were trying to retain control over a country which had become the world's playground. The rebel forces, UNITA, were involved in trying to regain their strongholds. A vast amount of various eastern bloc, as well as other communist-ruled countries' "military advisors," were involved at various locations. South Africa and its forces were also in the arena. As someone once described it, this was "cowboy country deluxe."

Now this young helicopter pilot had to fly into this war-torn area not quite sure who was friendly, who was not, and what any of the forces were wearing. But by applying his apt knowledge at navigation, purely on heading and time (a basic Alouette III helicopter), he managed to find the convoy. The vegetation in the area is mostly forest with some trees as high as 70 feet. The pilot went into a hover above the convoy, and the flight engineer started positioning the drum of fuel (44 gallon) nearer to the door so as to drop it in the soft sand below. The Alouette does not like lateral shifts in its Center of Gravity (CG). As the drum and flight engineer moved closer to the door, the pilot had to progressively move the cyclic stick over to the right to compensate for the lateral shift in CG.

Without any warning to the pilot, who had his hands full trying to maintain a level hover, the flight engineer kicked the drum out the door. Suddenly, the extreme left lateral CG no longer existed, but the cyclic stick was almost full over to the right. Anyone who knows the sensitivity of the Alouette III will know this is a no-no. The helicopter suddenly banked severely to the right. With this, the flight engineer fell backwards and hit the door behind the pilot.

The pilot, being as scared as he was in the situation, did not have the ability to assess which came first, the incredible bang and subsequent vibration behind him or the sudden bank to the right. In his mind, they were being fired upon with RPGs, and it was close. He immediately pushed the cyclic stick full over to the left and forward to regain straight and level and, at the same time, induce forward speed.

With the sudden bank to the left, the flight engineer behind the pilot went careering over to the open door. Unfortunately, some diesel

continued on next page

fuel had leaked onto the floor, and this aided the flight engineer in accelerating towards the door and subsequently out of the helicopter.

The pilot now looked back for the first time and was shocked to observe his flight engineer was missing. So they had not only shot at him with RPGs, but they had also managed to hit his flight engineer. The pilot was not going to make himself a target any longer and forced the helicopter to sub-treetop level. He was now getting out of there as fast as possible, with wheels and belly of the chopper hitting the treetops.

Fortunately, or unfortunately, for the flight engineer, he had managed to get hold of the step of the helicopter on his way out of the helicopter. He was now holding on for dear life, which was not being made any easier by his pilot, since various trees would pummel his body from time to time. This was no situation to stay in, and his major goal in life was now to get back into the helicopter. He managed to get a hand onto the floor of the helicopter and a leg over the step.

At this time, the pilot looked back once more to assure himself that the flight engineer was really missing. What he saw he could not believe. He saw a hand, and someone was trying to get into his helicopter.

He now wished he had never joined the Air Force. Not only had they shot at him on his first sortie, but also they had managed to shoot his flight engineer, and now the en-

emy was waiting in trees and jumping onto helicopters as they passed. All he could think of to rid himself of his potential death was to induce as much G force as possible to rip the enemy off his helicopter. He pulled back on the stick and pointed the nose skywards. Fortunately, the G force was insufficient to rip the flight engineer off, and as the aircraft ran out of speed, the pilot had no option but to push the nose down. This slight negative G force acted in the flight engineer's favor and helped him back into the helicopter. Now, with the full complement of crew back in the helicopter, the two of them had the chance to review the last few minutes of their terrifying experiences and work out what had really happened.

This remains one of the best "war stories" I have heard, but it also makes me wonder how we could train youngsters not to go through the same process. Unfortunately, experience cannot be duplicated, even though it remains one of the best teachers in our aviation careers. But, out of experience comes procedures learned by the old dogs, and this is taught to most of us.

The procedure of getting rid of the drum at that height was not one of the best I have heard of. There are better ways. The lack of communication also aided the events. A proper briefing prior to the event would have helped as well. Knowledge of the lateral CG of a small helicopter was not unknown to the pilot, but he failed to recognize it when it happened. All I can say is there are procedures, and they are there for a reason. Stick to them. Communicate all your actions to your entire aircrew, and the next time you feel you don't have sufficient information or are beginning to fill in the gaps, wind your watch for awhile, and reassess what is really going on.✈

# Deployment Traps

USAF Photos by MSgt Perry J. Heimer

During the months prior to your deployment, make an effort at a time and place of your choosing to experience the unfamiliar. Take the local training sortie to an unfamiliar field with an unfamiliar approach, an unfamiliar assault zone, and an unfamiliar drop zone.

J. T. RAGMAN

**A visit to the desert. A rotation through Bosnia. A few weeks in Panama. Hurricane relief through Central America. Deployments and their "deployment traps" have become a fact of life.**

## 1 First Trap: Comfort Zone Shock

Deployments take us far from the flagpole and out of our comfort zone, exposing us to a host of unfamiliar variables. Terrain may differ significantly, with resultant climb-out and engine-out concerns, cruise ceiling and drift-down concerns, and TAS/IAS concerns on short final to the short strip. Ground cover may foster visual illusions for which we are unprepared. Climate conditions may vary from frigid cold to blistering hot in the span of a single sortie. Radar versus nonradar. Familiar approaches versus unfamiliar. English as a first language versus English as a second language. Reliable navaids and clear radio transmissions versus the questionable and the scratchy.

### Some Remedies

• Recognition and acknowledgement are the first steps—"Toto, I don't think we're in Kansas anymore." Communication with members of your crew and with the full deployment package is another important step. Research, preparation, and exercising prudent caution are other steps that should be high on your list.

• During the months prior to your deployment, make an effort at a time and place of your choosing to experience the unfamiliar. Take the local training sortie to an unfamiliar field with an unfamiliar approach, an unfamiliar assault zone, and an unfamiliar drop zone. Take a weekend cross-country to fly over unfamiliar terrain and unfamiliar ground cover. During the days and weeks prior to the deployment, suggest—or better yet, prepare—a briefing addressing the unfamiliar elements present in your deployment location and their potential impact upon flight safety. Lastly, while deployed, actively and conscientiously employ the principles of crew resource management and operational risk management.

## 2 Second Trap: Hack the Mission

We're all creatures of our ego. "Good troops get the job done. Good troops hack the mission." An admirable and not uncommon mindset. However, there is room for an equally admirable mindset: "Good troops are proficient in their skills, exercise sound judgment, and focus on flight safety at all times." If skills, judgment, and flight safety can't complete the mission, which of the three are you willing to trade to complete the mission? Paraphrasing a comment from

the movie *Field of Dreams*—"If we build it, they will come," consider this twist—"If we employ our skills, employ sound judgment, and focus on flight safety, the mission will take care of itself." Conversely, "If we stretch our skills, fail to employ sound judgment, and take our eyes off flight safety, the mission may *never* happen." Dead aircrew and twisted airplanes will never hack this or any other mission.

### Some Remedies

- Rethink the "good troop" mindset.
- Speak up—it takes only one crewmember to call "time-out," "knock-it-off," "go-around," or "no-drop." Mission commanders, aircraft commanders, and NCOICs must speak out on this issue—often and forcefully. "The troops" are listening to what you say *and* to what you *don't* say. They're also watching what you do, and your action or inaction sends a powerful message.

## 3 Third Trap: Training Versus Operational

"We wouldn't do this in training, but this is a real-world operation." This mindset suggests the mission warrants a risk level or activity for which the aircrew hasn't been trained. Performing any activity an aircrew has *not* been trained to do is risky business. Undertaking such an activity in an operational environment is *doubly risky*. The operational environment is often fraught with variables beyond our control such as weather, terrain, crew experience, ATC environment, fuel load, cargo load, fatigue and circadian rhythms, runway length/width/condition, adrenaline, and the enemy threat. The operational environment is also likely to impose a time compression element upon the mission, limiting pre-mission planning and/or in-flight crew briefings, hamstringing sound crew resource management and operational risk management.

If an activity is of sufficient risk that we don't practice it under training conditions of our choosing, why double the risk by conducting the activity under conditions not of our choosing? Inherent activity risk is compounded by situational risk.

### Some Remedies

- Train for real-world operations. Just as we're encouraged to fly every mission as if it were a check ride, fly every training mission as if it were a real-world operational mission.
- At a pace and under conditions of your choosing, push your envelope. Bring your "training envelope" more in line with your "operational envelope."
- Develop a confidence and comfort level and a degree of proficiency commensurate with an "operational" tasking. By doing so, you allow yourself and your crew to state, "We've done this many times in training. Let's focus on the variables which make this different here and today." Risk is *doubly* reduced. You've done this in training, so you can focus on the operational variables.

If circumstance ever places you, or any member of your crew, in a position where one or more of you need to say, "We've never done this in training," speak up loud and clear, front and center.

- As you redeploy from your latest adventure, begin setting the stage for the next. Survey each crew, each crewmember, and each member of the supporting cast. "What lessons have we learned?" "What should we include in an after-action report?" "What should we forward to the flight safety shop or the training section?" And, "How can we do it better next time?"

We are paid to deploy and face the "deployment traps." We can't escape reality. We can, however, work to make those deployments safer. Recognize, acknowledge, communicate, and prepare for the "comfort zone shock." Focus on sound judgment and flight safety, and let "the mission" take care of itself. Train to operate. At a pace and under conditions of your choosing, bring your training envelope in line with an operational envelope. Do the paperwork. Survey the players for lessons learned and complete the after-action reports. ✈

*(J. T. Ragman is the pen name of an Air Force Reserve C-130 pilot. He is also a Boeing 757 pilot and human factors instructor for a major airline.)*

If an activity is of sufficient risk that we don't practice it under training conditions of our choosing, why double the risk by conducting the activity under conditions not of our choosing? Inherent activity risk is compounded by situational risk.

# There I Was

**Capt Kevin Greeley, USAF Reserves**
94 AW
Dobbins AFB, Georgia

***There I was...*** flat on my back at zero feet, and the airplane, she is burning next to me. Not quite the outcome that was briefed for the mission. So here is a short but interesting tale of the end of two flying careers—mine and the airplane's.

It all started as a routine training mission—a competitive sortie to the range for a standard set of bombing and gunnery techniques—known as "two 30s, two 20s, two 10s, two strafe"—with proceeds to the winner. Carl and I were No. 4 of four, with me in the backseat of one of Mr. McDonnell's almighty Phantom IIs, a first lieutenant weapons system officer full of youth, and we briefed to go as two two-ships 10 minutes apart to keep the range traffic to a minimum. Brief, suit-up, and preflight were uneventful.

After entering our "horsepower" (social security numbers, actually) in the forms, we boarded the war machine and cranked the motors. With ATIS information Golf, our two-ship rolled as required for an 1115 takeoff time on a sparkling clear April morning in St. Louis. Local airliners from TWA were already lined up on the taxiway, and the front guy generously offered us a cut in line for an intersection takeoff.

Lids down, run 'em up, brake release at precisely 1115:00, the blowers light, and two Guard Rhinos are making a lot of noise. Events were normal as airspeed lifted from the peg and then passed 100 knots, a standard call (to abort for tires) in the old F-4. Then, at about 120 KIAS, the nose swung sharply to the left, straight into lead's afterburner plume, and then erratically swung back to center and kept on going, hard over to the right, with the airplane in full grunt, blowers cooking, in a wild, tire-smoking skid off the right side of the runway.

Man, it was the harshest trip I've ever made—off the runway, terrain hammering at the airplane, thundering over a crossing runway (6-24), and then striking the edge of taxiway Charlie, promptly collapsing the nose gear with a vengeance, ramming a big piece of it through the cockpit floor into the seat. BOOM!! The Martin-Baker-Meet-Your-Maker seat takes my pale fanny up the rails, and I am gone, gone, gone on an uncommanded ejection that's way out of the envelope. That's right—uncommanded! Nobody pulled any handles. Stuff happens.

We always wondered if "Bitching Betty" would say "Canopy! Canopy!" in an ejection, and I humbly report that what I heard was "can-," as the comm cord pulled away and I was thrust from the jet. I remember a lot of banging and pounding and other abuse as the airplane ripped apart and the seat fired. The sounds of metal structure snapping and bursting spoke of enormous forces. The cockpit briefly filled with a white smoke as the canopy jettisoned, and with deceleration crushing me forward in the straps, I watched out the lower edge of the left side and saw the gun and radar dish drag by.

Then I grayed out from the acceleration when the seat rocket ignited and 25 Gs raised the seat to the "full up" position. I remember regaining full color vision in time to whiz past the control tower, fight the bailout bottle pressure while making a pass at the lap belt, just in time to get man-seat separation, a struggle in the windblast for a good parachute landing posture, a glance at the ground for just a microsecond, and thinking "Ouch!" 'cause the earth, she is coming up to meet me at a frightening rush. Whoomp! There it is. I am laid out on the grass like how this story began.

So I paw at the mask bayonet and get one end off to stop huffing against the bailout bottle. I stare like an idiot at the bone poking out of my G-suit while the airplane burns 50 yards from me and the 20mm ammo cooks off like popcorn. I am alone, dying, and the feeling of smallness and isolation is chilling.

So…Tail 68-311, F-4E, one each, late of Asian fighting and a proud warrior of the Air National Guard, died in sight of where she was born 20-some years before. I am thinking, *"Get the risers disconnected!"* 'cause if the wind drags the cute and twists me, them broken bones will get worse, not better.

Hah! No need. There's no chute—not even some shroud lines. The whole package is still in its hard plastic case, seeing as how I just never got high enough or went far enough to get that chute. But I didn't know this, and I stupidly fought against the pain of three crushed vertebrae to get at the risers. Couldn't reach the little suckers and quit trying. Took a deep breath, assessed the situation, and thought, *"Abort! Yeah, we should have aborted."*

The Bold Face zipped through my mind—**"throttles idle, chute deploy, hook down."** Fat lot of good that's

USAF Photo by MSgt Perry J. Heimer

going to do me now! So I started laughing a little, a nervous laugh, mostly out of relief at realizing I'm not dead, yet. And man! I'm pretty uncomfortable—left foot next to my face, thinking I wish that wasn't my boot—but I know it's my boot because it has my name on it. I can read the dog tag wired into the laces and see the blood type entry, and I think, *"Hey! They're going to need the info real soon!"*

There is no pain—not anything of consequence anyway—but the impact has bent me around pretty good, popped apart the long zipper on the flight suit, pulled my underwear around, and I'm feeling exposed in the cool morning air. I'm faced down the runway, which is into the wind, and I'm thinking, *"Man! That's bothering me right now."*

The flight docs quickly get to me, seeing as how I skillfully managed to crash in front of base ops, in full view of everybody. They cut apart my gear and clothing, got it all off, and eased me onto a back board. While they are doing this, I watch and see the whole pelvic area move with the strength and consistency of bread dough. Not a good sign.

We dashed off in the ambulance to the nearest hospital. After we arrived, my condition stabilized. I'm conscious and aware despite numerous life-threatening injuries. There follows a few hours of imagery to see what all is ruined and what isn't. There are some internal injuries (duh), plus a bonus of many broken bones—shattered, actually: calcaneous, talus, femur, pelvis, vertabrae. Here's a quote from the radiologist report: "L-3 vertebra—explosive burst fracture with extensive fragmentation." I'm in about as bad a shape as the airplane.

There followed several major surgeries and a few minor ones thrown in for good measure, a month in intensive care, a month in the orthopedic ward, a few months in a special hospital bed in my living room. Then a wheelchair, then a walker, then a cane, and today just a limp on cold days. It took me 2 years to learn how to walk, and I never did make it to pilot training or ever fly a fighter again.

I sure do miss flying fighters, 'cause I thought I was pretty good at it—all of it—air to air, air to ground, special weapons, blah, blah, blah. But I'm not sorry those days are gone. My brief, but brilliant career at McDonnell Douglas ended (and a few years later, they ceased to exist as a company). I still feel bad about ruining the bird (and its precious Pave Spike pod), even though it was only a machine, not a sentient being. I want to apologize to the crew chief for wrecking his jet.

Besides flying airplanes, I've spent my adult life designing and building them and therefore have a perspective of grief at the demise of my mishap aircraft. Still, the personal events were far more significant than the loss of one old airplane.

This story isn't as awful as it may seem. Eventually, I joined Lockheed, where I work to this day, designing the cockpit and avionics of the F-22A Raptor. So, I'm still in fighters, in a manner of speaking. Also, eventually, I flew again—as a navigator and EWO in the Reserves aboard the C-130. [Thanks, guys!] So I'm still an aviator, in a manner of speaking. My hope for the future is we get Strike Eagles in the Guard or Reserve. Ha, ha. That's a good one!

I want to take a moment here to thank the people who trained and mentored me—a young man's quick reactions and the knowledge you gave him saved a life, no doubt about it. I surely would have died without the "posture of readiness" I possessed due to the priceless inputs made by life support instructors, instructor pilots, instructor weapons officers, and many others. You all did your jobs so very well, and today a good man is alive, not dead, because of it.

And what about Carl? He had an outcome a tad more fortunate than mine. The rocket motor in his seat failed to fire (the ignitor was ripped away in the breakup of the aircraft), although the canopy jettisoned, his chute deployed, and the lap belt released. Bottom line is he rode out the disintegration of the airplane and pulled himself out of the wreckage of the cockpit as the airplane burned. He ran over to assist me, mostly unhurt, and we're still good friends.

As for me, I feel I am now luck-free, having used every bit of my luck, good and bad, in that one event. No matter how terrible the details of the outcome, it sure as hell beats having friends and family coming to a funeral. 'Nuff said.

I'm extraordinarily fortunate to have lived at all, and the experience reshaped my character and outlook in a fundamental and positive way. The relative importance of family and career are seen in a new light, and I'm thankful for even the simplest things in this world. Life is full of varying risks, especially so if you live your life in aviation.

For the love of God and everything you hold dear, be careful out there. In this business, there are bragging rights that go with having matching numbers of takeoffs and landings, and my takeoffs match my landings, since we hadn't really gotten off the ground! However, further bragging rights go with being able to say "I always brought my jet back to the chocks."

Yeah? Well, I brought mine back to the factory…✈

# MOVE SLOW, TALK LOUD, AND WRITE BIG

Editor's note: Even though the author speaks from a commercial slant, he speaks to those in all disciplines: Follow procedural guidance, know your job, and keep your cool.

**KEVIN GARRISON**
Courtesy *US Aviator*, Oct 93

Some of the best advice I ever got about flying complex aircraft came when I really wasn't flying at all. I was a flight engineer on the 727, fresh out of my first airline school, and sure I knew everything there was to know.

When you are a "newbie" and fresh out of the unreal world of the simulator, you are hip to everything that can go wrong on the beast. You are not only full of knowledge about the jet, you are ready and eager for the first problem to crop up during a leg. You're spring-loaded in the abnormal position, if you catch my drift.

Unfortunately, almost everything they teach you in that first school is wrong. Not that I'm saying I didn't have all 15 steps of the "electrical smoke and fire" checklist memorized. It's just the actual operation of a transport jet almost never goes like it does in training.

On one of my first for-real legs with the airline, the old captain I was flying with (they all looked old back then) gave me the best advice I've ever received about flying jets.

"Son," he started, "this is the thing about flying these jets. Nothing ever happens so fast you can't handle it in slow motion. The quickest way to screw things up is to get in a hurry and get confused. If something happens, I want you to take the time to wind your clock and then calmly get the checklist out. All you have to do as an engineer is to MOVE SLOW, TALK LOUD, AND WRITE BIG."

That advice was really good stuff on the 727. "Talk loud" was because the 727 has one of the noisiest cockpits in the airline world. "Write big" referred to all the takeoff, landing, and cruise cards I had to fill out as an engineer. He was also correct about the "move slow" part.

Another captain I later flew with had forgotten all about "move slow," and we almost got in trouble. We had an abnormal flap indication going into IAH—one of those things where you aren't quite sure how much flap you have hanging out there. We got into a big hurry to fix the problem because we were on final.

First, he called for the wrong checklist. Then I pulled out another wrong checklist—not even the wrong one he called for. We ran the wrong checklist I picked out, and we even ran **it** wrong. Finally, we got so confused we simply added 20 knots to our bug speed and landed with whatever we had hanging out on the wing. Actually, that is probably what we should have done in the first place.

There is almost nothing which happens on a subsonic people-mover that can't be done slowly and deliberately. Even an engine fire on takeoff can be handled slowly and calmly. Let's say that just after V1 is called out you get a very loud fire bell from one of the engines. Your instincts will tell you to hurry up and pull that engine fire handle. After all, there is nothing more serious than having a fire on board your aircraft, right? Wrong.

There **is** something worse than having an engine fire. Pulling the wrong fire handle and shutting down your only good engine right after rotation and still having a fire on your bad engine is far worse than just flying

for a few minutes, sorting out the problem, and then fixing the problem.

Even a decompression with a total loss of cabin pressure at, say, flight level 370 can be done slowly as long as you put your oxygen mask on in a fairly brisk manner. What's the use of doing an emergency descent if you hit traffic on the way down or lose control of the bird in the dive?

This article isn't about how fast or slow you should do things in a jet. It's about some of the things I've learned about flying through all kinds of weather over Christmas and Easter holidays into all kinds of wonderful towns like Boise and Baltimore.

Not that I'm the burning bush; there are thousands of pilots out there who have all kinds of better experience on complex jets than I have. There are guys who have traveled at Mach 3, guys who have flown the hump, guys who have done the shuttle thing. Nope, I'm not the perfect example of a Class A jet pilot. I'm just all you've got in this article; so sit down, hush up, and keep your feet off the furniture while I fill you with aviation wisdom and wit.

Over the past 15 years or so, I know I've forgotten more than I've learned about hustling cajun clippers (DC-9s) and three-holers (727s) around the land of the free and the home of the Atlanta Braves. I have managed to retain a little bit of aviation lore over the past decade and a half, however, and will attempt to pass along to you a tidbit or two. Here goes.

**THE BIGGER THEY GET, THE SIMPLER THEY ARE.** I know it doesn't make much sense, but the bigger or faster the airplane you fly, the easier it becomes. I think, looking back, the Cessna 150 I soloed in was much more complicated to me than the last 767 I herded through the skies. I know it's largely a matter of experience and all that other claptrap, but it goes deeper than that.

First of all, I never had a 30-year captain to help me in the 150 like I did in the 757. I never had as much support from the ground in terms of maintenance, weather, dispatch, and ATC help. You could buy the 150 for about 1 year's wages—the 767 would take a few hundred lifetimes to pay off, and for that kind of change you get quite a chunk of flyable aircraft.

Systems-wise, I think you'll find the complex aircraft a bit easier to get along with than their more modest counterparts. Fuel controllers on the MD-88 (as on all turbojets) are fully automatic: No mixture knobs, no prop handles on the quadrant either. As a matter of fact, you'd be amazed at what's not on a control panel of a modern-day airline-type jet.

We do have a few things which make life easier on that quadrant that you don't get in simple airplanes. If you mess up your descent and have to, say, come up with a 4,000 fpm rate of descent in your Cessna 310, you are in a world of hurt, right? If the airplane doesn't come apart from the stress, your passengers will kill you for what you did to their ears with that humongous dive.

In the MD-88, it's absolutely "no sweatski, GI." Just yank out that spoiler handle next to the throttles and down you go. The pressurization (another automatic feature) will give your passengers a 500-fpm rate in the cabin, and you pull off the dive without a hitch. See what I mean? Easy.

**COMPLEX AIRPLANES ALMOST NEVER BLOW UP.** I know every movie you've ever seen about airline flight had at least one huge explosion. It simply doesn't happen that much in the real world. First of all, jet fuel is almost impossible to ignite—it's nothing like gasoline. Also, if you are in the hurt locker enough to worry about spilled jet fuel, things aren't going well for you anyway. I'm talking here about just cruising along in flight and having everything suddenly go FOOM! on you. It won't happen.

**MIDAIRS ARE MIDAIRS, CRASHES ARE CRASHES.** Let's face it. It really doesn't matter what you're flying if bad stuff happens. Dead is dead, and being in a complex airplane is neither better nor worse when you end up room temperature. I'll only say bigger airplanes sure are easier to see before you hit them!

**NOTHING HAPPENS ANY FASTER IN A JET.** Really. The first few approaches you'll be rushed a little bit, but you'll fit in so quickly you won't believe it. There is no secret to flying huge, complex jet aircraft except this: If you pay attention, act professionally, and don't run into anything or anybody, they (the company folks) leave you alone, and you get to fly some pretty cool aircraft into some interesting places.

**BOTH BIG PLANES AND SMALL PLANES ARE SOLID FUN.** Coolness is a state of mind, and there is no "airplane envy" among true-believing pilots. You wouldn't cross the ocean in a canoe (although I'm sure it's been tried), and you probably wouldn't fly over the Atlantic in a Cub, yet some of the most challenging flying I've done has been in a "simple" Cessna 182.

Fun is where you find it, and I've never *not* had fun in anything I was flying. You don't have to be a 747 driver to be cool and enjoy all that flying has to offer. There really is an "in crowd" of aviation, and we're all in it. ✈

I know it doesn't make much sense, but the bigger or faster the airplane you fly, the easier it becomes. I think, looking back, the Cessna 150 I soloed in was much more complicated to me than the last 767 I herded through the skies.

# Murphy's Law

## "If anything can go wrong, it will."

*Flying Safety*, March 1993

We've all heard of Murphy's Law, and as aviators, we all believe it to be true. What do we know about this philosopher, Murphy? According to The Official Rules, by Paul Dickson, Murphy was a military genius. It was Captain Ed Murphy, US Army, who first announced in 1949 his profound law.

Subsequently, there have been many corollaries to Murphy's Law. The first was:

"It will go wrong at the worst possible moment."

A fuller understanding of the law and its corollaries will enable pilots and maintainers to better deal with the complexities of the modern force.

***Corollary #2.*** Nothing is as easy as it first appears.

***Corollary #3.*** If there is a possibility of several things going wrong, the one causing the most damage will be the one to fail.

***Corollary #4.*** Left to themselves, things tend to go from bad to worse.

***Corollary #5.*** If you tinker with anything long enough, it will break.

***Corollary #6.*** Everything takes longer than you think.

***Corollary #7.*** When things seem to be going your way, look carefully in the opposite direction.

***Corollary #8.*** The crew bus always pulls away from the transient ramp when you pull the throttles to cutoff.

***Corollary #9.*** If a regulation is not obeyed, another more complicated one will be written.

***Corollary #10.*** The most important turnpoint is on the edge of the map.

***Corollary #11.*** Frequency changes are always made while you're folding the map.

***Corollary #12.*** Once unfolded, maps cannot be refolded the same way.

***Corollary #13.*** Stuck mikes happen only when you happen to be singing.

***Corollary #14.*** Two safety officers flying together, aren't.

***Corollary #15.*** Nature always sides with the hidden flaw. ✈

# Tornados Over New Mexico

Official USAF Photo

**LT COL HANS SWOBODA, GAF**
HQ AFSC/SEFF

On any given day, a mix of F-117s, T-38s, F-4s, and PA 200 Tornados can be spotted on the ramp at Holloman AFB, New Mexico. Yes, that's right, PA 200 Tornados! Since May 1996, 12 of the over 300 German Armed Forces PA 200 Tornados have been stationed at Holloman.

A few years ago, when the German Air Force (GAF) was looking for a new place to conduct Tornado training, the USAF offered Germany use of their oasis in the desert. Both Air Forces viewed it as a good opportunity to strengthen the transatlantic military cooperation between the two nations while the US military was downsizing in Europe.

The German contingent at Holloman AFB added almost 870 people to the population of the nearby city of Alamogordo. "The response from the locals was overwhelming," according to Col Sowada, Commander of the GAF Tactical Training Center (TTC). Over 500 new homes have been built in the local community to accommodate the new residents, and plans for bigger and better shopping malls are already on the drawing board.

On base, the TTC, which provides academic and tactical flying training for Tornado aircrews, is manned with 330 German soldiers. Col Sowada, a command pilot with more than 3,500 hours flying time, is one of nine GAF pilots. Together with five Weapon System Officers (WSO), they train more than 100 aircrews each year. Right now, only experienced crews go to Holloman and attend either the 6-month Fighter Weapons Instructor Course or the $3^{1}/_{2}$-week Advanced Tactical Training (ATT) Course.

Typical missions for the German Tornados at Holloman are two- or four-ship formations with low-level flying, range work, and air-to-air training. During the air-to-air phase, the Tornados fly against USAF and USN fighters. "Fighting" against the dissimilar US aircraft provides GAF aircrews unique opportunities to learn more about the capabilities and tactics of our NATO partner and live up to the motto "Train like you fight."

The change in climate has been a learning experience for both aircrews and maintenance personnel. Overall, the Tornado's ground abort rate is lower than back in Germany. The warm and dry New Mexico climate improves the reliability and efficiency of the aircraft, although the high summer temperatures create some aircraft performance problems not often seen in Germany. With these temperatures at a high pressure altitude, the aircraft could use more than the 15,000-pound thrust per engine to push the 24 tons of metal into the air.

Once airborne and in the low-level corridors, the Tornados are allowed to fly as low as 100 feet AGL. During night low-level flying or if bad weather is encountered, the Terrain Following Radar (TFR) is used to keep the aircraft as low as 350 feet above the ground. After implementing a radar altimeter modification, the jets will be cleared further down to 200 feet while flying "hands off" TFR mode. And at this altitude, the aircraft still feels like a Mercedes Benz.

When the Tornados are flown fully laden over the New Mexico mountainous terrain, they behave quite differently from what the crews are used to flying back in Germany. They call it the "3H-effect"—High, Hot, Heavy. "It's a challenge to experience the aircraft at its limits," beams Lt Col "Glatze" Glass, the German Flight Safety Officer.

The GAF plans on moving their entire Tornado training operation to Holloman as of 1999. Holloman will then be the only training base for GAF Tornado crews. Pilots and navigators will complete their initial and follow-on tactical training while at Holloman. "This will be more cost effective than the current system of having the training in three different countries," says Col Sowada. This move will result in an additional 440 GAF personnel relocating to Alamogordo. It will also create more than 100 jobs to employ local people.

Alamogordo, the once small town between the Sacramento mountains and the gypsum dunes of White Sands National Monument, stands ready to host the additional German soldiers and their families. They have welcomed their guests with the same spirit of cooperation and generosity as the Germans did with American Forces relocating to Germany since the beginning of the Cold War. Having Tornados flying over New Mexico seems to be a good way of contributing to a better understanding between both the Air Forces and people of the two nations. ✈

# Class A Mishaps FY99

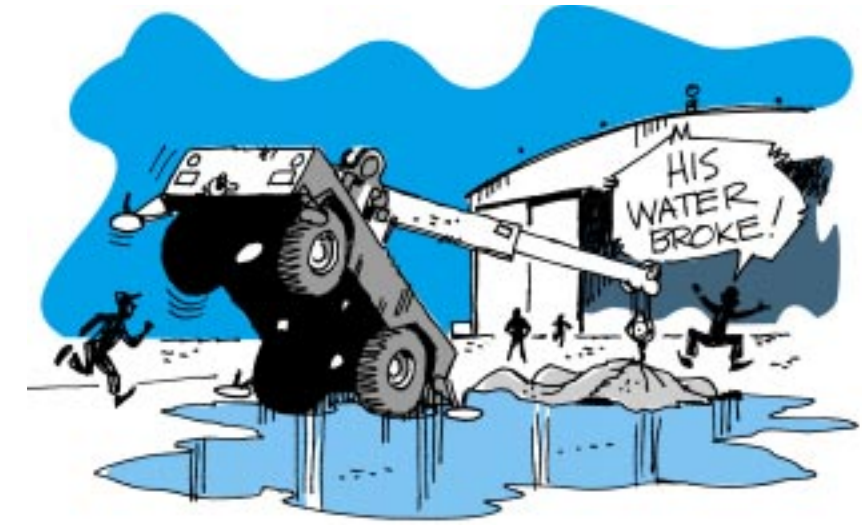
| FY99 Flight Mishaps (Oct 98 - Jul 99) | FY98 Flight Mishaps (Oct 97 - Jul 98) |
|---|---|
| 27 Class A Mishaps | 19 Class A Mishaps |
| 9 Fatalities | 4 Fatalities |
| 22 Aircraft Destroyed | 15 Aircraft Destroyed |

| | | |
|---|---|---|
| 6 Oct | ✶ | An airman suffered a serious back injury during a helicopter training exercise. |
| 21 Oct | ♣ | An F-15E crashed during a SATN training mission killing both crewmembers. |
| 22 Oct | ♣ | Two F-16Cs collided shortly after departure. One F-16 was destroyed and the other F-16 recovered uneventfully. |
| 29 Oct | | A C-9A's No. 2 engine failed and caught fire shortly after a touch-and-go. |
| 9 Nov | ♣ | An F-16CG crashed during a day BFM training sortie, killing the pilot. |
| 17 Nov | ♣ | An F-16C experienced engine failure and crashed during a day training sortie. |
| 19 Nov | ♣ | An F-16CJ experienced loss of thrust shortly after takeoff and crashed. |
| 4 Dec | ♣ | An F-16D experienced engine failure 25 minutes into flight and crashed. |
| 15 Dec | ♣ | An F-16C on a day training sortie experienced loss of thrust on RTB and crashed. |
| 29 Dec | | An OA-10A's No. 1 engine throttle cable failed during flight. The pilot had difficulty landing, the aircraft departed the prepared surface, and all three gear collapsed. |
| 7 Jan | ♣ | An F-16DG experienced an engine malfunction shortly after gear retraction and crashed. |
| 13 Jan | ♣ | A KC-135E crashed northwest of the departure end of the runway. All four crewmembers were fatally injured. |
| 20 Jan | ♣ | An OA-10A entered an uncommanded, nose-low attitude. Unable to return the aircraft to controlled flight, the pilot ejected, and the aircraft was destroyed. |
| 21 Jan | ♣ | An F-16CJ conducting low-level tactical navigation struck trees on a ridgeline. The engine failed, and the aircraft was destroyed on impact with the ground. |
| 28 Jan | ♣♣ | Two F-15Cs were flying a Dissimilar Tactical Intercept Training sortie against a three-ship of F-16Cs. The two F-15s collided during the first intercept and were destroyed. |
| 3 Feb | ♣ | An F-16C on a training mission had an engine malfunction. The pilot ejected after an in-flight fire developed, and the aircraft was destroyed on impact with the ground. |
| 24 Feb | ♣✶ | An RQ-1A UAV departed controlled flight, crashed, and was destroyed. |

| | | |
|---|---|---|
| **17 Mar** | | **On climbout, a U-2S canopy shattered, FOD'ing the engine and damaging the vertical stab. The pilot RTB'd and made a safe landing.** |
| **18 Mar** | | **An F-16C suffered major damage on landing.** |
| **26 Mar** | ♣ | **An F-16C on a day training sortie suffered loss of thrust, crashed, and was destroyed.** |
| **29 Mar** | ♣✶ | **An RQ-4A Global Hawk UAV crashed and was destroyed.** |
| **30 Mar** | | **A U-2S experienced loss of hydraulic pressure and suffered major damage on landing.** |
| **7 Apr** | ♣✶ | **A KC-135R sustained major fuselage damage. (Ground Mishap)** |
| **10 Apr** | | **An AMRAAM and No. 1 launcher were liberated from an F-16CJ during flight.** |
| **18 Apr** | ♣✶ | **An RQ-1K UAV crashed and was destroyed.** |
| **26 Apr** | ♣ | **An F-16DG experienced a landing gear malfunction while attempting to land. The pilot executed a successful go-around and proceeded to the controlled bailout area, where both pilots ejected. The aircraft was destroyed on impact with the ground.** |
| **19 May** | | **An F-117A caught fire on takeoff roll (takeoff was successfully aborted).** |
| **2 Jun** | ♣ | **An MH-53J impacted the ground while landing at an LZ. One crewmember was killed.** |
| **15 Jun** | ♣♣ | **Two F-15s crashed while on a local training mission.** |
| **18 Jun** | ♣ | **An F-16 crashed while on a local training mission.** |
| **1 Jul** | ♣ | **An F-16C, part of a four-ship SAT sortie, struck the ground during the low-level portion of the mission. The pilot was fatally injured.** |
| **12 Jul** | ♣ | **An F-16C crashed while on a local training 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 dollars.*
- ❑ *These Class A mishap descriptions have been sanitized to protect privilege.*
- ❑ *"♣" 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.*
- ❑ *Unless otherwise stated, all crewmembers successfully ejected/ egressed from their aircraft.*
- ❑ *Flight, ground, and weapons safety statistics are updated daily and may be viewed at the following web address by ".gov" and ".mil" users: http://www-afsc.saia.af.mil/AFSC/RDBMS/Flight/stats/index.html.*
- ❑ *Current as of 14 July 99.* ✈

# Maintenanc




### Feeling a Little Tipsy, Part One

This one was expensive. The mishap operator (MO) was performing an annual load test on a Grove 7.5-ton mobile truck crane, model RT48MC, under the auspices of a contractor. The test load was an 11,000-pound water weight test bag. The vehicle was on a concrete surface, the outriggers were extended and leveled, and the boom extension and radius parameters were going to be kept within specified limits for the load to be lifted. Everything seemed okay until the MO lifted the load and started swinging it to the right. When he reached a point of about 45 degrees, one of the outriggers slipped a few inches and the crane started tipping. The MO tried to swing the test load back to its starting position to counteract the tipping, but it was too late, and the crane went over on its side. The MO was okay, but the crane was damaged to the tune of $194,000. So what happened?

While the MO was fully trained and qualified on the Grove, he had never done a load test before, nor had he received any training on using water weight bags by the contractor. According to The Accident Prevention Manual for Business and Industry, it's recommended the load be dropped in the event the crane begins to tip. Second, if the contractor had contacted Grove before conducting load testing, they would have learned Grove recommends *against* using water weights, because they're unstable. Next, all parameters for conducting the 11,000-pound lift—flat, hard surface for the truck crane, outriggers deployed, boom extension and radius, load capacity—were within design limitations except for one: wind conditions. Per the vehicle's tech data, T.O. 36C3-5-14-1, parameters assume zero winds. In order to account for the effect of winds on lifting operations, the T.O. recommends reducing boom lengths and rated loads when winds exceed 20 mph. At the time of the load test, winds were 22, gusting to 31 mph.

Finally (and most tellingly), neither tech data, the manufacturer, nor AFOSHSTD 91-46, *Materials Handling and Storage Equipment* (1 Feb 97), ever required an annual load test. Unless specified by the particular mobile truck crane manufacturer, then per AFOSHSTD 91-46, crane load tests are required under only two circumstances: (1) Prior to initial use after extensive repair or modification; or (2) When the mobile truck crane is nuclear-certified. We were unable to tell from the mishap message how long the unit had been conducting annual load tests and couldn't help but wonder: Were annual load tests conducted because "We've always done it that way here"? Sometimes questioning established procedures is a very good thing.

### Feeling a Little Tipsy, Part Two

This one could have been very ugly. The crew was assigned to install a C-130 engine. The engine/propeller assembly was towed from the Engine Shop to the flightline on a standard engine trailer and positioned under the aircraft wing. Then, a Shuttlelift 3330E mobile truck crane was moved into position in front of the engine assembly. The mishap operator (MO) extended the boom, one of the other team members attached the crane hook to the engine assembly T-bar, and the MO then hoisted the engine just enough so the trailer mount bolts could be removed. Once they were removed, the engine was free from the transport trailer, and the transport trailer was cleared from the aircraft vicinity.

# ce Matters

The MO attempted to raise the boom to place the engine assembly in proper position to hang, but the boom wouldn't move. After several unsuccessful attempts, the engine installation team requested the shop supervisor's assistance and advice. The supervisor arrived on scene just in time to witness the Shuttlelift's rear wheels moving slowly skyward, and the engine assembly moving slowly earthward. Despite the fact that the engine kissed the ground with two propeller blade tips and its drain mast, the drain mast was the only casualty. Total cost for repairs was less than $175. But a look at circumstances surrounding the mishap made it clear this event could have been much more costly.

Even though there existed a letter designating a core group of crane training "Certifiers/Operators" and "Operators" trained by the certifiers, there were some discrepancies. One operator had never operated the crane, another had trained himself, and still another had never been administered a written test on crane operation, bringing into question the thoroughness of training *all* certifiers and operators had received. Considering that the unit had owned this Shuttlelift crane for almost 3 years, it would appear to be pure luck that no serious equipment damage had been done and no one had been injured before. Reminder: Chapter 8 in AFOSHSTD 91-46, *Materials Handling and Storage Equipment* (1 Feb 97), provides firm, clear-cut requirements for ensuring operators are properly trained and certified to run cranes. Is your program run in accordance with AFOSH standards?


**The Broken "Bone"**

The flight was normal. Upon landing, the crew discovered a hole on the upper right side of the No. 2 engine augmenter exhaust duct. *A big hole. One foot wide by three feet long.* Aside from the obvious, this event really grabbed Jet Shop's attention since the same augmenter had been involved in a burn-through while installed on the previous engine.

The origin of the problem that triggered the two burn-through incidents lay in the engine it had been mated to nearly 1 year earlier. Here's how it all started. Hard FOD had caused a first-stage fan blade to fail, causing significant damage throughout the entire engine. The augmenter and exhaust nozzle assembly (for sake of simplicity, we'll refer to these two sections as the "augmenter assembly") were separated from the rest of the engine, and after replacing several core fuel nozzles and exhaust nozzle parts, the repaired augmenter assembly was mated to another engine. The engine had accumulated only 34 flight hours after installation when it experienced an augmenter assembly burn-through (the first burn-through event).

The engine was removed, the augmenter assembly and engine were separated, and examination turned up a piece of inlet guide vane (IGV) flap composite material under the exhaust duct liner. Believing the composite scrap had created a hot spot that led to the burn-through, but unable to find composite material missing from any of the engine's IGV flaps, Jet Shop concluded the stray composite material must have come from the original FOD-damaged engine. The exhaust nozzle was replaced, the augmenter assembly was once again made serviceable, and it was mated to a third engine (the mishap engine).

Once installed on the mishap aircraft, the augmenter experienced another burn-through, this time after only 29 flight hours. A meticulous borescope of the augmenter section led to discovery of a nick in a fan fuel nozzle measuring .020 inch by .200 inch. This seemingly innocuous imperfection was enough to allow a blowtorch effect to occur that ultimately led to the burn-through damage.

A mishap like this illustrates why even though the obvious answer is *usually* the right answer, it isn't always so. The scrap of IGV composite material seemed like a sure thing, but removing it didn't prevent a second burn-through event. Total mishap cost was more than $200,000, putting it in the Class B mishap category. To the Jet troops who troubleshot this one so thoroughly and pinpointed the problem before it resulted in loss of an aircraft (and perhaps a crew!): Well Done!✈


### A Chance Encounter With the Grim Reaper

The mission was planned as a test support flight. An Air Force F-16 was to simulate a fast-moving, low-level, hostile aircraft attacking a designated site with air-to-surface missiles. The profile called for the Falcon pilot to fly at an altitude of 1,000 feet AGL starting at a point 20 miles from the target, then drop to 200 feet AGL when 5 miles from the target. The first and second runs of the test profile were uneventful, but for technical reasons, additional "attacks" were called off. The pilot subsequently made three fly-bys of the test site at low level and headed for the home drome with a Code 1 jet. It was only after landing that it was discovered the Falcon had clipped four power lines during one of those fly-bys, causing $171,000 damage to the radome, canopy, fuselage, right ventral fin, pylons, wings, and a TER.

Pilot and plane had come as close to being a smoking hole as one can imagine without actually *being* one. Here are the facts. The four No. 6 (about pencil-diameter) copper power lines were strung between two 35-foot-tall wooden poles, with one wire strung across the top of the poles and the other three wires mounted on a crossbar approximately 6 feet below the top wire. The bottom wires were just over 29 feet above the ground, and it appears the jet flew between the single wire and the group of three. Data showed the Falcon was doing approximately 516 KCAS at the time of wire strike.

Lest you have your own close encounter with the Grim Reaper, learn from the brush this pilot had with death—that he never knew about. A final sobering fact we almost forgot to mention. The two wooden power poles were spaced 40 feet apart; wingspan of an F-16 with missiles on the wingtips is nearly 33 feet. How close did he come to being a Class A mishap statistic? You do the math.

### Right State, Wrong Range

For all you pilots out there who *intentionally* drop things from your aircraft, here's another great object lesson in that "Positively identify the target before you drop your stuff" category. A US Navy FA-18 four-ship strike package/check ride was scheduled to drop bombs on a US Navy range. Each Hornet was loaded with two inert Mk-83 low-drags, and everything was pretty routine until approach to the target, where there was a scattered cloud layer at 3,000 feet. Ingress began at 16,000 feet, and the mishap pilot (MP) dropped both of his inert Mk-83s on the range center bull target. His only problem? The USN range is located just to the north of a US Air Force range, and the MP had dropped his load on the *USAF range* center bull target. As circumstances would have it, the USAF range was closed, and the MP's Mk-83s impacted only 300 feet from a team performing range maintenance. One can only imagine the reactions when their meditations were disrupted by the impact of fast-moving items in a ballistic trajectory! Fortunately, there were no injuries. But what if those inert Mk-83s had scored a shack on the range maintenance team? What if those Mk-83s that landed 300 feet from the range maintenance team had been live? Finally, what if the USAF range had been open and there had been USAF aircraft using it? Talk about ruining your day… We suspect this mishap prompted a thorough review and beefing up of local USN and USAF range coordination procedures. ✈

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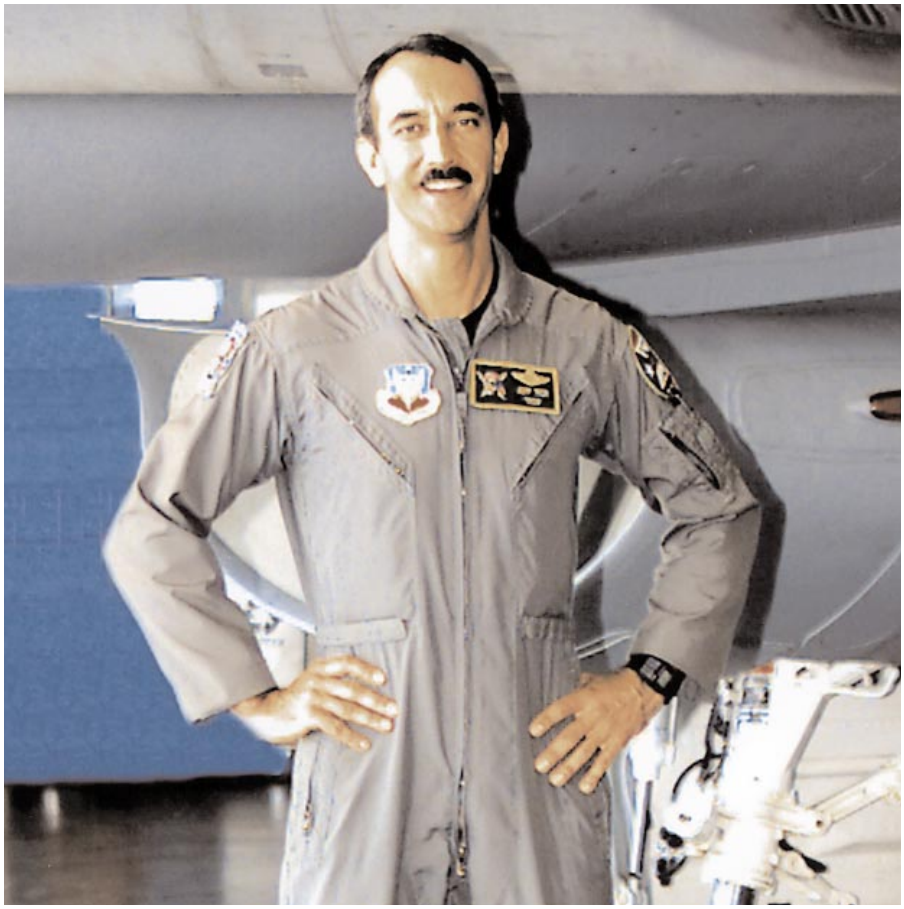

## LT COL JEFFREY S. TICE

**198th Fighter Squadron**
**Muniz ANGB, Puerto Rico**

Lt Col Jeffrey S. Tice was flying an Operational Check Flight (OCF) sortie on an F-16A that had been down for an extended period. He had just completed weapons attack functional checks when an abnormally high fuel flow reading caught his attention. He decided to terminate the OCF and was returning to San Juan when the engine flamed out with no warning at 12,000 feet.

Lt Col Tice quickly located the nearest suitable emergency field, Borinquen Airfield, approximately 20 NM away, slowed to best glide AOA, and began running the flameout landing checklist. Due to proximity to populated areas, Lt Col Tice elected to retain his aircraft's two external wing fuel tanks. Approaching Borinquen, an uncontrolled, joint civilian/Coast Guard facility, he had to manually tune to the local VHF frequency, announce his condition and intentions, and perform clearing turns to avoid civilian traffic. Because he was below 5,000 feet, Lt Col Tice elected not to attempt a restart and devoted full attention to landing the crippled aircraft. He performed a flawless dead-stick landing and successfully stopped the aircraft on the available runway.

Elapsed time from the first abnormal fuel flow indication to the full-stop, dead-stick landing was less than 4 minutes. Lt Col Tice's cool thinking in this sudden emergency prevented loss of life, averted damage to civilian property, and saved a valuable combat asset. ✈

Well Done!

(Lt Col Tice is currently assigned to 12th Air Force at Davis-Monthan AFB, Arizona.)


USAF Photo by SSgt Steve Thurow

# To the men and women of Operation Allied Force...

# WELL DONE!