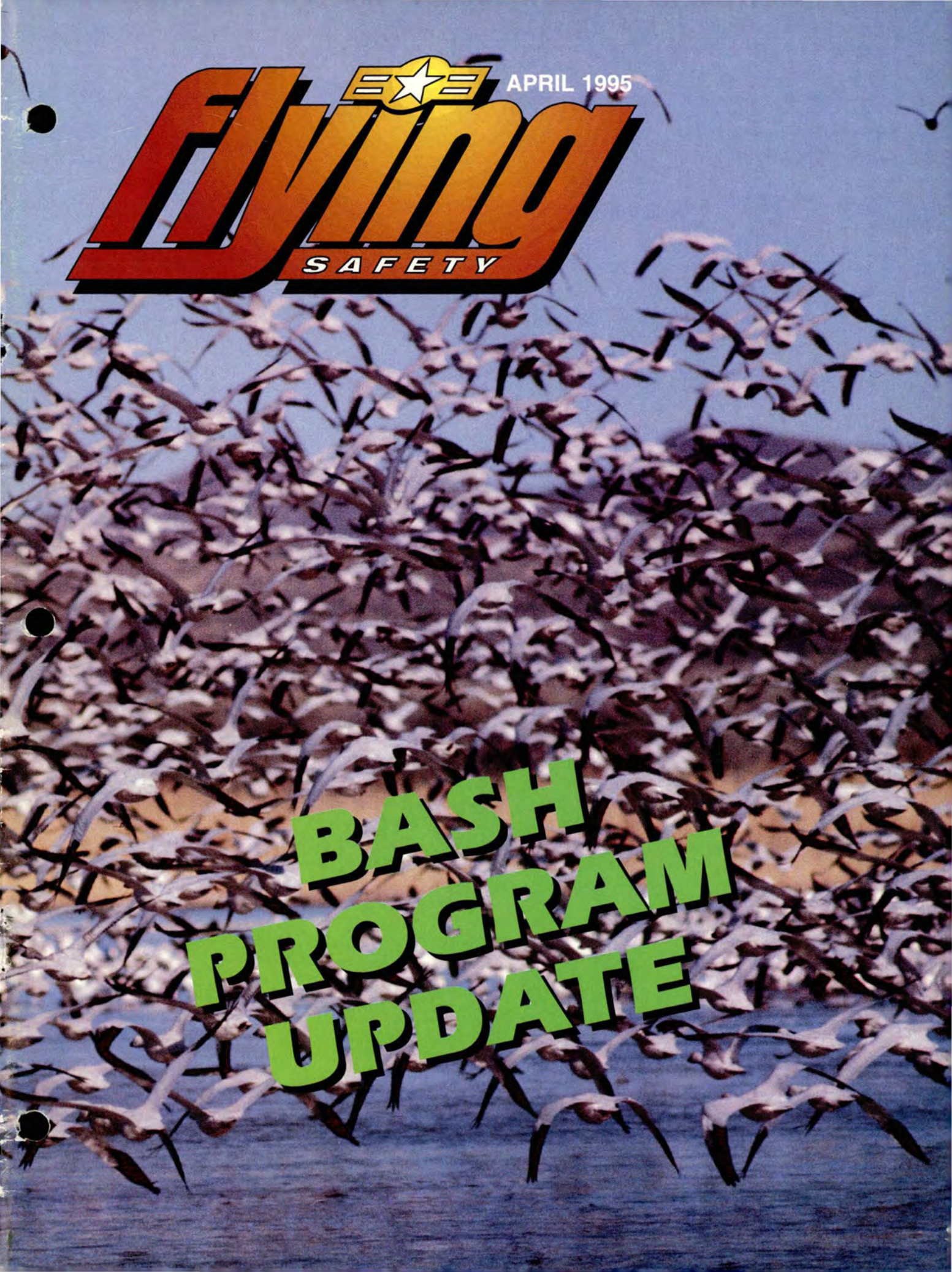
APRIL 1995

flying SAFETY



BASH PROGRAM UPDATE

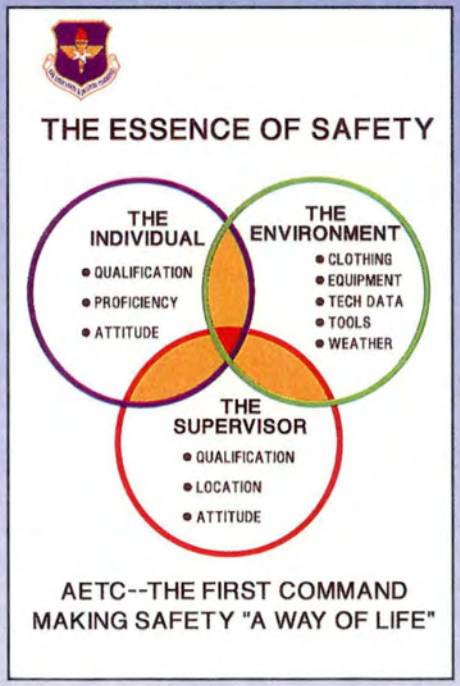
USAF Photo by MSgt Fernando Serna

THE ESSENCE OF SAFETY

General Henry Viccellio, Jr.
Commander, AETC

■ The AETC mission is to train and educate aircrew, technicians, and support personnel to be "mission ready" when they get to their gaining units. To do this, we've acquired better equipment, we're training more realistically, and we are participating in deployments, exercises, and competitions alongside our operational counterparts to ensure operations skills stay sharp. Quite frankly, we're adding an "operational mindset" to the training and education of Air Force personnel before they leave the command.

Based on the experience levels of the people we train, it is vital that we teach them the importance of safe operating practices from day one. It is also important that we closely monitor the environment in which they train and the supervision they receive. These three factors — the individual, the environment, and the supervisor are what I call "The Essence of Safety."



Let's take a look at the factors involved (see diagram) in building good safety habits — what I call "The Essence of Safety." We select **supervisors** who are qualified, ones who will get out and be involved with those they are responsible for training. It is vital our supervisors project a safe and positive attitude. We want to train in the proper **environment** by ensuring the proper clothing, equipment, tech data, tools, and suitable weather are available for the task. If not, wait until they are. Our instructors play the major role in developing the **individual**. Through training, they provide the qualification, the proficiency, and the example that bring our graduates to "mission ready" status with the proper attitude.

Always remember, the airmen you instruct will not only do as you say, they will do as you do. So next time you climb up that ladder, crawl under that jet, or aim that rifle down range, remember the young airmen looking over your shoulder will take with them not only the skills you teach them, but also your attitude toward safety and the mission. Let's all work hard to build effective, lifelong safety habits through focus and example. ■

UNITED STATES AIR FORCE

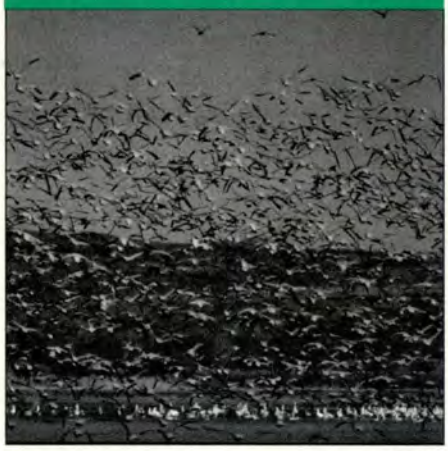
Our 51st Year

AIR FORCE SPECIAL PUBLICATION 91-1

Flying Safety

APRIL 1995
VOLUME 51, NUMBER 4

SPECIAL FEATURES



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Cover photograph by TSgt Perry J. Heimer

CONTRIBUTIONS

Contributions are welcome as are comments and criticism. No payments can be made for manuscripts submitted for publication. Call the Editor at DSN 246-0936 or send correspondence to Editor, *Flying Safety* magazine, HQ AFSA/SESP, 9700 Ave G, S.E., Ste 282, Kirtland Air Force Base, New Mexico 87117-5670. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

THERE I WAS

USAF Photo by Maj James H. Grigsby

■ "Did you just move the flaps to 50?!" "Uhhh, no."

It became very quiet in the cockpit as we rolled down the assault strip after landing. We all realized what we had just done. Of course, these things happen only on a checkride.

As I looked at the examinee, my friend and a man whom I respect, I knew his day was over — Q3, cut-and-dried my-hands-are-tied busted. As we prepared to go back up and administer the corrective action, one of those little red devils you see in the cartoons lit on my shoulder.

"Hey, stupid, how you gonna write this up? If you bust him, you'll be rattin' on yourself. You'll get busted, too!"

At that instant, a cold sweat popped out on my now faster-receding hairline. Integrity check. Just as I began to really get going on my E&E plan, the obligatory cartoon angel slammed down on my other shoulder.

"Surely you aren't thinking of weaseling out of this. What kind of message will you be sending the other guys on this crew? Do you set the standards or dodge them?"

Ahhh, the joys of being in Stan/Eval. I knew what I had to do, but that sure as hell didn't make it any easier. A very long pause ensued as we rolled down the taxiway.

"Okay, crew, I'm starting to think we had better just take this one back in and talk to the D.O." At that moment, one of our fine brethren airlifters called us up and sent us to Winchester.

"Hey, did you guys just land on the assault?" "Yep, that was us. What's up?" "Well, there sure were a lot of sparks (pause). Just thought you would like to know." "Yeah, thanks."

Like the song says, "I can see clearly now." But it wasn't gonna be a "bright, sunshiny day," and all the bad feelings weren't gonna disappear. Well, to make an otherwise long and circuitous story short, we all were downgraded and will receive some extra-special up-close-and-personal training — which we rightly deserve.

So how, you may ask, did two evaluator pilots and an instructor engineer manage to accomplish such a heinous and gawdawful thing? I believe it was a combination of complacency, distraction, "checkride-itis," and fatigue.

First, *complacency* caused by a breezy, sunny autumn day, two highly experienced crew dogs in the two front seats, just a quick assault takeoff, VFR pattern and a little squeak in the zone and the checkride would be over, short and sweet — NOT!

Second, *checkride-itis*. It seems one of the highly experienced crew dogs had a little trouble with gusting winds on that first attempted assault into the zone. Blood pressure and adrenaline squirting right on up there, yessirree. "Gotta get this next one in." "Boy, I sure hope he gets this next one in — I REALLY don't want to bust this guy."

Third, the kicker — *distraction*. "This looks kinda steep to me," "You're number three to follow..." "Jody umpty-ump, cleared for takeoff," "Eng, did you close the bleeds?" "Tower, say winds." Busy patterns and radios were the icing on the cake. One little radio call right when I ALWAYS, ALWAYS, ALWAYS recheck my configuration made me forget it completely.

Fourth, and last, *fatigue*. This was the engineer's third 0300 show flight of the week.

Hopefully, you can see how a combination of small, almost insignificant factors coincided to affect each of us differently but with a synergistic effect of $842.77 worth of tailskid and urinal drain. Complacency was my downfall, checkride-itis hit the guy taking the checkride, distraction plagued the pilots, and fatigue dogged the engineer.

How many of these factors are affecting someone on your crew every time you fly? Make it your business to find out! ■

DOUG BROSVEEN
Investigation Instructor, SCSI

3 MISHAP INVESTIGATION Three Techniques, One Story

■ ***Technique #1:*** When writing your pre-mishap plan, resist the temptation to assign yourself key tasks, coordination roles, or time-dependent jobs (such as sending the 8-hour message). Why? you ask. Because if your commander is at all like mine, the first thing he wants to tell headquarters is, "My safety person is on scene." Addressing a message is difficult to do when you're standing in a swamp up to your armpits trying to avoid feeding the alligators.

Technique #2: Do not *ASSUME* anyone responding to the mishap knows what to do or will do it the way you want it done. We are dependent on crash-rescue, EOD, environmental management, security police, mortuary affairs, public affairs, and many others to do their jobs timely and correctly. When in doubt, *don't assume* — ask!

Technique #3: Stay alert for new techniques or tools that will help you do your job as mishap investigator faster and better. You will never have enough time to do the job the way you'd like to.

Now the story. The obnoxious telephone sitting next to the alarm clock that showed 12:33 a.m. rang at least five times before I could answer it. The voice on the phone was from the command post. "We've just lost a helicopter in the desert with three fatalities." Struggling to get my tongue and brain coordinated, I told them I would be in within the hour, and I would need a support helicopter 30 minutes before dawn to take at least 10 people and myself to the crash site. The voice said, "The wing commander has already told headquarters *YOU* are en route to the site tonight, and your helicopter will be ready to leave in 35 minutes."

Thirty minutes later, I stumbled into the command post where I found I was to be the only one going to the site. "Do you need anyone else tonight?" *"No, but here's a list of folks I'll need at first light. For now, I'll get by with the people that are on site."* "The helicopter crashed in a very remote area, and there is no one on the ground at the site." *"If there is no one on the ground, how do we know all three crewmembers are fatalities?"* "Because the HC-130 said so." *"In the middle of the night at 200 feet and 150 knots?"*

"Would you like to talk with the 130?" The HC-130 AC quickly confirmed the message he had originally passed was there was *no sign* of survivors. *"Stop the music! I'm not going to any crash site in the middle of the desert and middle of the night alone if there is any chance of survivors. What would I do — wrap them in my wreckage diagram charts and tell them to wait for morning? People dying in my arms because I can't help them is not my specialty. I want at least two paramedics on that helicopter with me."*

The medics were recalled, and while I was waiting for them to arrive, I started thinking of the futility of stumbling around the desert in the dark for 5 hours. That's when I got an idea. *"I want two pair of NVGs to take to the crash site."*

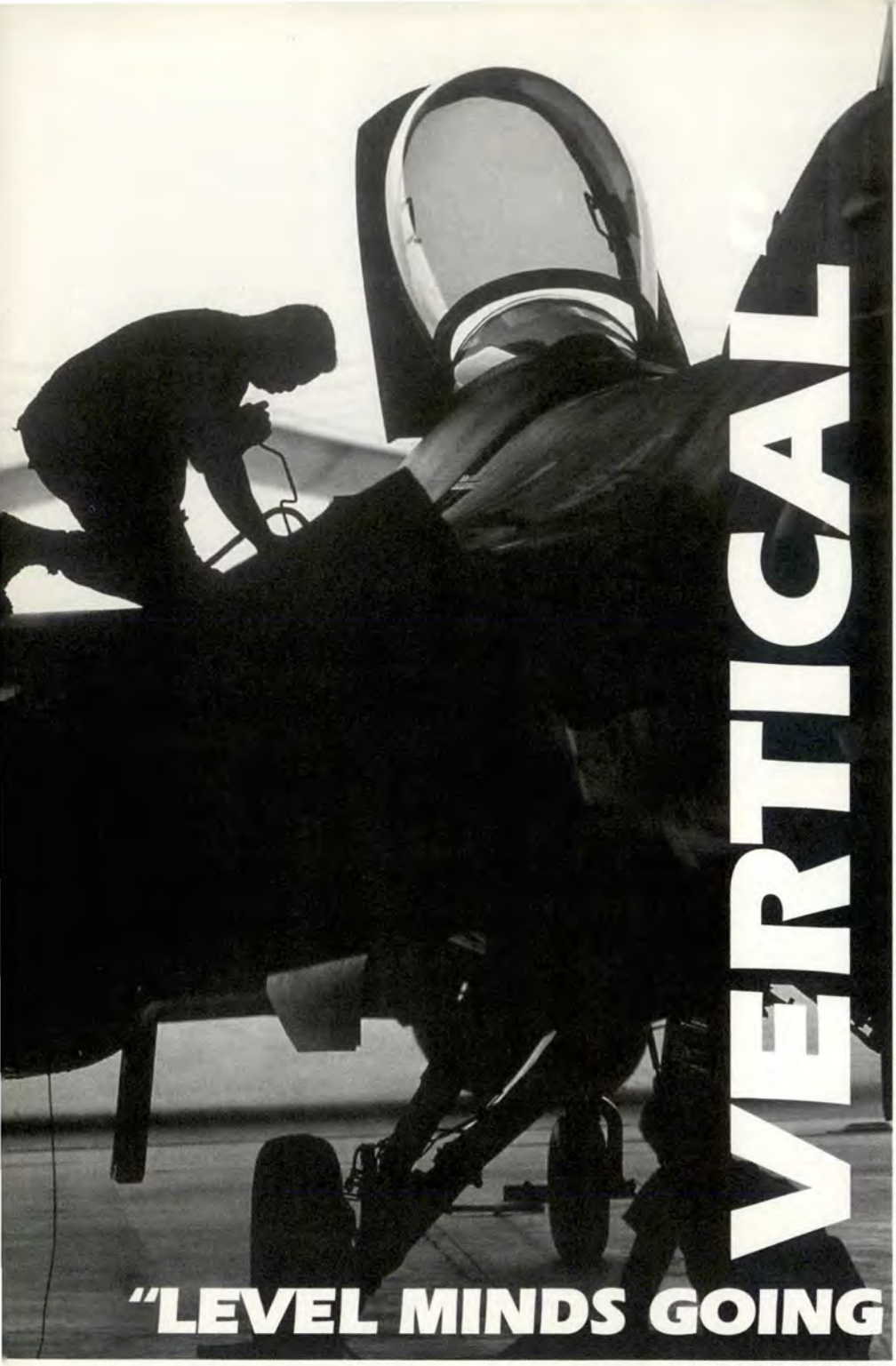
When we got to the site, unfortunately, the medics were not needed, but they did help me use the NVGs to complete the wreckage diagram of the site. This was fortunate because at first light, this *remote* crash site started to resemble a freeway at rush hour. TV trucks, trailers, campers, jeeps, motorcycles, and a scout troop on horses all descended on the three of us standing in the desert.

This story is a true one, and, if you missed them, the three messages were:

#1. Don't task yourself to perform key jobs if a mishap takes place. When you are in the dark desert looking for the toilet paper in your investigation kit, you are not in a position to send the preliminary message report.

#2. Don't *assume* that other agencies have fully discharged their responsibilities at the crash site — ask questions. If you aren't qualified to help injured folks, bring medical personnel with you.

#3. Use every tool at your disposal to get the job done. Using the NVGs to measure ground scars and complete the wreckage diagram in the dark gave me time to concentrate on parking the thundering herd descending on me at dawn. ■



"LEVEL MINDS GOING VERTICAL

Photos by TSgt Perry J. Heimer

CMSGT DON A. BENNETT
Technical Editor

How is it possible that up to three or more responsible, mature, trained maintainers and/or task supervisors would each fail to do their jobs properly and directly contribute to a flight mishap? Well, it's happened many times in the past. Here's another one to add to the list.

■ An aircrew didn't appreciate the unexplained increases in their aircraft's roll rate and G-loading during turns. They weren't sure what the problem was, but they wisely decided to land their aircraft and let maintenance figure it out. It's a good thing they did!

What maintenance found is a nasty nightmare for any commander, maintenance manager, and, certainly, pilots. They discovered a horizontal stab had disconnected in flight and went vertical! The nut for the stab's actuator rod end wasn't installed properly, and a critical cotter pin was missing! Sound familiar?

A dozen flights before, maintenance had installed *both* horizontal stab actuators due to earlier cannibalization actions. The maintainers tasked to do the installations did everything in accordance with tech data — except torque the rod end nuts and install the cotter pins! No sweat though, because they made the proper aircraft forms entries to make sure the connections were completed.

Now, this is where this particular maintenance journey takes a few odd twists and turns to become an epic mishap odyssey — a journey strewed with complacency, poor judgment, miscommunication, and broken down maintenance procedures.

First of all, another technician came out and worked the **longitudinal input rod** which was usually written up for similar maintenance actions, **but not this time!** So why did the technician misread the forms and work the wrong components?

Worse yet, if there wasn't a discrepancy on the longitudinal input rod and nothing about it written up in the forms, then what, pray tell, did the technician work on? It sure wasn't the horizontal stab rod ends!

However, if, indeed, there was a discrepancy with the longitudinal input rod and the maintainer did, in fact, fix it, then why wasn't it written up in the forms? Anyway, the technician signed off the corrective action blocks for the disconnected horizontal stab rod end writeups but didn't complete the task.

Now comes the real heartbreaker. Another maintainer, who was a task supervisor and inspector, supposedly inspected and signed off the grounding condition. Again, someone misread the original writeups on the horizontal stab rod ends. He had to also miss the disparity between what was written up and **what was actually fixed!**

Our aircraft and equipment inspectors are entrusted with the "last

look" of a grounding or unsafe condition. Their credibility and integrity have to be above reproach. It's demanded they pay close attention to details, especially while interpreting the aircraft or equipment forms' writeups!

Next, a known requirement for followup of the horizontal stab maintenance by the quality assurance folks wasn't fulfilled. If a second set of eyes couldn't catch the faulty maintenance, then surely a third set would have. But quality assurance wasn't even brought into the loop.

This costly omission definitely points to a breakdown in some of the mishap unit's corps of supervisors' capability to carry out established policies and procedures. This leads to the last problem in this mishap development.

Where were the shift, shop, branch, or flightline maintenance managers (expeditor/production supervisors) during the course of the work or clearance of the mishap aircraft's forms? If the task was so critical that it had a mandatory followup by quality assurance, then why wasn't at least one of the maintenance supervisors or managers concerned enough to ensure proper compliance of the task? Also, why wasn't there an **automatic process in place** to ensure all applicable agencies and specialties are notified of critical tasks such as this one.

Because of a shortage of spare parts, the mishap unit had been cannibalizing and reinstalling a lot of the horizontal actuators, so this critical task wasn't a rare occurrence. They should've had the procedure down to a science. That includes inviting quality assurance over for a peek at the completed work. What happened to that old, well-proven procedure of cutting a work order for the primary work center and automatically issuing work orders to secondary work centers *and/or* quality assurance for certain writeups, i.e., cann actions?

Hopefully, the mishap unit is regrouping after this mishap and solving a few problems. In the meantime, a lot of fliers, maintainers, and family members are extremely thankful for the safe, quality cultures all you other commanders and maintenance managers have developed or are in the process of developing. You all know the proper organizational attitude and mindset will prevent these senseless, organizational breaches of maintenance discipline.

Well, you *are* developing such an environment, aren't you? If not, then your unit is a prime candidate for having a serious ground or flight Class A mishap — caused by "level minds going vertical." ■

Recently a wing commander had an ominous feeling something wasn't right, but didn't know exactly what it was or what to call it. It was just that ol' sixth sense telling him something was lurking about, just waiting for the right time to appear in the form of a ground or flight Class A mishap. There were a few "actual" events, minor in nature, that probably helped raise the hairs on the back of his neck. These little hiccups didn't meet any mishap categories, but they did serve as early warning signals that something wasn't right.

You'd be concerned, too, if some of your best maintainers, known for always turning a quality wrench, were involved. Add to that, these minor events could've been deadly if the conditions were just right!

Anyway, this commander wasn't about to wait and see what it was — especially during the course of a formal mishap investigation. So he asked for help within his staff and from folks outside the wing to assist in identifying the reasons for his uneasiness. Other actions included a complete stand-down in the wing's busy flying schedule and devoting an entire day to rehashing safety issues and processes.

Smart move, Sir — a check-and-balance search for complacency.

AN UPDATE FROM THE BASH TEAM

MAJ DAVE ARRINGTON
HQ Air Force Safety Agency

■ The USAF Bird Aircraft Strike Hazard (BASH) Team — what the heck is that? And what does it have to do with you? For those of you who have had close encounters with our feathered friends, you may have some idea. For everyone else, well, laugh it off and read on for enlightenment. But I think you might be surprised.

How serious is the bird strike problem? The numbers speak for themselves. Each year, over 3,000 bird strikes are reported with damage averaging over $50 million. Since 1987, the USAF has lost 14 aircraft to this problem. Eleven crewmembers were killed, and there were several permanent injuries.

Keep three things in mind:
1. **Wildlife can/has ruined many a flier's day.**
2. **The BASH Team exists solely to help make your flying safer.**
3. **There are ways to reduce the risks you face.**


Official USAF Photos

We know almost all bird strikes occur at 2,000 feet AGL or less. (See figure 1.) We also know that nearly 70 percent of bird strikes occur in the airfield environment, with a little less than 30 percent during low-level flight. (See figure 2.) By identifying strike remains, we can determine what species of birds we hit by time of day and year.

At this point, you are probably thinking, "So what! This is nice info, but how does it help me in the cockpit?"

It helps you in two basic ways. First, we know where to concentrate our research and program management efforts. Second, we can give you do's and don'ts during your mission to reduce your risk of a catastrophic strike. Let's start with the team.

What is the USAF BASH Program mission, and what are we doing for you? Our mission is the preservation of war-fighting capability through risk management of wildlife hazards to aircraft operations. We do this through three distinct programs: intervention, avoidance, and tolerance.

Intervention

Intervention is just what it implies — taking direct action to manipulate the birds themselves. This takes place at the airfield and involves habitat manipulation, bioacoustics, and pyrotechnic techniques for bird control. Remember that 70 percent of the strikes occur around the airfield, so much of our time is concentrated in reducing that risk. We provide staff assistant visits to evaluate the base and surrounding habitat and provide information on bioacoustics and pyrotechnic (frightening) techniques.

In most cases, if the base manages habitat properly and has a bird control team for frightening, bird and mammal (BASH deals with all wildlife problems) strikes can be reduced to a minimum. The important thing to remember is that we are managing to reduce flocking and the numbers of large birds — it's impossible to discourage all species.

Although only 30 percent of bird strikes occur during low-level flight, 70 percent of all damage is done in this flight regime. The energy equation says it all: E = 1/2 mass x velocity squared. For example, an aircraft traveling at 500 KIAS, striking a turkey vul-

ture (the most commonly struck bird), equals 1.5 million foot pounds of energy. That equates to one nice piece of antiaircraft artillery. There isn't an aircraft made that won't suffer damage from such an encounter. Obviously, we cannot manipulate the bird habitat in our military operating areas (MOA) and low-level training routes. Thus, avoidance becomes the only solution, and that's where we have our biggest challenge.

Currently, we have developed a Bird Avoidance Model (BAM) which predicts or gives a relative risk for any visual or instrument route. We can also give a general analysis of ranges and MOAs. The problem with this current model is that it requires each unit to call us with requests for analysis by our low-level expert. In other words, there is a time delay between request and delivery. Plus, it's rather restrictive since it analyzes the entire route as a single entity, rather than by leg segment.

Thus, we are developing a user-friendly, WINDOWS-based system that has incorporated updated bird migration data and will include many new species. This new model will be loaded on CD ROM to be sent to every unit for time-effective route/range/MOA analysis. The model will allow crews to call up a map showing bird hazard locations with route overlay and intensity based on time of day, year, and desired flight altitude. The crew can then select a leg-by-leg analysis to determine appropriate actions to minimize the risk.

But it doesn't stop there. Routes can be built (MOAs/ranges) by simply activating the crosshair (mouse) and selecting the desired route points over the risk map that avoid high concentrations of birds. The model will then complete a leg analysis for comparison. You can also enter preplanned routes for MOAs or ranges by lat/long and modify points that fall in high-risk areas. We hope to have this model available in early 1997.

Avoidance

Avoidance in the traffic pattern is an important issue. Although it is fairly simple to control birds directly on the airfield, it is entirely different for those passing over or near the runway. Bird conditions in the area are passed to aircrews via Bird Watch Conditions code. There are three levels. **Light** — bird activity is at normal low intensity, and flying activity is not impacted. **Moderate** — birds are in the immediate vicinity, and transition should be limited to minimum requirements for training. **Severe** — extreme bird activity which should cancel all transition training and limit landings to straight-in full stops. Launches should only be mission-essential sorties.

I know what you're thinking at this point. "What determines the bird intensity levels?" This becomes somewhat difficult since each location is unique. But there are a few general guides.

First, if the bird activity is just a few scattered small species around the perimeter of the field, **Light** would be a good call. If there are soaring birds of prey (which includes vultures) near the field or pattern, or small flocks passing over the field, **Moderate** is in order. Large congregations of any bird in the vicinity, especially flocks of large birds, **Severe** is the call. However, here is an extremely important note: **Moderate** and **Severe** should be in effect only while birds are physically present. Once they depart the area, allow approximately 20 minutes, then return the bird-watch condition to **Light**. Maintaining a bird-watch condition of **Moderate** for the entire migration season does nothing to warn aircrews of current feathered activity and can lull them into thinking moderate intensity is normal.

Photo by TSgt Perry J. Heimer

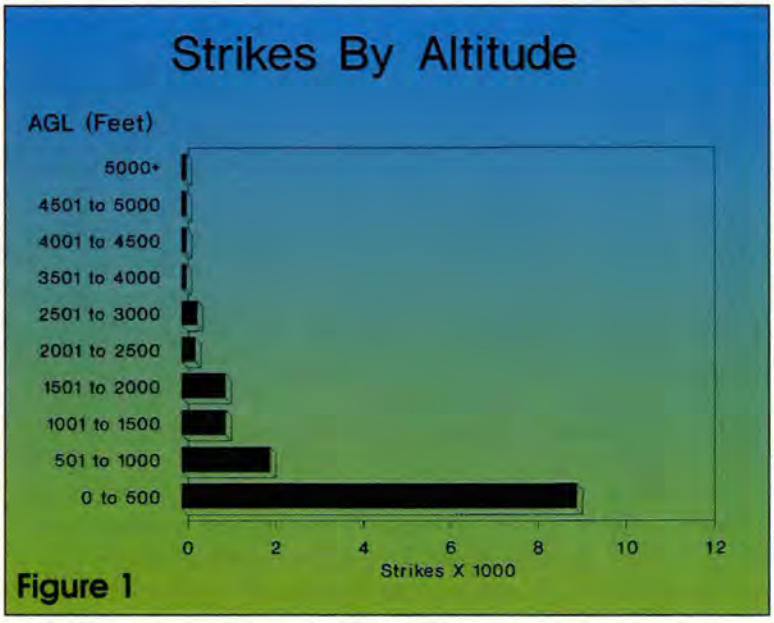


Figure 1

The Judgment Call

Who should be making the judgment call? That's a good question — the answer varies at each base. Here are some general guidelines to go by when establishing procedures.

Tower has the capability to relay information to an aircrew quickly. Thus, tower personnel should always have the authority to change bird-watch condition codes. It's their job to observe airfield activity at all times, and they can inform crews immediately if there's a hazard.

ATIS should be used to broadcast infor-

continued

Avoidance in the traffic pattern is an important issue. Although it is fairly simple to control birds directly on the airfield, it is entirely different for those passing over or near the runway. Bird conditions in the area are passed to aircrews via Bird Watch Condition codes.

BASH TEAM continued

mation on current activity. This will give an aircrew a heads-up on what to expect. Aircrews should advise tower of any bird or animal activity observed while flying or taxiing and advise tower that an upgrade of the bird-watch condition code is warranted. Base ops, primary supervisory officers, and flight safety officers who observe bird activity should have the authority to call tower and change the code. Crews transitioning in the area should advise tower of any potential hazards for relay to other crews. Bottom line — time delay is the enemy.

Preventing Catastrophic Damage

Even with the best BASH program imaginable, some bird strikes will occur. With this in mind, aircraft components are, and will continue to be, designed to withstand impacts. That doesn't mean the strike won't inflict damage, but catastrophic damage will, hopefully, be prevented or, in extreme cases of engine ingestion, contain the damage to allow safe egress.

As an example, B-1 windscreens are designed to take a 4-pound bird at 550 KIAS and not fail. F-16 windscreens have been upgraded to withstand strikes above 500 KIAS. The T-38 community now has a 4-pound, 400-KIAS windscreen available. These new windscreens have saved more than just a few lives.

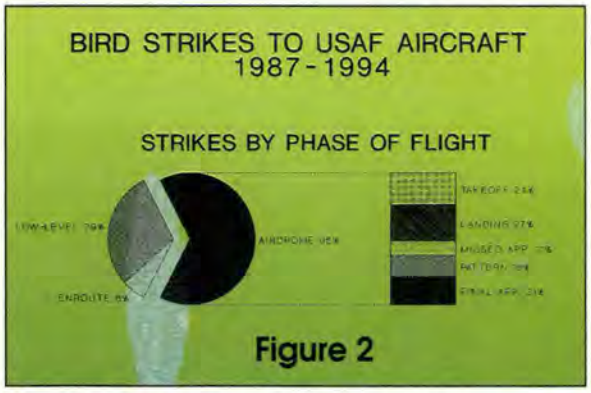


Figure 2

The vast majority of birds, including waterfowl, migrate at night. The sunrise and sunset rule is probably a little easier for schedulers to live with for times to avoid, but excluding night flying during spring and fall just isn't going to happen.

The folks in Aircrew Protection at Wright-Patterson AFB, Ohio, are responsible for this technology. They work closely with the BASH Team to obtain strike statistical data. This data is used to determine strength criteria based on the type of birds likely to be encountered. This is a dynamic field. For example, we know heavy weight specie populations are on the increase and will likely result in component criteria changes. We regularly discuss these issues with Wright-Patterson AFB to ensure the most accurate data is available for design engineers.

What You Can Do

The above info is nice and dandy, but you're thinking, "What can I do in the cockpit right now to help myself?" There is quite a bit you can do to help protect yourself and your aircraft. Let me start by saying this: There is method to the madness related to birds' feeding and migration patterns.

First, if you're going low level, use our BAM to get an idea of the relative risk. Your wing flight safety shop should have BAM information for your use.

The next step is knowing a few basic rules of times and locations to avoid if possible. Generally 1/2 hour before until 1 hour after sunrise and 1 hour before until 1/2 hour after sunset are peak activity periods. During migration season, you can also include the hours of darkness. The vast majority of birds, including waterfowl, migrate at night. The sunrise and sunset rule is probably a little easier for schedulers to live with for times to avoid, but excluding night flying during spring and fall just isn't going to happen.

However, keep this in mind: Peak migration activity is likely to occur just before and after a major weather frontal passage, especially during the fall. Also, migrating birds tend to fly at higher altitudes. Thus, being 1,000 feet AGL during night low level is probably no better than 500 feet AGL.

For those with NVGs or FLIR capability, abort the route when activity is observed. If a handful is on the move, very likely there are many thousands right behind them. Again, the best bet is to avoid the area if the BAM indicates the risk is high.

During midday, raptors or birds of prey are a risk to you. These birds like to ride thermals or hang on the windward side of cliffs or hills. Keep a close eye when approaching ridgelines or in areas where thermals are likely. Raptors have taken more lives and destroyed more aircraft than any other group of birds.

Avoid water, or at least overfly at the highest altitude possible. Where there is water, large birds will be nearby.

Last, if birds are observed in the pattern, LAND!

By now you have a very general idea about BASH hazards and the team dedicated to you. This article just scratches the surface of what we are doing and what you should know to reduce your exposure. In future writings, we will take single subjects and explain each in detail to make you familiar with every aspect of the potential wildlife hazards you face. ■

TOO HOT FOR OUR COMFORT

CMSGT DON A. BENNETT
Technical Editor

With the onset of hot weather right around the corner, here's a recap of a physiological mishap. It contains a timely reminder for all passenger (pax)-carrying aircrews, air terminal managers, flightline managers, and pax service personnel.

■ An airlifter crew was scheduled for a midafternoon en route departure from a southern base. The outside temperature was approaching 90°F (anyone who works on the ramp knows it's a lot hotter on a sun-beaten flightline than the "official" temperature), and the humidity was notoriously high.

Predeparture duties included loading approximately 70 pax. This took an unusually long time to accomplish because of a pax service transportation problem. Instead of one mass pax load, the pax were to be transported out to the jet in small groups.

The first conversation between the mishap loadmaster and flight engineer concerning the troop compartment temperature occurred prior to the arrival of the first load of pax. However, **there wasn't a lot of concern yet**. It was considered normal for the inside of the aircraft to get warm when outside air temperatures were high and the sun blazed down on dark-colored aircraft.

There was an additional problem. Only one of the aircraft's auxiliary power units (APU) provided cool air. It was routine, during pax loading, to shut down the APU on the pax-loading side of the aircraft. And every time another load of pax arrived at the aircraft, the APU was shut down again. Naturally, the time taken to load the pax didn't allow the nearly crowded troop compartment to cool adequately.

After the last of the pax had boarded, the aircraft commander (AC) expedited engine start in order to cool things down for the crew and pax in the back. Nevertheless, during the taxi out, the mishap loadmaster advised the AC the troop compartment temperature was still too high, and there was little or no airflow entering the compartment. This prompted the AC to have an on-board crew chief dispatched to the environmental compartment to manually adjust the troop compartment shutoff valve. **The crew chief quickly found the adjustment screw head of the shutoff valve had been stripped and *could not* be adjusted with a screwdriver!** While all this was taking place, the troop compartment loadmaster reported to the AC a couple of passengers had fainted.

At this point, if you really stop and think about it, doesn't it sound reasonable the mishap **would** happen? Imagine — a hot, stuffy troop compartment, full of warm bodies, with little or no air circulating!

The aircraft was immediately returned to the parking ramp. The AC had all the necessary rescue resources scrambled to render aid to the heat-stricken passengers. (After block-in, and during the pax offload, a quick-thinking loadmaster rendered first aid to an unconscious, convulsing passenger by administering oxygen from a portable oxygen bottle.) In addition to the passengers who passed out, there were many others experiencing symptoms of heat exhaustion. Luckily, everybody fully recovered after a short period of fresh air and cooling down.

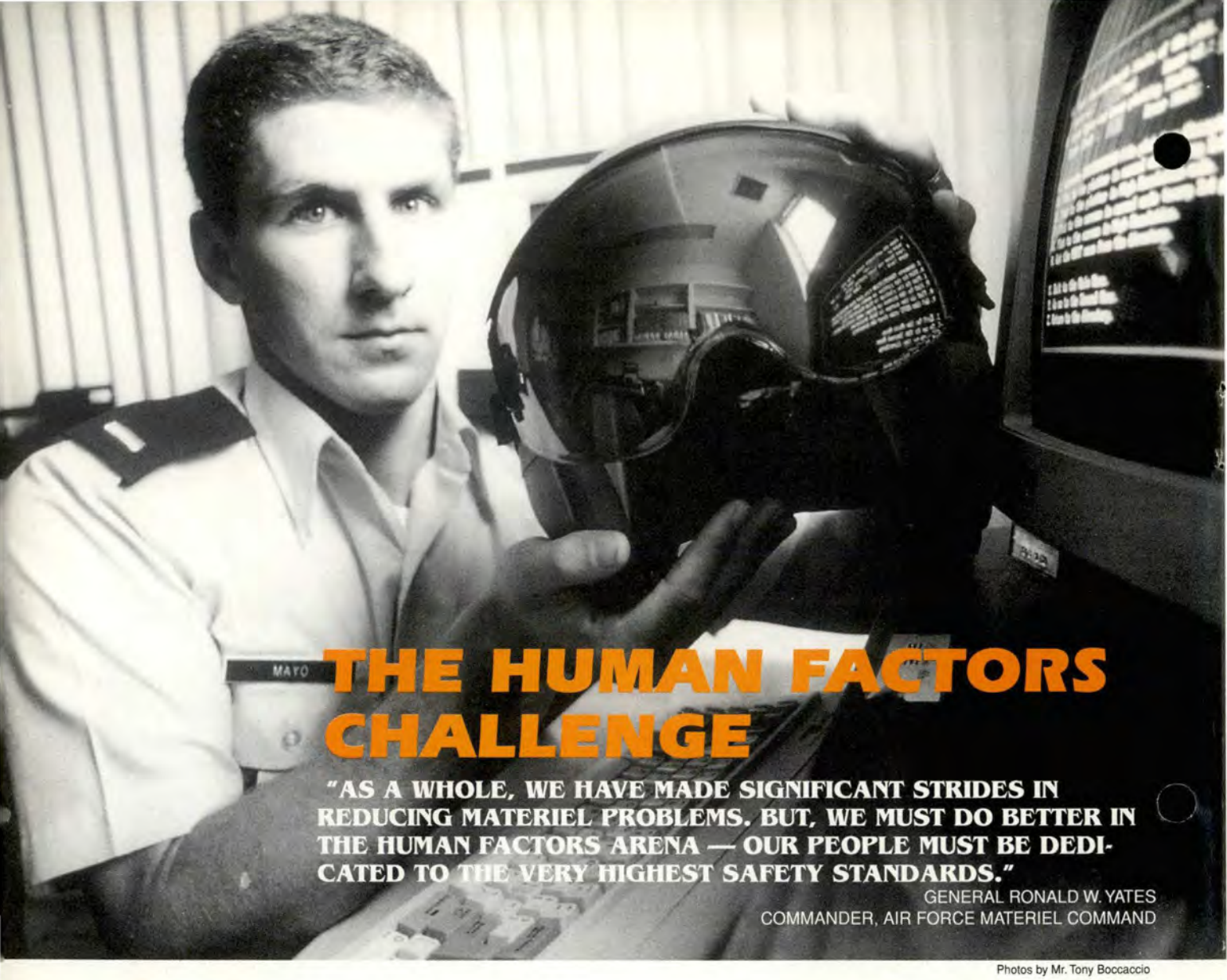
Of course, we weren't there, and maybe we don't have *all* the facts about how everything came together to cause the mishap. Besides, it's not polite to do some "armchair hindsighting," but there's still a few nagging questions that beg for answers.

First, where was the portable ground air conditioner? The aircraft commander, loadmaster, maintenance production supervisor, or the pax service agency could have considered the additional time necessary to load pax would probably warrant **additional** pax health and comfort considerations, **especially on a hot ramp!** Dispatching a portable ground air-conditioning unit to the jet so cool air could be ducted to the troop compartment would certainly have helped prevent this physiological mishap.

Secondly, why wasn't the loadmaster a little more aggressive in "warning" the cockpit crew of the overheated troop compartment, **e.g., of the inadequate airflow condition?** Probably, effective communication and coordination between the cockpit and troop compartment would have better illuminated the potential for a physiological mishap if the hot and stuffy condition of the troop compartment wasn't eliminated.

Lastly, why didn't the maintainer(s) who last adjusted the troop compartment shutoff valve write up and/or repair the valve's stripped screw? Had the valve been properly adjusted and cool air allowed to enter the troop compartment during the extended pax loading operations, the mishap probably wouldn't have happened!

What's the important thing to remember from this mishap? Foremost — **it wasn't unique!** Hot (and, for this discussion, adverse) weather, equipment failures, human errors, broken down processes, and difficult cargo and pax loading activities have, and will always, cause some occasional problems or mission delays for aircrews and ground support personnel. Maybe we lose our safety focus when we begin to deal with the problems with a "routine" mindset or attitude. However, we just can't afford to treat even the simplest problems as routine lest we invite the onset of complacency. And we all know when complacency becomes routine, then things can *really* get **"too hot for *our* comfort"!!!!** ■



THE HUMAN FACTORS CHALLENGE

"AS A WHOLE, WE HAVE MADE SIGNIFICANT STRIDES IN REDUCING MATERIEL PROBLEMS. BUT, WE MUST DO BETTER IN THE HUMAN FACTORS ARENA — OUR PEOPLE MUST BE DEDICATED TO THE VERY HIGHEST SAFETY STANDARDS."

GENERAL RONALD W. YATES
COMMANDER, AIR FORCE MATERIEL COMMAND

Photos by Mr. Tony Boccaccio

The human factors arena is a big challenge, and there is a role for Air Force professionals at every level. The potential for growth is limitless, and if the the Air Force is to remain the world's foremost air power, it is critical!

PEGGY E. HODGE
Managing Editor

■ The key to preventing a potential mishap is involvement. The Air Force Materiel Command (AFMC) is involved—from the design stage, to the test stage, to operation, to system retirement. A profile of the command and its Human Systems Center provides a look at some of the things the command is accomplishing in the human factors arena—an area Air Force Materiel Command is striving to do better in.

The Command

AFMC is an integrated team delivering and sustaining the best products for the world's best Air Force. It is the principal organization responsible for managing *every* aspect of *every* Air Force weapon system from inception to final disposition.

The Air Force activated the command on 1 July 1992 when they combined the Air Force Logistics Command and the Air Force Systems Command. Headquartered at Wright-Patterson AFB, Ohio, it directs approximately 118,500 military personnel and civilian employees—including most of the Air Force's scientists and engineers—in laboratories, product and test centers, air logistics centers, and specialized centers.

The command directs four laboratories at the heart of its basic research efforts. AFMC promotes dual-use technology partnerships and Cooperative Research and Development Agreements (CRDA) with industry. A Cooperative Research and Development Agreement is an agreement between an industrial or university partner and a federal laboratory. That agreement is to cooperate in an area of research where both can benefit. There is no contract or money exchange.

Four product centers use the science and technology from the four major laboratories to develop and acquire systems.

New equipment or weapon systems are then tested and evaluated at one of the three test centers. Each test center has world-class facilities not found elsewhere in the Defense Department and sometimes nowhere else in the world.

Once fielded, weapon systems receive depot-level maintenance and overhaul during their life cycles at one of the command's five air logistics centers.

And finally, the command's specialized centers focus on critical areas such as basic research, cataloging the science of weights and measures and standardization, metrology, security assistance, and "retired" weapon systems.

The Human Systems Center

The Human Systems Center's (HSC) guiding principle is to make the human the heart of aerospace systems and operations. It is the Air Force's home of science and technology related to the integration of human concerns in Air Force systems. Recognizing that people are the key to all Air Force endeavors, the HSC focuses on human-centered research, development, acquisition, and aeromedical operational support.

The HSC's customers are virtually every man and woman in the Air Force and increasingly those throughout the Department of Defense. Now more than ever, with President Clinton's Defense Conversion initiatives and technology transfer programs, HSC customers also include nondefense commercial industry.

The "HSC is considered a line organization," Col Thomas G. Smogur, Director of the Commander's Action Office for the Center, explained. "We are not a medical organization even though there are a lot of medical people involved, and we do a lot of medical things.

"We're about half civilian and half military with one-third medical personnel and two-thirds line personnel. Our mission is scientific and technical work. Of the 3,000 people in the HSC, about 1,000 are scientists and engineers. About 40 percent of our scientists and engineers have PhDs or their equivalent medical degrees.

"Our motto at the Human Systems Center is 'There are No Unmanned Systems.' There are many systems which apparently are automatic, for example, cruise missiles, but there are no unmanned systems because there are people involved. Our job is to make sure the warfighter is more effective. We do that by providing human-centered technology."

As one of the oldest Air Force organizations, dating back to World War I (see HSC's History), the HSC's equipment, training products, and operational techniques make today's warfighters and support people far more capable than those of just a few years ago.

HSC's people work in five areas to meet current and future human-centered operational requirements. They are Crew Systems and Life Support; Human Resources; Aerospace Medicine; Environment, Safety, and Occupational Health; and Environics.

The Crew Systems and Life Support area accomplishes research and develops, fields, and supports technology and systems to optimize human combat performance and survivability. They also work to ensure weapon systems configurations are compatible with human operator requirements. Examples of their work are the laser protection and personnel susceptibility (see this issue of *Flying Safety*, page 22); advanced technology anti-G suit (see *Flying Safety*, September 1993, page 13); the universal water-activated release system; and spatial disorientation countermeasures.

The Human Resources area accomplishes research and develops, fields, and supports unique manpower, personnel, and training technology and systems. Its work includes pilot candidate selection method (includes testing), training for situational awareness, and night vision device training research.

The Aeromedical area provides research and specialized operational support in aeromedical consultation, epidemiology (a branch of

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The Spatial Disorientation/Altitude Training Chamber and the Centrifuge Trainer are just two examples of technological accomplishments designed to help optimize human combat performance and survivability.

"By considering the human capabilities and limitations beginning with weapon system conceptualization, we can eliminate the human as the factor which currently restricts our combat capability," said Gen Yates. In aircraft mockups such as the one pictured above, aircrew are given the opportunity to recognize human limitations of a particular aircraft.

medical science that deals with the incidence, distribution, and control of disease in a population), drug testing, and hyperbaric medicine. They also develop, field, and support aeromedical systems and equipment. Examples of their work include hyperbaric medicine (see *Flying Safety*, September 1993, page 2); HIV screening process (see *Flying Safety*, September 1993, page 21), and disease outbreak investigations.

The Environment, Safety, and Occupational Health (ESOH) area assesses risks to people from hazardous materials, noise, electromagnetic radiation, and occupational processes in USAF operations. Examples of their work include safe drinking water act implementation, indoor air quality, air force ergonomics, and toxicology research and development.

And, finally, the Environics area provides environmental quality technology by reducing the cost of cleaning up waste sites. Environmental quality efforts at Tyndall AFB, Florida, centers on low-cost, highly effective ways to prevent environmental problems and restore existing facilities. Its work includes microorganisms used in biodegradation, biodegradable solvents and cleaners, and solid rocket propellant disposal program.

The Challenge

Human factors criteria are paramount in the operation, maintenance, and support of our weapon systems. As General Yates has said, "By considering human capabilities and limitations beginning with weapon system conceptualization, we can eliminate the human as the factor which currently restricts our combat capability; we can maintain our weapon systems faster, smarter, and cheaper; we can train our people better, in less time, with higher efficiency; and we can make our systems safer for the operator, the maintainer, and the noncombat environment."

The future of the human factors arena holds many challenges for the Air Force. Its potential as a force multiplier is limitless. But if the Air Force is to remain the world's foremost air power, we must be a leader in the application of human factor principles. ■

HSC'S HISTORY

■ The HSC traces its origins back to 1918 when the Medical Research Laboratory was formed at Hazelhurst Field, New York.

■ In 1922, this laboratory was redesignated the School of Aviation Medicine, and 4 years later, it moved to Brooks Field which was a center for primary flight training.

■ In October 1931, both organizations moved to Randolph Field. The school moved back to Brooks during the summer of 1959, and the base became the headquarters for the Aerospace Medical Center the same year.

■ Brooks became the Aerospace Medical Center headquarters in October 1959. This was the first step in placing management for aerospace medical research, education, and clinical medicine under one command.

■ In November 1961, both the school and center were reassigned from Air Training Command to Air Force Systems Command and assigned to the new organization, Aerospace Medical Division (now HSC). The Center represented the initial step in placing the management of aerospace medical research, education, and clinical medicine under one command.

■ On 21 November 1963, President John F. Kennedy dedicated four buildings housing the Aerospace Medical Division headquarters and the Air Force School of Aerospace Medicine. It was his last official act before his assassination the next day.

■ In 1986, the Department of Defense began streamlining its organization as a result of the Packard Commission recommendations. This division's acquisition mission emphasized its human-centered technologies. It restructured its functional areas and was renamed the Human Systems Division on 6 February 1987.

■ In December 1990, the Air Force Systems Command underwent a major restructuring which consolidated 16 laboratories nationwide into 4. Brooks AFB and the Human Systems Division became home of one of the "super labs." The new lab, named the Armstrong Laboratory, is a world-class center for the science and technology of protecting peole in Air Force systems.

■ On 1 July 1992, the Human Systems Division was renamed the Human Systems Center as part of the structuring of the new Air Force Materiel Command. The command was activated 1 July 1992 when the Air Force Logistics Command and Air Force Systems Command were integrated.

THE BEST JOB IN THE AIR FORCE

USAF Photos by TSgt Perry J. Heimer

Air Force aeromedical airlift supports all US military forces. In less than 36 hours, a patient from anywhere in the world can be delivered to a specialized medical center in the United States.

DOROTHY SCHUL
Editorial Assistant

■ The people responsible for this effort are highly qualified flight nurses and aeromedical evacuation technicians whose jobs are critical to our Air Force mission. A detailed look at their training program, their many responsibilities, and a talk with the type of flight nurses working in the field today will show you just how they are able to accomplish their mission.

"Our responsibility here at the school (especially with the new curricula) is to teach our students what to expect when they arrive in a contingency or war environment. They're probably not going to see the beautiful C-9 with a red cross on the tail, and they might not see the traditional C-130 or C-141. They're probably going to see nontraditional aircraft being used for aeromedical evacuation. These nontraditional aircraft include the C-5, KC-135, KC-10, and sometimes the C-12, C-21, and the C-27. In the near future, the C-17 will provide aeromedical evacuation services. At all times, the most important component of aeromedical evacuation is to weigh the risks of flight with the benefits of flight."

This quotation is from Colonel Karen D. Kimmel, Chairperson of the Department of Aerospace Nursing at the USAF School of Aerospace Medicine, Brooks AFB, Texas. In the past, she and her staff of 12 taught seven classes a year, 80 aeromedical evacuation technicians and nurses in each class. With more emphasis being placed on advanced clinical skills and one-on-one teaching, they are testing a program of 17 classes per year with 32 students each. The course lasts 5 weeks and 2 days.

During this time, special emphasis is given to trauma assessment and nursing care of the patient at altitude. Training is composed of academic instruction coupled with practical exercises simulating operational conditions. Also included are the effects of alti-

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Photo by SrA David Locker

Col Karen D. Kimmel, Chairperson, Department of Aerospace Nursing, Brooks AFB, Texas, enjoys telling about the distinguished history of aeromedical evacuation nursing. "We've been at this for a long time ... The first evacuation occurred in '43, was 6½ days long, and covered 11,000 miles."

tude on the students as crewmembers and on their patients; how to plan and administer aeromedical evacuations; patient management; how to operate aeromedical equipment; how to accomplish safe patient transport on nontraditional aircraft; medical survival techniques; and medical aspects of nuclear and chemical defense operations.

The school also teaches a course in battlefield nursing, a 1-week course, taught six times a year. Much more skill-intensive, the training is designed for nurses going to a combat environment where there will be minimal traditional medical support and lots of roughing it.

Experienced nurses from Vietnam, Desert Storm, and Mogadishu have added their wisdom to this course over the years. The main emphasis is not just on what the hands do (starting cutdowns, inserting tracheostomies, putting in chest tubes, etc.) — it's on how nurses and senior medical personnel can successfully deal with the stresses of nursing in a battlefield environment.

Aeromedical evacuation crews perform their wartime mission on a daily basis, from transporting routine patients on scheduled C-9A flights in the States to special humanitarian missions overseas on C-141B and C-130 aircraft.

A whole day is devoted to the psychological preparation nurses must have before they go into this environment. A lot of triage and clinical skills are taught, as well as lessons learned from other nurses' experiences. Details may change with each battlefield, but the fundamental emotional and psychological challenges nurses will face remain the same from conflict to conflict.

Prospective aeromedical evacuation personnel must be prepared to deal with their feelings. During peacetime, medical care in this country can accomplish the phenomenal. Most people, especially young and healthy people, can be saved. But in war, medical personnel will patch up 18- and 19-year-olds so they can go back into battle. Some are probably going to die. The time to start thinking about this is not in the middle of a combat environment but during training. That is what they introduce at the school.

"Our role is to patch them up and send them back to fight again ... and that's hard. By nature and our profession, we want to save everybody....However, there are times when you're doing triage, you can't save everyone, and you have to make yourself walk away. You know you have the skills to save the soldier, but in the time it would take for that one individual, you could save three others. That's a very, very difficult concept for someone trained in and oriented to a peacetime environment."

This troublesome concept must be thought about and discussed before medical personnel get into combat. It's an opportunity to work through feelings in a controlled environment, even if the bottom line is to say "My psyche cannot handle this." Some-

times career changes must be made.

"In the aeromedical arena, there has been a decided push to go far forward — more toward the front lines than we have ever been before."

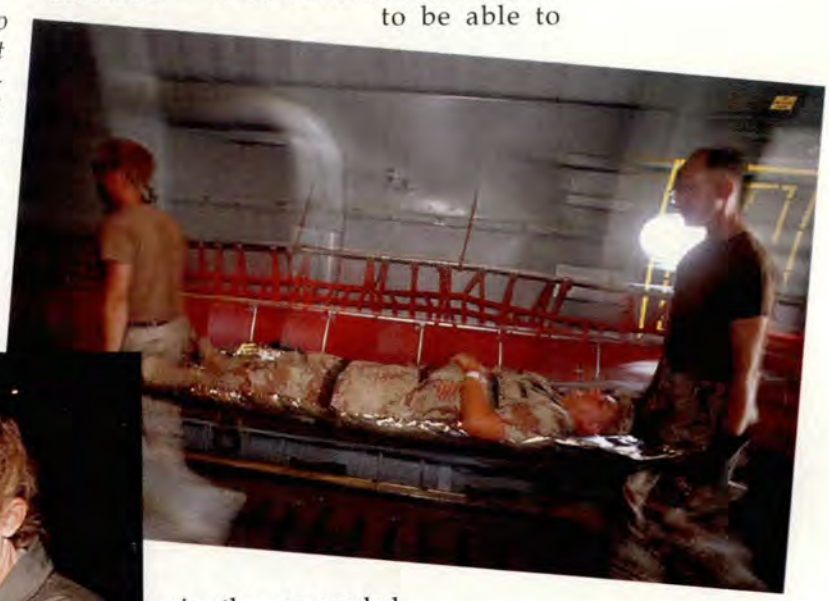
Col Kimmel told of one of her staff nurses who served during Desert Storm. At briefings, the nurse revealed how fearful US medical people were when exposed to incoming shells, not knowing whether the Patriots would take out all of the SCUD missiles. Courses taught at the school will never remove that fear, but students will be given confidence in their training and have the tools they need. This is just one of the reasons the teaching staff believes they have the **best job in the Air Force.**

"In aeromedical evacuation, we have to go where the patients are collected. In Desert Storm, several times our aeromedical crewmembers were forward of the security police. We had people responsible for their own perimeter defense, responsible for tying in with Army and Marine support per our doctrine for water, food, and fuels for their generators. Rapidly advancing with the ground war, we had aeromedical crewmembers finding themselves in different roles than they traditionally had in the past."

Each aircraft has its challenges as far as how the mission is performed. Students must be taught what to expect. It's important they learn respect for the capabilities of each type of airplane and what physical stresses should be anticipated.

"...We're looking at C-5s, KC-135s, KC-10s, anything that will get us across the pond until the C-17 and aeromedical evacuation Civil Reserve Air Fleet (CRAF) B-767 stands up in larger numbers...we teach students, when they show up on the tarmac — like what happened in Desert Storm, or more recently in Mogadishu — with large numbers of very serious, very recently stabilized patients, how to interact in an airborne environment on an airplane they've never seen before."

In addition to the classroom courses, there are three airplane mockups (C-130A, C-141B, and C-9A) prepared with stanchions to hold litters, as many as five high, to teach methods of caring for patients in tight, unsterile quarters. (See "Aircraft Mockups.") The top litter could be far above the head of a medical crewmember. If a wounded or seriously ill patient high up needed special care while airborne, a nurse would have to find a foothold, shinny up the litters, or use the ladder — whatever resource is available to be able to give the care needed.



Where there are large deployments of US military personnel, aeromedical personnel will be nearby. In Somalia, deployed aeromedical evacuation crews evacuated sick and injured personnel to hospitals in Europe and the United States.

Under the best circumstances, there is an opportunity to do a load plan and figure out which patients will need the most care. They need to be at waist level, eye level, or working level. Going into a hot loading zone — a place you need to get in and out of quickly — the door is opened, patients are hurried on, and the airplane is out of there. Patients can be rearranged for their needs later.

Good coordination with ground personnel is extremely important so those in the Mobile Aeromedical Staging Facility know how to help position patients. Once the litter bearers are there, they have to be told which patients to take first.

"...Some people wait years to get a position in our courses, so we usually have very motivated, dynamic classes."

To become a flight nurse, you must be a registered nurse on active duty with the U.S. or allied forces, or a member of the Air Force

continued

THE BEST JOB IN THE AIR FORCE

continued

Reserve or Air National Guard, and you must be physically qualified. The Flight Nurse Course and Aeromedical Evacuation Technician Course prepare you to function as an aeromedical evacuation crewmember aboard aeromedical evacuation missions.

These courses include an intensive study of altitude physiology, how it applies to the crewmember as a healthy individual, and how it might affect patients. Changes in barometric pressure and a decrease in oxygen pressure, dryness of the air, noise, fatigue, vibrations, and thermal factors affect a patient's well-being, and the student learns how to counteract these stresses.

If a nurse gets personal satisfaction in providing care and treatment in land-based hospitals, aeromedical evacuation is an even more rewarding assignment. You'd have a hard time convincing those who choose it they don't have the **best job in the Air Force.** ■

AIRCRAFT MOCKUPS

C-130

"...The aircraft comes in with weapons, beans, and bullets...then you reconfigure from the top..."

The C-130 has, perhaps, the most primitive setup, but it is the airplane of choice for Major Leslie Johnston, USAF NC. It's a cargo aircraft, but after the cargo is offloaded, it can be configured any way according to the needs of the patients. The C-130 can land almost anywhere, and some countries don't have runways or landing strips.

Maj Johnston said, *"Half the time we didn't know where we were going or what we would find when we got there....They didn't have runway lights in one place and wanted to put smudge pots out for us so we could land....We thought we'd wait for the sun to come up."*

Maj Johnston was Chief of Aerovac in Panama for about 3 years, covering from the tip of Mexico to the tip of South America. She once flew with a C-130 aircrew to the coast of Honduras to bring out patients. As part of the government agreement, garbage couldn't be buried there. Personnel would put their garbage on a pallet, save it, and the first airplane to go in would have the privilege of bringing it out. So patients were placed all the way to the front, and the garbage pallet was all the way to the back. The pilot turned the air conditioning up to make it smell better in the airplane. Patients were covered with blankets, and the medical crewmembers sat in their jackets and huddled.

Col Kimmel: *"Airflow doesn't sound like a big deal, but if you're going to be flying for several hours, you definitely want to know about airflow!"*

Medical personnel must know how air flows in various aircraft — front to back, up and down, whichever way it goes. At times, there may be patients with contagious diseases such as tuberculosis on board. It's important to know where to position them so other patients are not exposed.

"Mention the word 'tailswap' to any nurse, and they go AAARGH!!!"

One of the worst things to happen is to have your aircraft configured for your patients just like you want it and then there's a

maintenance problem. You have to take everything off and put it all on another airplane. You must know what kind of electrical current the new aircraft has, whether your medical equipment is compatible, how to get out the emergency equipment on board, and how to use it. There have been occasions when two or three different types of aircraft would have to be swapped out before patients could be brought to the aircraft.

C-9

The C-9A gives a very stable ride. For a nurse, it's the Cadillac of aircraft — you just plug medical equipment in and that's it. Flight nurses can sit near their patients. If there is someone they are really worried about, they can put a litter strap around their waist, put another strap through the clamps on the litter stirrups, and stand to take off and land. Nurses do this with respiratory patients or newborn babies. Col Kimmel stated that of all the patients she had over the years, newborn babies made her very nervous — they are extremely susceptible to the stresses of flight and their condition can deteriorate very quickly.

C-9 missions can be grueling for flight nurses and aeromedical evacuation technicians. *"The C-9, especially domestic, can have from six to nine takeoffs and landings each 16-hour period."*

Traditional domestic missions are a maximum of three 16-hour days. Col Kimmel told of days, flying in this aircraft, when she would go through a complete 100-degree cycle of weather changes. Starting at Scott AFB, Illinois, it might be12 degrees below zero with the wind chill factor. Flying down through the southern route, she would finally land in California. There it might be 100 degrees. She would find herself peeling off layers of clothes and putting them back on again. If she got caught in a rainstorm out on the flightline while bringing on patients, she would be soaked to the skin. At altitude, it's cold!

During Desert Storm, the C-9 flew with litters four high because there was a large number of patients coming into Andrews AFB to be filtered out in the continental United States. Whenever possible, the most critical patients would be at the center litter level where it was possible to perform CPR if necessary. The ambulatory patients were seated in the back of the plane. The C-9 can carry 40 litters, or 40 ambulatory patients, or any combination of the two.

C-141

Col Kimmel: *"The C-141B is the strategic workhorse for aeromedical evacuation. They get across the pond, but the missions are long! Atlantic flights can last up to 12½ hours at high altitude. After 2 hours, there's less than 4 percent humidity in the air, your throat hurts, your eyes hurt, and your skin feels like leather."*

This aircraft is for patients who require sophisticated care and evaluation at large medical centers in the United States. There are no other military aircraft at this point in time that will do, in the same volume, what the C-141B will do. Ambulatory patients are up front, the litters are configured toward the rear. Patients can be rotated in flight.

The C-141B is a long aircraft, and it's a good distance for litter patients to walk to the bathroom. Nurses spend a majority of the trip helping people down off of litters, getting them up to the comfort pallet in front where they can use what is similar to a commercial aircraft restroom, and back to their litters.

The C-141 is an aging fleet. Now C-17s are coming on line. The replacement ratio of the C-17 for the C-141 is a one-for-two replacement. The C-141 can easily carry 70 litters. The C-17 is probably going to have somewhere between 24 and 48.

"THE HAPLESS MAJOR: EX-PILOT EXTRAORDINAIRE"

We all know somebody who had the makings of a brilliant Air Force career, but for some reason they didn't quite make it. They just rambled along, year after year, until they finally retired or separated from the service. Even then they didn't have a clue as to what it really took to be one of the best — pilot, maintainer, noncommissioned officer, or officer. Not that being "The Best" is an absolute prerequisite for closing out one's career. But think about it. Would you want less than "The Best" working on your aircraft, flying the aircraft you're on, or performing surgery on your ticker?

CMSGT DON A. BENNETT
Technical Editor

■ *This story begins with some old golfing buddies sitting around chatting over a bucket of coffee. They hadn't even teed off when a thunderstorm blew in. Now was a time to embellish some old worn-out tall tales. One of the golfers, a retired Air Force major, had been tight-lipped for quite some time. When he finally chimed in, silence swept over the assembled duffers. His story was about an incident which took place late in his military career — a story they all had wanted to hear because it was a closely guarded secret. They all charged their coffee cups and settled back to hear a story from the hapless major: ex-pilot extraordinaire.*

The story began when he was a highly experienced veteran combat pilot and an "old head" major. He had just transferred to an old base where his new squadron was flying a new aircraft with a new mission. Transitioning to all this new stuff was a cinch for the major because, as he profoundly exclaimed, *"You really can't teach an ole dog new tricks!!!"*

"Why? We old timers have done it all. We've been there before! And where we haven't, we just rely on our vast knowledge, real-world experiences, and the ole noodle to get us through it! 'Improvise!,' my Daddy always used to say, 'and when ya can't, just confuse 'em with b___s___!' So I did — all my life", he chuckled aloud.

The major said he soared from unqualified copilot to instructor pi-

continued

lot with ease. Even so, he agonized over the new aircraft and its new mission being more like a cakewalk when compared to the *"flight through hell"* missions he had done in the past. He used to teasingly tell bosses and peers they needed to do some serious, down-low dirt work, or "fly Nam" so they could humbly and graciously appreciate *"a real military aviator"!*

His intimidation tactics must have worked. Nobody questioned him about anything he did or said. The seasoned major was virtually placed on a gigantic pedestal. *"Even got to thinkin' of myself as the old, wise, father-guru of the squadron, especially with all those youngsters. Ya know, those sparklin' clean, uncorrupted, newborn second louies. Oh, how they loved my war stories!"* he howled.

Then his face became long and sad as he explained that soon everything became routine — no excitement to really crow about. Then boredom set in. *"And ya know what happens when we get bored, don't ya?* he questioned. *"Yep, complacency comes next."*

The major didn't stay in the books because he thought he already knew it all. He didn't stay on top of his flying skills or his weaknesses because he was, after all, an experienced, high-time pilot. *"An air warrior!"* he shouted.

The major didn't stay in the books because he thought he already knew it all. He didn't stay on top of his flying skills or his weaknesses because he was, after all, an experienced, high-time pilot.

But his bout with complacency had become so bad that even some of the Grand Instructor's brand spanking new students would point out his errors, both on the ground and in the air. Of course, they were too embarrassed to make a big deal of his mistakes because of who he was. And naturally, his ego wouldn't let him make a big deal of the mistakes either. The old war vet thought those simple, little errors were just temporary brain dumps. Not to worry. He could get *the edge* back anytime he wanted.

Then the inevitable happened. The Great Guru got knocked off his feet for doing something pretty stupid. You see, he had come to the point where he really didn't like most of his students outflying him or knowing more about the flight manual than he did. So he resorted to doing some of that impromptu, sporty, eye-watering sort of flying. He knew he still had that old derring-do moxie in him. So he just had to let his crew (and especially his young pilot upgrade student) know he wasn't over the hill yet. And that

was exactly what the major said he was trying to do one day on a routine mission, *"...flyin' over hill and dale. Low levelin', that is. Strictly taboo, but, by golly, it sure impressed the crew."* It impressed them so much they wanted everybody to know just what the new aircraft was really capable of doing, *"with, of course, a real pilot at the controls!"*

Unfortunately, when the major's aerial feat got back to his boss and the Commander, well, he kinda got his wings clipped. *"Shoot! I was an unqualified copilot before. So what? I'd just climb up that ladder again. No sweat!"* he exclaimed.

The ex-Grand Instructor did eventually climb up again, but not as fast as he thought he would and certainly not as high as he had previously been. They didn't give him his cherished instructorship back, but he did get to command an aircraft again. The major remembered he wasn't even the least bit embarrassed by all the scuttle either. Anybody else would be, especially when faced with meeting a flight evaluation board to basically determine if he or she was responsible, mature, and honest enough to continue flying. But not this guy! *"I was back in the wild blue yonder. That's all that mattered. I was happy,"* he exclaimed.

Did he learn anything from being busted? Heck, no! The old major was still the best, experienced pilot (in his opinion!), and his pride wouldn't let him think otherwise. Anyway, he went a while and kept his snoot clean until...

There he was — the last day of a week-long mission — just one more refueling stop, then home. So far, the trip had gone great. He and his crew were working well together and hacking the mission. No problems, no shortcuts, no ego trips.

As he and his copilot were mission planning, a phone call came across the base ops desk for them. Their wing command post ("Mother" is what he called them) wanted them to add another short en route stop on the way home. *"In order to pick up some classified materials — some real important stuff,"* the controller reported. The major had weakly pleaded for a reprieve but was told his crew was the only one available. Okay, fine! Back to the flight planning board he went.

He recalled he really didn't mind the extra stop too much, but his crew got a little wiry, especially his young right seater. It seems she had some preplanned personal business to attend to and would have preferred to *"stay on schedule, thank you."* But she *was not* that upset! Nor did she make a big deal of it!

He recalled he really didn't mind the extra stop too much, but his crew got a little wiry, especially his young right seater.

Still, the major recounted, he wanted to seize the enforced mission divert as a golden opportunity to overwhelm his crew with his *"acute ability to adapt to any situation."* But he withheld his new flight plan idea from the crew — a brilliant plan that would carry out the new mission leg *and* still get them home as scheduled! Sadly, the next chain of events would prove to be career-ending for the overconfident aviator.

Once at cruise, the major sprung his surprise. He literally shocked the crew with this announcement. *"Co, get ahold of Center and request a change in altitude to two-zero-zero. We're goin' high and catch the jetstream goin' south!"*

This could eliminate the regular en route refueling stop and get a crew home a few hours earlier. But flying a low-and-slow, unpressurized aircraft at such altitudes meant going on oxygen. And when several crewmembers challenged the major's decision with a few concerned questions, he was already prepared with his answer.

continued

"Yeah, yeah, yeah, I know some pilots, too, who thought 'bout doin' this, but they never did 'cause they're sissies. Don't have 'the right stuff' to go the limits. And yeah, I'm aware we'll be suckin' on the hose for over 4 hours. But I lived on the hose in Nam and was gettin' shot at too! So all of ya just pipe down, hook up, and let's get this baby home!" the major responded to the now chastised crew. The new altitude was approved by Center, new waypoints were punched in, and off they climbed.

Everything was going fine until they encountered some headwinds. Not much, but certainly not the tailwind he was looking for — any resistance at all would certainly cut into their safety margin on fuel. The crew grew a little concerned as time passed. But not so with the done-it-all-been-there major. He had everything under control, on course, on time.

As their alternate fuel base neared, the young copilot dared to ask the elder command pilot if they should go ahead and put down for gas. She might as well have slapped him instead. Having been personally insulted, he firmly answered back, *"Never question the planned actions of an experienced pilot unless you see the ground fillin' your windshield. Other than that, everything else is based on experience, knowledge, and skill. Something you haven't acquired yet!"*

However chided she felt, the recently upgraded copilot still didn't like the situation at hand — **not at all**! Bravely, she again challenged the major. And again, she was rebuffed, but with this caveat *"And if you're so sure of your calculations, and still think I'm wrong, then take control of the plane and set her down for gas. If not, then just sit back and learn a thing or two."* The copilot shut up after those words. If the major didn't budge a bit on his position, then he must know something her relatively inexperienced mind hadn't caught on to yet.

As their alternate fuel base neared, the young copilot dared to ask the elder command pilot if they should go ahead and put down for gas. She might as well have slapped him instead.

"As I look back on that moment, that lieutenant would've let me fly her to her grave. Her eyes kept gettin' bigger as time, and our fuel, passed, but she wasn't 'bout to test me again! Too bad. She had some very legitimate concerns — had that fuel usage rate nailed down to the ounce, but didn't have the nerve to continue challengin' me!" the major told his very attentive audience.

As life would have it, if the major didn't have bad luck, then he wouldn't have any luck at all! Things got worse as the ominous mission continued. The winds weren't exactly what he expected nor did the en route weather help any. *"Plus, there was tons of traffic in the air that day, and Approach Control had us 3 days from Sunday out in the middle of nowhere!"* he continued while beads of sweat poured off his brow. The major must have been reliving the experience at that point. He was obviously agitated that unanticipated outside forces came to bear down on his otherwise perfect plan.

The crew's skin was crawling by the time the "DESCENT" checklist was called for. While the others

wouldn't take their eyes off the fuel gauges, the copilot was literally, but silently, screaming at herself for allowing the flight to continue. They were past the point of no return, and the alternate airfield was now useless. They were *all* really committed now!

Of course, everybody's anxiety clearly showed, except the major's — if he was even experiencing any. Strictly business as usual. The copilot wondered how he could remain so calm. She also worried about whether the rest of the crew would ever forgive her for not standing her ground with the overbearing aircraft commander. The lieutenant promised herself, if she survived this nightmare, she would *never* get into a situation like this again. Later, she would end a long period of silence with *"... Please hear our prayers. Thank you, Lord!"* There were several loud *"AMENs"* heard from the back of the aircraft.

Finally, as the minutes ticked by in hour increments, the copilot got a chance to redeem herself. The fuel status turned critical which should have warranted an "emergency fuel" condition call to Approach Control. When the lieutenant mentioned such a call was in order, the only reaction she received from the major was a polite *"No, it's not necessary. We're almost on the deck now."* The major will never forget her reaction to that statement.

"I wish I hadn't said that to my inexperienced, young copilot. Obviously, she was frightened. Never been on the leadin' edge before. The least I could've done was let her have a little something her way. But, hell no, I had to go and slap a sleepin' gorilla!

"Boys, she almost came right out of her seat, and she was lookin' at me with killer eyes! Whew! I'm lucky to be alive to tell y'all this! Anyway, she went ahead and made the emergency fuel call. But what an embarrassment! It was unnecessary, but what can I say? Ya can't soar with eagles when you're stuck flyin' with turkeys like I had!" he ended with a laugh.

The traffic controllers cleared

their way, and the aircraft finally reached the runway. A tremendous wave of elation overtook the crew, except for you know who. The major just kept on performing his duties and would shake his head in disgust as he witnessed the verbal and nonverbal acts of celebration from his crew.

But you could've heard a pin drop as a fuel-starved engine shut down, **by itself**, as the aircraft pulled in the parking spot!

"Guess nobody really cared to listen to my side of the story before jerkin' me 'round like they did. First, the bosses back home wouldn't let me continue the mission. Next, I was summarily grounded — forever! Me! The best pilot that outfit ever had, for sure! Then came the choice to retire or stay 'round and listen to some unpleasant music. So, here I am!"

The major just kept on performing his duties and would shake his head in disgust as he witnessed the verbal and nonverbal acts of celebration from his crew.

When the major paused, all his buddies were left frozen. He knew he had tugged on their heartstrings a little. But he wasn't done. Oh no — he had finished the story only up to his nonvoluntary retirement. Now came the long-awaited explanations of "how come" and "why now." He proudly sat straight up, then started off smartly."

You know, fellas, there finally comes a time when we have to get slam dunked to learn from our past mistakes — a point in time when ya are forced to realize enough is enough. And lately I've had to finally face the truth 'bout my military flyin' career. For what started off to be a brilliant career ended abruptly many years later on a sour note. I lived too long on my past laurels and never grew up. Even as the Air Force evolved over the years, I stayed in the past. Now I know what it really takes to be a true professional pilot in the United States Air Force!

"But it's all over now. Too late. Now my only absolute sense of satisfaction after 20 years of service is that it finally ended without gettin' myself or someone else killed!" He let out an audible sigh of relief, then slumped back in his chair. The room remained quiet.

He looked like he was resting for a few minutes, then suddenly the major jumped up, clapped his hands, and woke up his buddies with *"Now, let's go get a couple of rounds in before the sun goes down!"* Everybody was surprised by that statement because, as one of them simply observed, *"But there's still lightning out there!"*

"Come on, guys! You're not goin' to let a few flashes keep ya grounded all day, are ya? Hell, I've knocked many a ball 'round durin' lightnin' shows before. I remember back in..." The major's scolding faded as he led the group out the door.

The experienced, old-head major had finally awakened from the quiet, reserved life he led after retiring. Now he was back in the saddle, in command, had a crew, and was on a mission! However, the morning paper would herald his last and fatal bust: **"Four Struck by Lightning on Golf Course — One Dead, Three Injured"** ■

THE COMMERCIAL LASER THREAT TO AIRCREWS

Official USAF Photos

LT COL ROBERT LEE
HQ Air Force Safety Agency

■ There is a new hazard to flight safety in the form of commercial lasers. They are most commonly associated with casinos and other outdoor laser light shows at theme parks, large outdoor concerts, and fairs. Unfortunately, they can be more than entertaining — they can turn your night mission into an unforgettable flight.

While lasers can cause eye injury, our flight safety concerns revolve around the fact lasers can also cause flash blindness, dazzle, or glare which can startle, distract, and cause loss of situational awareness. They can also impair your ability to see through the HUD or windscreen. The following Air Force and civilian examples describe encounters with commercial lasers.

"On 15 June 1994, a flight engineer was illuminated and reported 3 to 5 seconds of flash blindness along with blur, pain, and sensitivity in both eyes which persisted for several hours. The laser was 3.5 miles away and within allowable power limits for commercial lasers."

While lasers can cause eye injury, our flight safety concerns revolve around the fact lasers can also cause flash blindness, dazzle, or glare which can startle, distract, and cause loss of situational awareness. They can also impair your ability to see through the HUD or windscreen.

"(On takeoff), at approximately 500 feet AGL, a laser beam of green light struck the right side window of my cockpit, striking my first officer (FO) in the right eye and blinding both him and me for approximately 5 to 10 seconds due to the intensity of the light beam. I immediately notified the tower controller (who stated) this had become a recurring problem with the laser show coming from the top of the (hotel) in Las Vegas. We were very fortunate because this could have been a much more serious situation had the laser struck myself as well as (my FO) at a more direct angle, severely blinding both of us and endangering the lives of my passengers and crew."

According to airline sources, Las Vegas has had more than 50 incidents with outdoor lasers, even with the required safety procedures in place. You might wonder how this could have come to pass. Despite the best of intentions, it was done legally using existing laser occupational safety standards. Unfortunately,

While the applicable agencies work the details in resolving the commercial laser issue, there are precautions you, as aircrews, need to take to minimize the likelihood of a flight safety problem.

what is safe for occupational settings (like laboratories or factories) may not always be safe for landing an aircraft.

A request to operate an outdoor laser is worked through the Food and Drug Administration's (FDA) Center for Devices and Radiological Health. It also goes to the FAA who develops power and airspace restrictions for laser use in navigable airspace based on national and USAF safe exposure limits called maximum permissible exposure (MPE) levels. MPEs are based on prevention of eye damage, not flash blindness or glare. Flash blindness or glare can occur well below established MPEs.

The distance from the laser at which the energy is equal to the MPE is called the nominal ocular hazard distance (NOHD). The NOHD is the distance from the laser where there is NO risk of eye damage. The FDA and FAA use the MPE and NOHD to determine if a laser is a flight safety problem to air traffic. If the traffic areas fall outside the MPE, the FDA and FAA approves the use of the lasers. Unfortunately, there is no standard the FDA or FAA can refer to regarding the effects of glare and flash blindness on flight safety!

As this problem "came to light" for the Air Force with the C-130 incident last year, safety, operations, and medical personnel came together with commercial aviation. Several meetings have taken place to quantify problems and work toward satisfactory resolutions for all parties. HQ USAF/XO has also formed a Laser Tiger Team involving all the services to investigate the scope of the problem to military aviation.

While the applicable agencies work the details in resolving the commercial laser issue, there are precautions you, as aircrews, need to take to minimize the likelihood of a flight safety problem.

■ **First,** identify where there could be laser light show activity. The Air Force Flight Standards Agency has recently published Procedures Bulletin 94-5 which directs aircrews to check in the back of the Airport Facilities Directory for the location of permanent laser displays including dates, duration, and eye-safe distances. Additionally, they recommend checking NOTAMs for permanent lasers, including the local NOTAMs for your destination, which should list the temporary laser light shows. This will require you to contact the destination Flight Service Station.

■ **Second,** avoid flying near areas where laser light shows are known to exist.

■ **Third,** if you encounter beams in the sky, avoid looking at them. Shield your eyes or deflect them away from the source.

■ **Fourth,** notify the controlling agency and the appropriate Air Force safety and medical personnel. If the laser hits someone in the eye and causes *any* problem, a Class C physiological incident report needs to be filed and the flight surgeon needs to be notified. Additionally, a high accident potential report needs to be filed.

This last bullet is critical to getting our arms around the problem. To date, none of the reported in-flight encounters with lasers has caused any permanent or disqualifying eye injury. Flight surgeons and safety officers are working closely on this issue, and they need to know the extent of the temporary effects experienced to try to build a case for better protective regulations.

We have a real threat out there which is in friendly hands, but we need your help in getting a handle on just how serious the impact could be to military aviation. We cannot do that without proper reporting. Nor can we defend new guidelines on limiting outdoor laser operations without factual reports of exposure. So if you "see the light (laser)," then see the light and report it and maybe save someone else from "seeing the light" and losing an aircraft. ■

This blue-green argon beam causes only a small amount of glare during the daytime. The laser is about 1.5 km downrange. The exposure is completely eye safe, about 5 percent of the USAF safety standard. If the laser beam was not colocated with the primary target, it is probable that glare would not significantly impair the mission. As the power of the laser increases, glare during daytime could become a problem. (Day and night versions pictured above.)

EN ROUTE NAVIGATION — THE NATIONAL ROUTE PROGRAM

AIR FORCE FLIGHT STANDARDS AGENCY

CAPT BOB FOWLER
HQ AFFSA/XOF

■ The future of en route navigation in the United States has recently taken a great leap forward. The FAA began its National Route Program for flights above FL390 on 9 January 1995. You ask, "What is the National Route Program? Why haven't we heard anything about it?" Well, this is it — your simple introduction to the current program and a quick peek into where all this is headed.

The FAA has been using area navigation (RNAV) for several years now. In addition to normal IFR equipment, RNAV requires a navigation system which allows aircraft operation on any desired course, between any desired points. The system can be either internally based (INS) or externally based (Omega/VLF, GPS, or a VORTAC referenced Course Line Computer). RNAV allows the pilot, under certain restrictions, to fly random routes, between departure and arrival transition fixes, off airways.

The National Route Program (NRP) the FAA is currently installing utilizes most of the same rules and requirements of RNAV. The equipment required is identical, as well as most of the rules for filing and flying this procedure. You must still plan the flight from a departure transition fix (or SID) to an arrival transition fix (or STAR). However, these fixes must be within 200NM of the airports used.

The biggest difference between RNAV and NRP is the requirement for NAVAID or Fix-Radial-Distance points. Random latitude-longitude points are not authorized under the NRP. Great circle routes must be flown between fixes, and one fix per Air Traffic Control Center must be filed.

While the NRP and RNAV sound alike so far, the first major change occurred 1 February 1995. On this date, the FAA lowered the altitude for NRP participation to FL370. All aircraft properly equipped and filing an NRP flight plan should be cleared as such. The next step allows aircraft departing and arriving at locations west of the Mississippi River to fly the NRP at FL350 and above, opening the areas east of the Mississippi on 1 May 1995.

If all goes as scheduled, the plan is to open more altitudes and areas on a monthly basis until, on 1 November 1995, all aircraft flying at FL290 and above can fly the NRP between any two airports.

Figures 1A and 1B show how the NRP will work. A flight from Hunter AAF, Georgia, to Columbus AFB, Mississippi, is currently filed: Direct SAV..DBN..MCN.J40. MGM..Delbe.. IGB..CBM. (See figure 1A.) Under the NRP, the flight can be filed: Direct MCN..CBM. (See Figure 1B.)

Figure 1a: Flight Plan using normal Route Structure

In the future, pilots will play a more active role in air traffic management decisions made to get an aircraft from point A to B.

The current provisions of the NRP are published in FAA Advisory Circular 90-91 and updated in FAA Notice N7110-128. Your MAJCOM airspace office should have copies you can consult, and the local Flight Service Station should have any phase-in restrictions. Also, check the FCIF and your local stan/eval for messages covering Air Force procedures and restrictions. NRP procedures will also be published in FLIP General Planning (by midsummer) and AFMAN 11-217 (formerly 51-37).

What's Next?

While the NRP seems like a great leap forward, you ain't seen nothing yet! The next generation ATC system will be interwoven with automation, an air traffic "manager," aircraft avionics, and the pilot. The new avionics will consist of Flight Management Systems (FMS), Mode S transponder, Mode S/VHF datalink, GPS, and TCAS. In the future, pilots will play a more active role in air traffic management decisions made to get an aircraft from point A to B.

The Free Flight Concept is based upon the integration of all current systems, a few under development, and new computers into a voiceless cockpit concept. The aircraft, using these systems, becomes a "flying bubble." In this bubble, the GPS will be integrated into the FMS with Mode S to let ATC know where the aircraft is going, while the Mode S/VHF datalink is used to pass messages, weather data, and ATC communications from the ground to the cockpit and the cockpit to the ground. The TCAS system will keep the pilot informed of other traffic both in the air and on the ground, allowing the pilot to avoid potential conflicts.

A moving map display will follow the route the aircraft is flying and includes a situational awareness display showing nearby airways, NAVAIDs, restricted and prohibited areas, as well as active MOAs. The system will also integrate a display used for full Doppler weather radar and conflicting traffic avoidance.

The Mode S/VHF datalink will keep pilots updated on all en route and destination weather or airfield problems, giving full graphic weather depiction charts if desired. All routine ATC communication will be via datalink. The system is also being programmed to provide continuous weather data from the airplane to a central weather facility without pilot input! This will provide better en route weather to all users as the computers receive more up-to-the-minute information. The last verbal communication the pilot hears will be "Contact departure" until the computer advises the pilot to "Contact tower" approaching the destination. The datalink will also allow the pilot and ground-based company to pass messages back and forth without ever having to transmit over the radio. The skies sure are going to be quiet.

With GPS and INS, the oceanic airways should also be easier to fly. SATCOM systems should have datalink capability, giving oceanic control better management of aircraft, allowing closer spacing between them. This should make using the jetstream easier for all airplanes.

While the National Route Program is just beginning, it is the first step in a much larger design. Next time you are flight planning, give it a try. ADW..BKW..FAM..BGD..EED..NKX is a much easier way to get from Andrews AFB to Miramar NAS than the traditional ADW..LDN.J134.J6.HVQ.J78.TML..NKX. The flight planning is similar, but programming an INS for the airways takes 18 points versus 6 using the NRP. Flight following will also be much easier, giving you more time to ensure the mission is running smoothly and relieving much of the stress on both you and ATC. ■

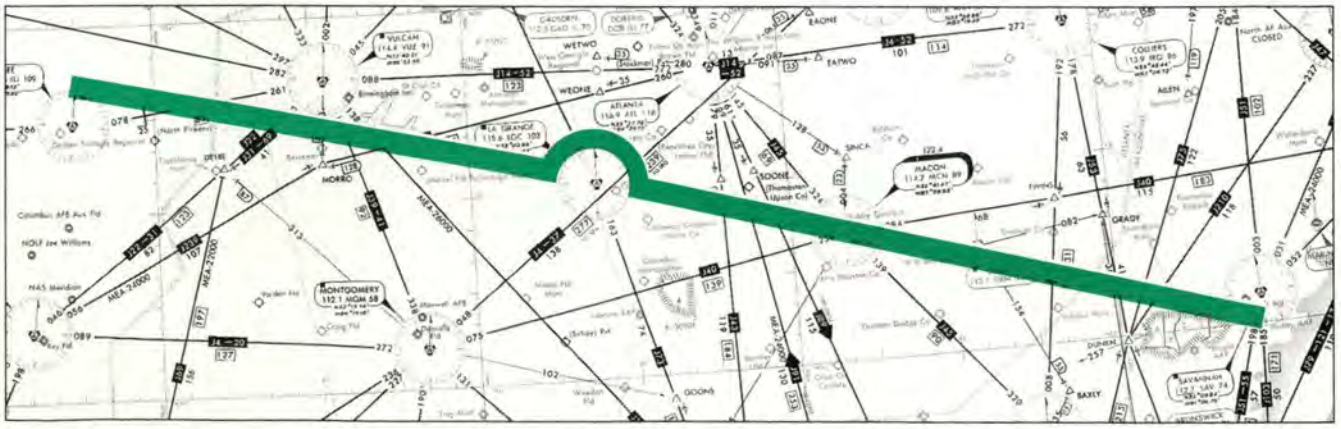


Figure 1B: Flight Plan using the National Route Program

It's back! The old IFC Approach quiz you used to know and love.

AIR FORCE FLIGHT STANDARDS AGENCY

MAJ BOB FOWLER
HQ AFFSA/XO

■ Now that the Air Force Flight Standards Agency has replaced the Instrument Flight Center, we have taken author's prerogative and renamed the article "Instrument Quiz" (our boss also told us to).

Take a look at the Enid Woodring Muni VOR or GPS Rwy 35 approach plate, and answer the following questions based on your knowledge of Air Force manuals, instructions, and regulations. The prize — if you get everything right — is the ultimate satisfaction that all your studying in flight school actually stuck. Enjoy the new quiz, and send any ideas or questions you would like to see in "Instrument Quiz" to HQ AFFSA/XOF, DSN 858-2126, or FAX DSN 858-3196. Now for the first quiz:

1. You are northeast of Pioneer VORTAC heading south on radar vectors. Vance Approach clears you to "proceed direct Pioneer VORTAC, cleared for the VOR Rwy 35 at Enid Woodring." When can you descend out of 4,000 feet MSL?

a. Descend now, the MSA is 2,800 feet, and so is the procedure turn altitude.

b. Passing Pioneer VORTAC, descend to 3,000 feet MSL, since the transition routing is part of the instrument approach procedure.

c. Outbound from ODG, established on a parallel or intercept heading.

d. Once established on the 228°R from Pioneer VORTAC.

2. You are under control of Vance Approach Control and the Woodring tower is operating. Vance altimeter is 29.84. What is the straight-in MDA for your Category D aircraft?

a. 1,560 feet, since Woodring tower is open.

b. 1,600 feet, since you have the Vance altimeter set.

c. 1,560 feet, if you get the altimeter from Woodring CTAF.

d. b and c above.

3. During your preflight planning, being a good pilot, you notice the VASIs were NOTAM'd inop. What is your Cat D visibility requirement now, assuming you are using Enid Woodring local altimeter?

a. 1 SM, the loss of VASIs have no effect.

b. 1 1/4 SM, the VASIs are considered a visual aid to landing.

c. 1 1/4 SM, the VASIs are part of the MALSR, and the note at the bottom of the page requires you to increase the visibility.

d. It doesn't matter; you don't go anywhere without VASIs.

4. When must you be configured for the approach?

a. Prior to commencing the procedure turn, since there is no final approach fix.

b. Before turning inbound for the approach.

c. Prior to getting clearance to land, since you aren't foolish enough to land without gear.

d. Prior to descending out of 2,800 feet.

5. You have decided to fly on the one IFR day Oklahoma experiences each year. Being prepared, you have coordinated alternate missed approach instructions with Vance Approach to climb to 4,000 feet, and at the departure end of the runway, turn right to proceed direct Will Rogers VORTAC. After establishing yourself on the inbound leg, Woodring tower advises you the weather just dropped to 100-foot ceilings and 1/8-mile visibility. What do you do now?

a. Either continue the approach as published, or level off at your current altitude, proceed to the missed approach point, and complete the published missed approach procedure. Let ATC know what you are doing when you get a chance.

b. Proceed on the approach as published, or level off at your current altitude and proceed to the VOR (MAP), climb straight ahead to 400 feet AGL, and proceed via the alternate missed approach instructions to 4,000 feet and Will Rogers.

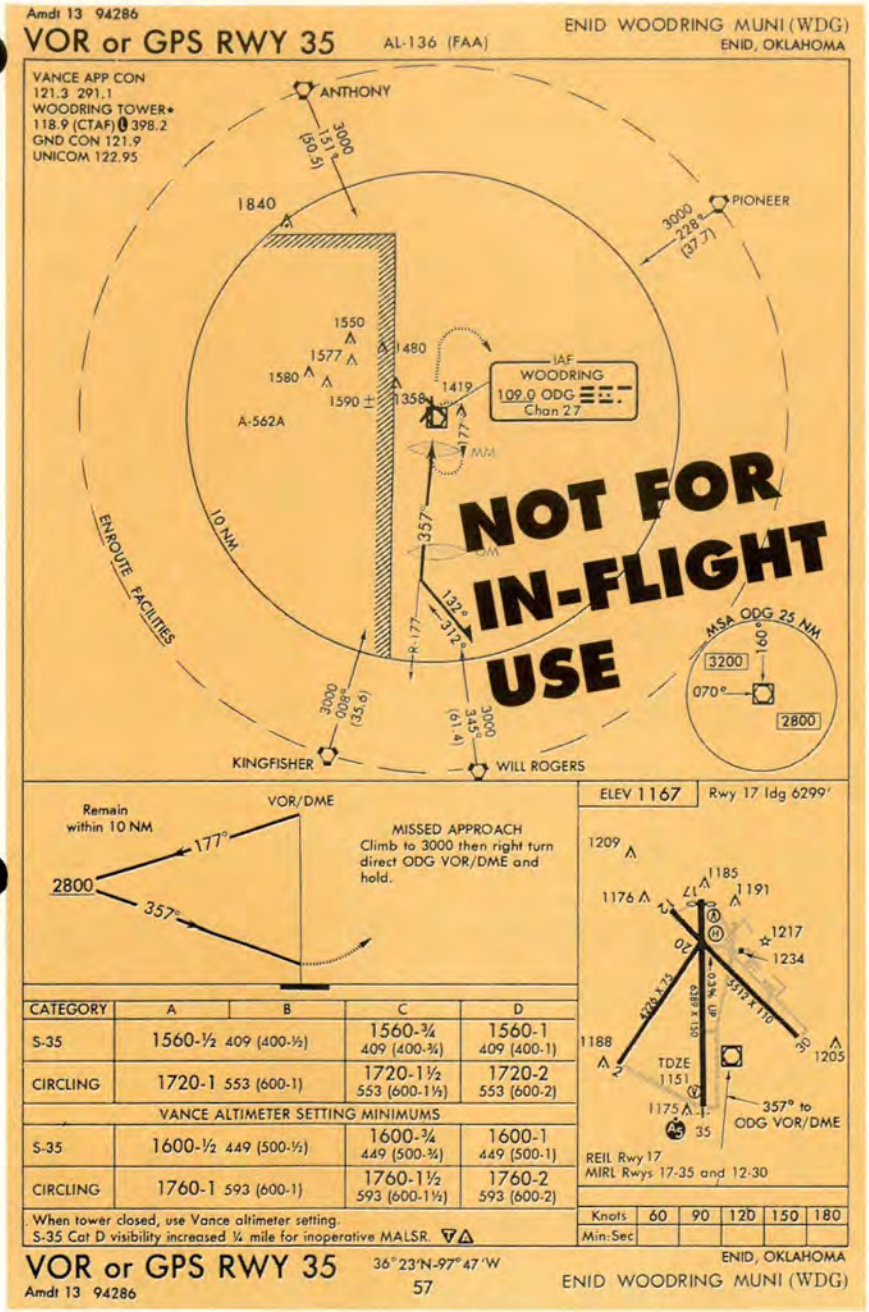
c. Pull up and get out of the area NOW, weather and Oklahoma can only mean one thing — tornadoes.

d. Either a or b above.

BONUS: What does the AL-136 (FAA) at the top of the Approach Plate mean?

ANSWERS:

1. **b.** AFM 51-37, 10-4c. Once cleared for the approach, maintain the last assigned altitude and heading until established on a segment of the published routing or IAP. In AFM



51-37, paragraph 7-6b(1)(e), published routings are defined as terminal routings from en route or feeder facilities that provide a course and range from the en route structure to the IAF.

2. **d.** The note within the Landing Minimums box allows lower minima if you have the local altimeter setting.

3. **a.** AFI 11-206, paragraph 8.15.2, and FLIP General Planning, Chapter 2. While AFI 11-206 does state that Visibility Minimums will be increased by ½ SM for instrument approaches conducted to fields with inoperative approach lighting, the GP definition and TERPs regulations do not consider VASIs part of the approach lighting system.

4. **d.** AFM 51-37, 12-2e and GP. AFM 51-37 — Establish approach configuration and airspeed before the final approach fix (FAF) unless your aircraft flight manual procedures require otherwise. GP Definition — Final Approach Point — "The point, applicable only to a nonprecision approach with no depicted FAF (such as an on-airport VOR) where the aircraft is established inbound on the final approach course from the procedure turn and where the final approach descent may be commenced. The FAP serves as the FAF and identifies the beginning of the final approach segment."

5. **d.** The answer may be either a or b depending upon whether your MAJCOM has published the AFFSA IFC/IS letter, dated 3 June 1993, changing AFM 51-37. The correct answer will be b once AFMAN 11-217 replaces AFM 51-37.

For both a and b, AFI 11-206, paragraph 8.14.2, with MAJCOM approval, allows a pilot to continue the approach to the MAP and land if the aircraft is in a safe position to land, and the runway environment is in sight. **NOTE:**

a. AFM 51-37, 15-1f NOTE: (3) — If you encounter weather conditions that preclude you from executing the climbout instructions from the appropriate point (departure end of the runway), execute the appropriate missed approach from the MAP or DH (4). If you cannot comply with your last ATC clearance (climbout instructions), ATC must be advised.

b. Letter Changing AFM 51-37 — 15-1f(2). The controller will issue missed approach instructions. They supersede published missed approach departure instructions and constitute an ATC clearance. Even if you must execute an actual missed approach, you must comply with the verbally issued missed approach departure instructions when able. Unless otherwise instructed, you may initiate an immediate climb to the assigned altitude. Delay any turns until past the departure end of the runway, if visible, and 400 feet AGL. If the departure end is not visible, climb on the runway heading until 400 feet AGL, then start your turn. ATC may direct a turn at another point.

BONUS: The AL at the top of the page stands for Approach-Low. The 136 is the tracking number. The (FAA) is the appropriate authority for the procedure.

Congratulations on completing the first of many AFFSA IQs. Remember, if you have any comments, questions, or disagreements, contact AFFSA/XOF at DSN 858-2126 or COMM (301) 981-2126. ■

IT'S A PRIVILEGE

COL CHARLES MATTHEWSON
Staff Judge Advocate
HQ Air Force Safety Agency

■ **QUESTION: I've heard that cockpit voice recordings (CVR) may lose their privileged status. At the same time, however, we see that AFI 91-204 requires us to document promises of confidentiality on CVRs for aircrews. What's going on?**

ANSWER: *You've heard right, and you're reading the AFI correctly.*

Let me take you back in time to July of 1993 when the Air Force (and the Department of Justice) had just argued to keep the CVR out of private litigation involving a C-5 mishap in 1990. The families of the deceased crewmembers were suing the airframe and engine manufacturers, and the plaintiffs' attorneys wanted the CVR as evidence. The Air Force had intervened to keep it out of evidence based on its confidentiality under our mishap investigation regulation (AFR 127-4, at the time).

Despite our arguments, the Federal District Court judge ruled CVRs were not covered by the federal case law which had developed our safety privilege over the years. The judge reasoned that CVRs were strictly factual, one-of-a-kind products which were not the result of a safety investigation and not duplicable by any amount of investigation. He also noted that commercial airline CVRs are normally disclosed during civil litigation and that the Air Force can always limit their use within the military if necessary.

Our initial reaction to this ruling was to shore up our training and recordkeeping so the next time we ended up in court we could more easily prove our making of promises and crewmembers' reliance on them. This explains why 91-204, which was drafted and edited in latter 1993, contains the provisions you referred to. Upon closer study, though, most legal and safety experts at policy-making levels in the Air Force agreed that even these attempts probably wouldn't yield a result any different from that in the C-5 case.

In the meantime, Congress passed a law saying the Air Force "upon request, shall publicly disclose unclassified tapes . . . and other factual information" from the accident investigations done under AFI 51-503 (formerly AFR 110-14). This, we felt, would make it even more difficult to defend the CVR privilege in the future.

Based on all this, it's been proposed we no longer try to keep our CVRs totally confidential. Instead, the policy will probably be modified to permit relevant portions of CVR transcripts to be releasable to the public in an approved format, much like the NTSB does for civilian mishaps. Additionally, to guard against a fear of repercussions and to ensure crewmembers don't restrain their in-flight, mission-related conversations and aren't tempted to manipulate or alter their official recordings, we expect mishap-related CVR transcripts to be prohibited from use in disciplinary or other adverse actions.

All of this remains a topic of policy discussion and subject to high-level approval, and, until changed, the CVR provisions currently in AFI 91-204 remain "the law" for the Air Force. ■

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POSTAL INFORMATION — Flying Safety (ISSN 0279-9308) is published monthly by HQ AFSA/SESP, 9700 Avenue G, S.E., Kirtland AFB NM 87117-5670. Second-Class postage paid at Albuquerque NM, and additional mailing offices. POSTMASTER: Send address changes to Flying Safety, 9700 Avenue G, S.E., Kirtland AFB NM 87117-5670.

*U.S. GOVERNMENT PRINTING OFFICE 1995-679-016/03010

THERE I WAS

USAF Photo by Walt Weible

■ Most aircraft have takeoff weight restrictions which limit the amount of fuel they can carry based upon the amount of passengers and cargo on board. The T-37 does not have this problem. Instead, it will take all the fuel you can pack into its three fuel tanks.

With a limited supply, fuel management is critical in the Tweet. On a recent student low-level out-and-back mission, I became even more aware of how critical it is to monitor your fuel state.

While approaching the entry point to a local SR route, I was instructing the student on route entry and preentry checks. It was during this time that I noticed erratic and an unusually low fuel quantity for this point in the sortie. Investigating further, we found an imbalance between the two wing tanks.

During attempts to correct the imbalance, it became evident that now *both* tanks were not feeding to the fuselage tank, and using gravity feed was not alleviating the situation. We were almost 60 miles from base, trapped fuel in both wings, and due to the earlier erratic fuel indications, had only a rough idea of how much (or little) usable fuel we had.

We had a couple of options: Land unannounced at a civilian field ahead which had short runways and no UHF radio or continue back to our home station. After evaluating our situation, we determined we had sufficient fuel to continue home with a long, low-power en route descent direct to the perch, landing with approximately 100 pounds of fuel. As I am here to write this article, all went well.

There are several important lessons to take from this experience. *First, monitor your fuel state.* There is a reason we do a 1,600- to 1,700-pound fuel check, and ops checks are required every 15 minutes in the T-37. This situation could have been a lot worse if we had not noticed the problem when we did.

Next, always remain situationally aware. Keep in mind where you are and what your options are in case something goes wrong. There is a reason we mark divert airfields on VFR maps — just in case. If we had not recognized the problem when we did, this may have been our only option.

Lastly, applying the four basic steps of handling an EP will get you through. To "maintain aircraft control," we began a climb and started back toward base. We "analyzed the situation" by evaluating our fuel state, current locations, and possible divert options. In this case, the checklist did not provide any specific guidance. Once we determined our best course of action, we "took the appropriate action" by heading home with a low-power descent to final so we could "land as soon as *conditions permit*" (not as soon as possible). As we returned home, we continued to reapply those same steps as appropriate. It was a valuable learning experience, but a good feeling when we pulled our power with landing assured. ■

A Near and Present Danger...
AVOID THE BOIDS!