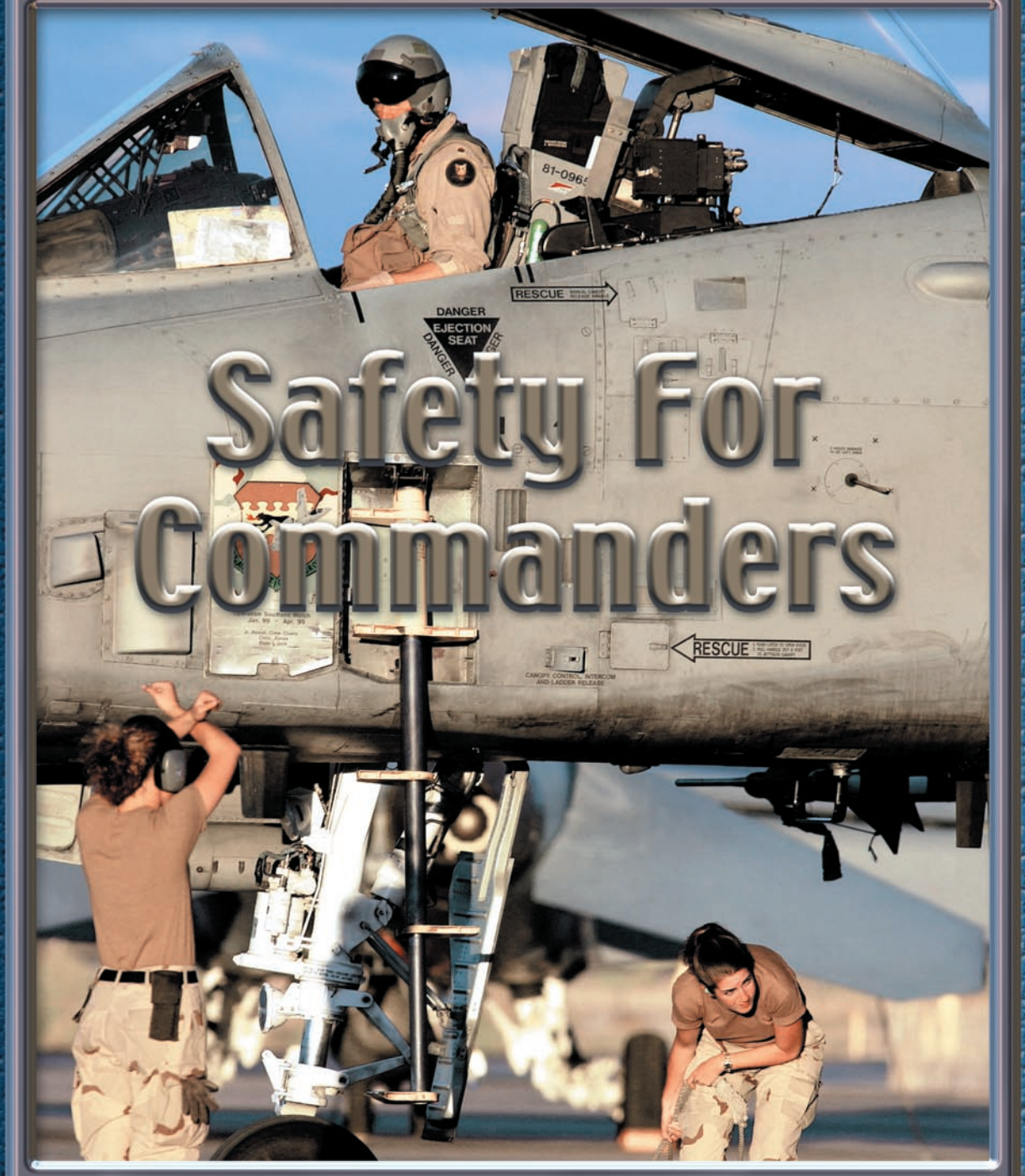
UNITED STATES AIR FORCE
FSM
FLYING SAFETY MAGAZINE
JUN 2006

Safety For Commanders



FSM
FLYING SAFETY MAGAZINE

AIR FORCE RECURRING PUBLICATION 91-1

contents

Cover: USAF Photo
Rear Cover: USMC Photo
Photo Illustration by Dan Harman

U.S. AIR FORCE

Flying Safety Magazine on line: http://afsafety.af.mil/magazine/htdocs/fsmfirst.htm

JUNE 2006, VOL 62 NO 6 U.S. GOVERNMENT PRINTING OFFICE 2006-560-493-41012

SAFETY SAGE

RIGHT SEAT WINGS OF GOLD

Courtesy ASRS *Callback* #248, Feb 00
NASA's Aviation Safety Reporting System

ASRS received two flight crew reports describing a bad weather IFR incident. The First Officer's report was succinct and to the point:

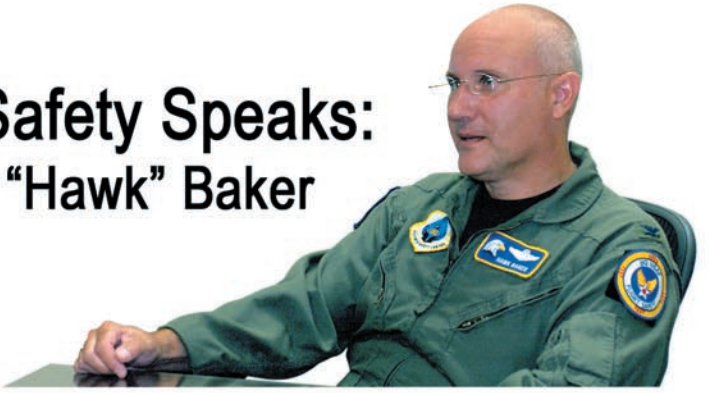
On missed approach, Captain got behind aircraft and climbed 500 feet above assigned altitude.

The Captain's report explained why the altitude bust occurred and affirmed the value of the crew concept:

I'd like to say something about the effects of fatigue, bad weather, and flying: they don't mix! The day this event took place was 3 of 4. I had gotten up after getting only 3-1/2 hours of sleep so I could drive to work... Strong surface winds, precipitation, low ceilings and visibility were present. The leg was the worst leg I have ever flown... I think the combination of fatigue, bad weather, a late close turn to intercept the localizer, a slow autopilot, a go-around from an unusual attitude, and me not being in the loop all contributed to this event.

They say a good First Officer is like gold. Thank heavens for mine on this day. CRM also played a positive role in that my First Officer pressed me diplomatically enough for me to say "Enough is enough!" That's why there are two pilots in the cockpit.

USAF Chief Of Aviation Safety Speaks:
An Interview With Col Jeffrey "Hawk" Baker



HQ AFSC Photo by Cody Carroll

JERRY ROOD
Managing Editor

Col Jeffrey A. Baker has been chief of the Aviation Safety Division at the Air Force Safety Center for less than a year, at this writing. As he was preparing to move over to become commander of the Mission Support Group of Kirtland AFB, we got his perspective on Air Force safety.

Col Baker has a rich background for his safety position. He has been on the CENTCOM J-5 staff for security cooperation, was the Incirlik AB chief of safety, and Izmir AB commander. He has over 3,000 hours of flight time, mostly in F-117s, EF-111s, and T-38s, and has flown the F-111A/E. Additionally, he was a T-37 instructor at Laughlin AFB, TX, and chief of aerospace physiology at Holloman AFB, NM, where he has 155 spins in the centrifuge at nine Gs.

He came to the Air Force Safety Center in July 2005 to serve as chief of the Aviation Safety Division, and his perspective has been on progress. When asked what the biggest safety problem the Air Force has had in the past, he quickly shifted to his primary focus—improvement.

"I think one of the biggest issues we have is that we've been fairly stagnant. We have a good program, and we have good results compared to the sister services. However, we haven't shown much improvement over the last decade. And I think there's an opportunity, maybe to explore new and different ideas to see if we can bring those mishap rates down to hopefully meet the SECDEF's goal."

He took the Secretary of Defense challenge—to reduce preventable mishaps by 50 percent—very seriously. "We missed the '05 goal, barely," he said, "but we're looking at the 75 percent reduction in '08, and hopefully we can make some inroads into that."

Asked if he thought we had hit a plateau in terms of mishap reduction, he said, "We've done a lot of the simple things. But, as you can see, a lot of our mishaps in recent history have been—the majority of them—operator error, if you will, or human factors, the term we use today. So, how do you fix the human? That's a little tougher to do. But that's not impossible. And every leap in reducing mishaps rates in aviation tends to come with technology. We made progress from the 40's to the 60's, when the F-4 came on board, that reduced the mishap rate significantly. When the F-16 and F-15 came on board, obviously the rate went down even further. Now, as we start to bed down the F-22 and the JSF, I expect an even further reduction."

But when it comes to reducing mishaps, his focus is less on the overall MDS and more on the technological and diagnostic systems. An important one he mentioned is the Military Flight Operations Quality Assurance system (MFOQA)—the use of "Quick Access Recorders" to collect extensive flight data (detailed in *Flying Safety* in May and July, 2003).

"Among some of the things we're researching now, the MFOQA can be another leap to helping us improve," Col Baker said. "That will have an impact on the human performance, too, because it will not only watch systems of the airplane, it will watch how that airplane is flown over time, even down to *by pilot*, if you wanted to. You could say, 'Person X might need some additional training or retraining or just a spin-up,' whatever you want to call it, in certain areas to avoid a potential mishap."

Another technological solution that he cited was the Automatic Ground Collision Avoidance System, or Auto GCAS.

"The Auto GCAS collision avoidance systems will keep the pilot from hitting the ground for whatever reason," he said. "Because the airplane just won't do it, it won't let you hit the ground, or (with A-CAS) hit another airplane, especially in your own flight or a friendly aircraft that is equipped with the same system.

"These are the types of technologies that we're pushing right now from the flight safety standpoint. MFOQA is coming along very quickly. We already have it on the T-6 and the C-17, to some degree, not all but some. We're looking at expanding that to more modern fighters where it makes sense, where the money will have some return on investment. Systems like T-37s, we're probably not going to put MFOQA on because it would cost more than the aircraft's worth, and it's going into the boneyard. But definitely we'll put that technology on the F-22."

On a more personal level, Col Baker's goal is a simple one, though not an easy one.

"My personal goal, really, is zero Class A mishaps," he said. "People laugh at me and say, 'That's impossible; you can't have it.' But, you know, as a chief of safety at a wing, that was my goal, and

I thought it was a reasonable goal. And actually we executed it in my year there: We didn't have a Class A mishap. Now, if every squadron has that goal, and if every group has that goal, and the wings have that goal, it's not that big of a stretch to say, 'Why can't we as a MAJCOM or Air Force have the same goal?' Is it tough to make those? Yes, but nobody's willing to stand up at the beginning of the fiscal year and say, 'I'm going to have three mishaps and kill two people.' No, our goal really is zero. And I think we can push toward that.

"I think it's the only goal we can have. I mean, resources are so precious, whether they're equipment or human. We can't afford to lose those valuable assets."

In response of the Secretary of Defense's charge to the armed forces to reduce mishaps by 50 percent, the Air Force has led the way, and it's something Col Baker is proud of.

"In aviation, our typical record is better than our sister services," he said. "Comparing Navy to Air Force, it's usually a factor of two-to-one. Our programs are the best. But that doesn't mean there's no room for improvement."

Among the ideas for further improving flight safety, he cited the Operational Safety Assessments (OSA). OSAs are staff visits by experts from the Air Force Safety Center to gather information on the strengths and weaknesses of a unit's safety programs by conducting in-depth interviews. Col Baker was personally involved in OSAs at the Air National Guard in Wisconsin, and with AFSOC at Al-Udeid AB.

"Our new ideas are the SAT (Safety Analysis Team) process, and the OSAs," he said. "These are things that we're trying, to see if they work. They're not proven yet, but we're forcing some of our scarce resources here at the Center to make these things happen, to see if they can make a difference. Some preliminary and very sketchy data, which you can't hang your hat on, appears to show we're making a difference. If you look at AFSOC's record before we did a SAT or OSA, it was high. And since then, they've had very few, or no Class As. That's very, very good. And if you look at another record that we have: To this day, this year—and I'm knocking on wood here—we have not had an aviation fatality. We have destroyed some aircraft, you know, we've been bending metal and other things, but we haven't killed anybody. And that says something."

(Editor's note: The Air Force has had one fatality since this article was written.)

But his emphasis is always on the future, on improving the record, on driving the mishaps rates lower yet.

"I think right now, looking at some of the mishaps we've had, we need to concentrate on the basics. We've got guys going out, flying in what we'll call a combat environment, which may sound harder, but a lot of times it's easier than coming back and having all the training rules, all the airspace restrictions, and just the basics of doing tanker operations safely and efficiently. We seem to have some letdown from coming back, and we're seeing some silly mistakes being made that are causing mishaps. We're seeing some 'errors in basic airmanship,' is a better way to put it.

"I can't talk specifics because some investigations are still ongoing," he said, "but it's clear there are at least a few Class As and a lot of Class Bs that you just say, 'Where was the airmanship here?' These are just this basic. It's what I would expect out of a brand-new wingman. But these are experienced guys, most of them instructor pilots, and it's just a breakdown somewhere."

Col Baker thinks more emphasis needs to be placed on the instructors as well.

"Our instructors need to be much more involved with day-to-day flying ops in every squadron," he said. "Whether they be weapons instructors or IPs, whatever, they need to be involved from the briefing to the conclusion, day-in, day-out."

He is philosophical about the legacy he might have left for his successor at Chief of Aviation Safety at AFSC.

"You know, I've been here such a short time; I'm barely getting my arms around it. There's such a breadth of responsibility here. I think one thing that I would hope he could see under his watch is MFOQA coming to a very mature state of not being only a resource, but actually out there being used—because we've got great results from that. The commercial industry, which has been doing this for 20 years, has got phenomenal results from it, and saved a lot of dollar costs from mechanical failures. And also it's paid off in not having mishaps. So I'd like us to bring that program around.

"Also, I'd like to see Auto GCAS start to have some momentum behind it. That, and the automatic collision avoidance system, which is basically ground and air together. That technology is not as developed quite yet. With Auto GCAS, the technology is there, it's available, you can start funding it, and putting it on airplanes—operational airplanes, not just test airplanes. But we're looking for the resources to do it. And the tough part is convincing some folks that spending a million dollars today can save them four million dollars in ten years. That's a tough thing to sell.

"It's that million dollars in your hand right now that you've got to put somewhere, and why would I spend it on this piece of equipment when I can go buy something else with it?"

Col Baker's view is that safety is worth the expense, although it might be a tough sell, and difficult to quantify.

"It's hard to put your finger on what caused that mishap *not* to happen," he said, as he prepared for the next stage in his Air Force career.

Col Baker will shortly be replaced by Col (sel) William Brandt, who recentlty graduated from Army War College.

Air Force Safety: Stopping Mishap Creep

LT COL RANDY GIBB
AFIT
Arizona State University

(Editor's note: From Dec 02-Jun 04 Lt Col Gibb was 99 FTS/CC at Randolph AFB.)

USAF Photos
Photo Illustration by Dan Harman

In every squadron there is the potential of an unnoticed event, or series of events, that may compromise safe operations. Squadron Commanders must accept the fact that some policies or procedures provide the opportunity to foster latent errors within their organization that may result in a mishap, perhaps not today, but sometime.

"Past success does not guarantee future safety," says Sydney Dekker in *Ten Questions About Human Error*. He goes on to say that safe operations and the absence of failure does not necessarily validate previous mishap prevention programs. Applying this to aviation: Just because a squadron hasn't had a mishap doesn't mean that a chain of events isn't slowly developing within the squadron. This article relates the Squadron Commander's role in aviation safety with everyday leadership involvement.

When AF Chief of Staff General John P. Jumper challenged the Air Force in 2004 to reduce its mishap rate by 50 percent, he said no mishap is acceptable, and that losing valuable Air Force personnel in peacetime training "means that they will never get to the war."[5] The overall USAF flight Class A average mishap rate from Fiscal Years 1994-2004, was 1.32 (1.32 mishaps for every 100,000 flying hours). The FY05 Class A mishap rate was 1.49. General Jumper even recommended we strive for a zero mishap rate. While this is a huge goal, clearly the rates of 1.32 or 1.49 are still too high. We cannot fall into a trap of accepting these mishaps rates as a "cost of doing business" because there is still room for improvement in daily operations.

"Mishap Creep"

Dekker shares a unique perspective on aviation system failures, and four of his concepts are applied to military aviation and their contribution to incremental drift towards accidents, "mishap creep":

(1) conflicting goals;
(2) everyday normal activities;
(3) borrowing from safety; and
(4) insidious delegation.

Conflicting goals, according to Dekker, are scarcity of resources and competition. The resource scarcity problem in the Air Force is represented by aging weapon systems, maintenance part shortages, budget issues, and downsizing the force (losing experienced personnel). The competition is the tug-of-war between combat/contingency operations and existing policies and procedures, training requirements, upgrading to meet mission requirements, proficiency attainment, training graduation dates, and juggling multiple missions and deployments while maintaining currency requirements.

Often, organizational failures occur when normal people do their everyday jobs. Failures rarely occur from gross breaches of flight discipline. Failure hits during a seemingly unrelated chain of events—each problem/issue benign on its own, but when combined with other events lead into disaster. Wagenaar and Groeneweg describe the oblivious state of a person prior to a mishap: "Accidents do not occur because people gamble and lose, they occur because people do not believe that the accident about to occur is at all possible.

Small, non-significant, and temporally distant events can combine into catastrophic failure. Minor decisions made with the best intentions start an organization drifting toward disaster. Dekker describes this as when "departures from routine become routine." People have to find a way to balance the competition of scare resources and mission accomplishment, and the result is that something gets "borrowed from safety." Borrowing from safety refers to taking shortcuts or amending/violating normal procedures in the name of mission accomplishment. These are not monumental deviations, just minor changes to procedures for either convenience or given the unique context of the situation. Smart people believe they are doing the prudent thing. In the long run, however, they are not the first or the last to modify a "standard procedure" in order to get the job done. Consequently, a hazard is placed in an organization waiting for the right time to strike—the creation of a latent error.

Senior levels of Air Force leadership decide on policies for the successful balance between resources, mission, and safety. These decisions are made at a strategic level and delegated down the chain of command. Yet, it is at the individual level that execution of that balance occurs—squadron members making routine decisions in their daily activities, juggling scarce resources and competition of expectations. Dekker describes this delegation of external pressures in handling competing goals as an "insidious delegation" where upper level organizational ideals are pushed down to the individual to implement. This is where the mishap creep occurs, something is borrowed from safety for the sake of the mission.

Squadron Commander

The Squadron Commander, however, can make a difference. The Squadron Commander can influence the manner in which Air Force individuals make those everyday decisions and carry out their activities. Through daily interactions, the message of safety must be well communicated and understood as the *commander's intent*. Squadron Commanders are not hired to keep the status quo. Commanders are hired to ask questions that have not been asked and to look in places that previous commanders have not looked.

Through the course of the next year, commanders should plan to brief their squadron on different mission/aircraft-specific areas. An "operational curiosity" must exist in a squadron to question the logic of the squadron's culture and seek a better way to conduct business—more efficiently, more effectively and safer. Where is the squadron most vulnerable? What aspects of the mission have become too complacent? Where are the holes in the daily process of sortie planning and execution? What incidents or "near mishaps" have occurred? Similar to military combat planners, Squadron Commanders must devise their *safety strategy* by examining their own weaknesses and determining how to defend against mishap creep—on a daily basis.

Research

Over the last year I have analyzed a sample of 124 Class A controlled flight into terrain (CFIT), loss of control, spatial disorientation, and midair collision mishaps between 1992 and 2005. These 124 mishaps were classified as "human factor" mishaps: Human error was the primary cause of the accident. My methodology consisted of recoding the previous Safety Investigation Board report for each mishap into the new Department of Defense Human Factors Analysis and Classification System. Of the 124 Class A mishaps, 109 were training missions resulting in 173 fatalities. Only a small percentage of the mishaps, just seven percent, had flight discipline issues in which the pilots *gambled and lost.* The remaining accidents involved pilots who found themselves part of a chain of events and did not realize that the *accident that was about to occur was at all possible.* For instance, of the 124 mishaps, 96 were ejection seat-equipped aircraft but only 50 attempted to eject.

A point worth mentioning in the assessment of the 124 mishaps involves comparing recent mishaps to studies of pilot error dating as far back as the 1940s4. The reality is that pilots will err, and those errors are amazingly similar over the last 60 years of flying. Regardless of technology, pilots make mistakes of execution, forgetting, and substitution. Squadron Commanders can help improve error management and teamwork (crew resource management, CRM) to reduce the consequences of errors as well as help improve oversight of the planning and execution of operations (operational risk management, ORM).

Stopping The Creep

CFIT mishaps are especially of great concern to the Air Force. From 1993-2002, CFIT accounted for 59 destroyed aircraft, 132 fatalities, and $1.94 billion in losses. The 48 CFIT mishaps I studied included controlled flight into terrain during low-level sorties and low-level maneuvering, as well as during the approach and landing phase of flight. Trends noted in classifying the CFIT mishaps overlapped with all CRM dimensions described by AFI 11-290, *Cockpit/Crew Resource Management Training Program*: situational awareness, crew coordination/flight integrity (leadership and assertiveness), communication, risk management and decision-making, task management, and mission planning (analysis).

The principles of CRM create conditions that facilitate recognition of and recovery from errors. Despite required CRM training at all levels of flight training, the factors involved in the 124 mishaps

USAF Photo

demonstrate CRM training is still not completely hitting its target. Squadron Commanders can fill the gap with specific briefings to address aspects of CRM pertaining to their squadron's mission. I firmly believe in what CRM has to offer, but it has to be delivered in such a way that the squadron buys into its concepts and it is reinforced on every sortie.

Far too many mishaps occur in training. ORM is an outstanding tool that can mitigate risk in the squadron. Aspects of ORM failures were part of nearly every mishap chain of events in the 124 accidents examined. These failures can be described as failing to account for pilot proficiency, pilot experience (recent and/or total), as well as crew composition dependent upon weather and mission.

Squadron supervision needs to be aware of psychological/behavioral issues of pilots as well. These include overconfidence, over-aggressiveness, and complacency. Squadron Commanders need to be in touch with their personnel to know which individuals are approaching experience levels that may set a person up to fail due to their own hazardous attitude. Any method which enhances awareness of squadron personnel and mission issues can only better the oversight and assessment of operations, which is the road to hazard mitigation. ORM allows squadron leadership to continuously challenge the manner in which operations are conducted and how decisions are made. Organizational mistakes often occur by normal people doing their everyday job. ORM is one way to explore how the daily process is being accomplished.

Unfortunately, there are countless aviation mishap examples that, regardless of their airframe or major command, can teach all pilots lessons of airmanship and resource balance. These case studies of previous system failures are good starting points for Squadron Commanders to share both CRM and ORM lessons. The discussion should not focus on what the mishap pilots did or did not do, but rather on teamwork and latent errors within the organization that put the pilots in a position to fail.

For example, given the concern for CFIT, a squadron determines that the highest risk mission type is a low-level sortie. To mitigate the risk and remove any latent errors within the squadron process/culture, the first step is to thoroughly review all aspects related to low-level activities, ranging from planning, briefing, route deconfliction, bird hazards, wing/group/squadron procedures and policies, squadron oversight of scheduling, and execution. Then, based on that new found information, develop and present findings and recommendations for new low-level procedures at a Commander's Call. CRM can be incorporated into the low-level briefings, specifically risk assessment and task management, and squadron supervision may also be amended to better account for any issues. As the Squadron Commander, you are informing everyone of your safety intent regarding the expected level of professionalism for that specific area of mission accomplishment. Then, once the squadron has firmly adopted the new approach toward low-levels and "the bar has been raised," move onto the next identified risk area.

Squadron Commanders can directly influence their squadron to make prudent decisions, balance resources and mission, and not borrow from safety. By establishing specific mission oriented aspects of your squadron to concepts of CRM and ORM, the gap can be filled between talking about CRM/ORM and making them part of your squadron's culture. With the leadership of the Squadron Commander, the Air Force can stop mishap creep, day by day.

References

1. Air Force Safety (2005). Data obtained directly from USAF Safety Center, Kirtland AFB, NM.
2. Air Force Safety Analysis (2003). Air Force Safety Analysis, 1993 – 2002. Retrieved March 15, 2005, from http://afsafety.af.mil/AFSC/files/tome2.pdf.
3. Dekker, S. W. A. (2005). *Ten Questions About Human Error: A New View of Human Factors and System Safety*. London: Lawrence Erlbaum Associates.
4. Fitts, P. M. & Jones, R. E. (1961). Analysis of factors contributing to 460 "pilot error" experiences in operating aircraft controls. In W. W. Sinaiko (Ed.), *Selected papers on Human Factors in the Design and Use of Controls Systems* (pp. 332-358). New York: Dover Publications.
5. Jumper, J. (2004, February 18). Chief's Sight Picture: Air Force Safety...The Goal is Zero Mishaps. Retrieved March 15, 2005, from http://afsafety.af.mil/AFSC/files/safety.pdf.
6. Rolfsen, B. (2005, October 17). Aircraft mishaps increase in 2005. Air Force Times, p. 16.
7. Wagenaar, W. A. & Groeneweg, J. (1987). Accidents at sea: Multiple causes and impossible consequences. *International Journal of Man-Machine Studies*, 27, 587-598.

Demanding Safety Means Commanding Safely

USAF Photo

CAPT BRETT CLUTTER
96 BS/DOT
Barksdale AFB LA

Catchy title, play on words, or accurate statement? I'll provide you reasons to see that all three are true, especially the latter. Now, before I lose readers because you don't think this article is going to apply to you because you're not "commanders" and therefore cannot "command safely," let me define what I mean and how it applies to all of us.

I am, of course, talking about command in the literal sense, and about commanders at the Air Force, Wing, Group, Squadron, and Flight levels. However, the information here also pertains to the command responsibilities and influence that we all have as Air Force members. This is what's meant by "leadership," not just leadership based on rank, but more importantly, leadership based on influence.

We all know that everyone has the potential to influence their peers, and all those around them. An example of this for me, and probably many others, is an instructor (callsign "Chief") who is definitely not the highest ranking individual in the squadron, and doesn't have the most prestigious job title. Yet, his decisions, his attitude, and his expertise influence a large number of individuals above and below his rank, and they also influence the environment that we operate in every day. Luckily for those of us around him, he fills the "command" shoes well, and has had a positive and safe influence on us all. I'm sure you, too, can identify with someone in your organization who has that same level of influence, from the commander to the new guy. Now that you understand this article is written for you, let's get into the meat of the concept.

Safety Programs

Which safety slogan/philosophy are you *supposed* to be operating under, and which one are you? Safety First, Mission First, Safety is Paramount? I bet the answer to that is not crystal clear in everyone's mind. This is why it's important for commanders and leaders to not only state their position on safety, but also act on it. Walk the walk, not just talk the talk.

One of the biggest responsibilities of a commander is "his/her safety program." *Yes, commanders are inherently responsible for their people's safety. Therefore, the programs and policies that are set up are ultimately theirs, even though they are usually facilitated and managed by delegated individuals.* This is why new commanders are required to post a safety policy letter in the workplace, so all subordinates know and understand the goals, philosophies and the mental environment that their unit (whatever level it may be) will be run under. That being said, how many readers are asking themselves, "What does our letter say?" And the more important question that I'll discuss: "I know what it says, but is that really the environment we are operating in?"

The reason practicing what we preach is so important is because it eliminates confusion, builds credibility in your leadership and your policy enforcement, and most importantly, provides a safe work environment that is conducive to safe decision-making by subordinates.

The military is great on providing checklists that standardize operations and minimize opportunities for human error caused when a poor decision is made, but the fact of the matter is that checklists can't do it all. Decisions have to be made. So, it is everyone's (especially commanders') responsibility to encourage and train people to make the appropriate and safe decisions. This can only be done if you provide a safe environment that encourages and empowers the people to make those safe decisions.

An example of this is aircrew leaders who operate by the books, enforce policies and also honor crewmembers when they call "knock-it-off." By doing this, everyone knows what is expected of him or her. For the maintainer, it is honoring suggestions by subordinates to improve the safety of a process and not just blowing off the suggestion because it goes against the de facto policy (the way it has always been done). Both of these are just simple examples, so let's talk more in-depth about this "Safe Environment" that we want to provide.

Safe Environment and Policies

I think we all would agree that the more safe we are at our jobs, the better, but you would be amazed at how some of the policies we set up, some of the bureaucracy we have to go through, and some of the attitudes we portray can have such an adverse effect, almost to the point of even discouraging safe operations.

Policy, for instance: Most, if not all policies are made with good intentions, and often to achieve a certain goal. The problem arises when you don't take the time to evaluate all the consequences of that policy, both directly and indirectly. The indirect consequences are usually the ones that get us in trouble. Before implementing a new policy, or even evaluating an existing policy for that matter, we need to ask ourselves a couple questions. Does this policy promote safety? Does it help our people make safe decisions? Let's take a look at a recent policy I've come across, which I think will drive this point home.

While TDY to an Air Force base located in a desert region, several fellow officers decided they wanted to get together after work and play a game of pick-up basketball on the only available outside basketball court. The temperature was about 95 degrees on the court. Thinking about being safe, they decided to go to the outdoor recreation center and sign out a five-gallon Gatorade-style water cooler so everyone could stay hydrated. Good decision, right? Well, they found out it wasn't that easy. In order to sign out that cooler, the officer had to get a letter signed by his commander allowing him to check it out. Now, how many of us really think it's feasible to write a letter, track down our commander, and ask him to sign it so we can get a cooler to play basketball for an hour or two? Yeah, right! This is an example of a policy that not only doesn't promote a safe environment, but actually discourages one.

Every policy we set is there to establish a known environment. When you walk into the Stan Eval shop for aircrew or the QA shop for maintenance, you know that based on their policies they encourage an environment of evaluation, so you better bring your "A" game. That sign-out policy for a water jug just tells people that the red tape is more important than taking care of our people's safety. Is that really what we want to say? It's pretty hard to get people to believe that safety is really paramount when *your* policy puts roadblocks in the way of the safe path. Yes, I did mean to emphasize "your." Because unless you step up to change or address existing policies that don't make sense, you might as well have been the one to have written it. The extra effort is a pain sometimes, but it is what our integrity demands of us!

Now, let's talk about an example of a great safety program currently in use, and hopefully, you can judge how you can implement it and continue to make it work better.

Operational Risk Management (ORM)

One of the ways the Air Force is trying to analyze, address, and get people to think about safety is with ORM programs. One of the basic principles of ORM is to get more than one person involved in the loop to identify, analyze, and mitigate hazards so people can make the appropriate decision at the appropriate level, then review whether or not it actually worked. Although this does not guarantee 100 percent safe environments, at least we know the risks and can deal with them appropriately.

The big concept relies on two participating parties. The party who engages in the "acceptance of risk" (usually at the commander level) and the party who engages in the "assumption of risk" (usually at the operational level). Acceptance of risk just means that the big-picture person knows all the risks and how the task executer plans to mitigate them. They can then choose to accept/decline/change the task based on the cost/benefit analysis. Assumption of risk means the person actually identified to execute the given task knows all the factors of what they are getting involved in, and executes the plan in the safest manner. The closer these two parties are, the better.

So, what does that have to do with a safe environment for decision-making? Well, the problem that many units are seeing is that the person who accepts the risk doesn't always accept the judgment of those who have to assume it. If this behavior continues too long, it establishes an "unwritten policy" that says to the task executer, "Your opinion doesn't matter, and I am no longer going to empower you to have a say." That is a dangerous place to be, and totally defeats the purpose of ORM. Just like the water jug sign-out policy, it indirectly discourages people from trying to follow the path of safety.

Previously, we've read about areas where the safe environment theory may have fallen short, so now let's talk about several techniques we all can use to build and promote that safe environment.

Techniques to Encourage a Safe Environment

(1) Be consistent with your policies and actions. Nothing confuses your people more than inconsistent policy enforcement, and confusion can be deadly in a career that requires quick, decisive decision-making.

(2) Listen to your subordinates and colleagues. Even if it just *appears* that you don't take their suggestions or questions seriously, that will cause a shutdown of communication. Without that constant flow of communication, it opens up opportunity for people to deviate from known policies based on their own decision, because they don't feel they can ask questions. Independent thinking is good, but not when they don't have all the information that the policy developer has.

(3) Provide feedback and approval. By keeping your people in the loop and affirming their efforts with approval, you are encouraging future performance to be even better.

(4) Empower your people. When your people exercise the ORM process and decide the cost outweighs the benefit, honor their decision. Every time you make them accept risk that they deem unnecessary, you are degrading their perception of the process as a valid tool.

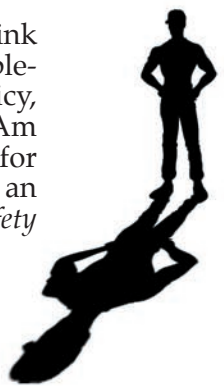
Most of these things are probably common knowledge when it relates to leadership, but it never hurts to be reminded.

Easier or Harder?

The previous examples are several ways to drive home the message of this article. We all know that military life is inherently dangerous at times, but "at times" is the key phrase. It doesn't always (in fact, never) requires us blindly being unsafe when there is no need.

The bottom line is this: Every single one of us who wears the military uniform has the authority and the responsibility to encourage safety in everything we do. We all have influence on someone, sometime, whether it is through command policies or shop practices. Get involved, and help your commanders who usually make those decisions. It is everyone's job and responsibility, not just the Unit Safety Officer's.

So, the next time you think about starting a task or implementing a program or policy, ask yourself this question: "Am I making it easier or harder for my people to be safe?" In an environment that *demands safety* we must *command safely!*



Man's Gotta Know His Limitations

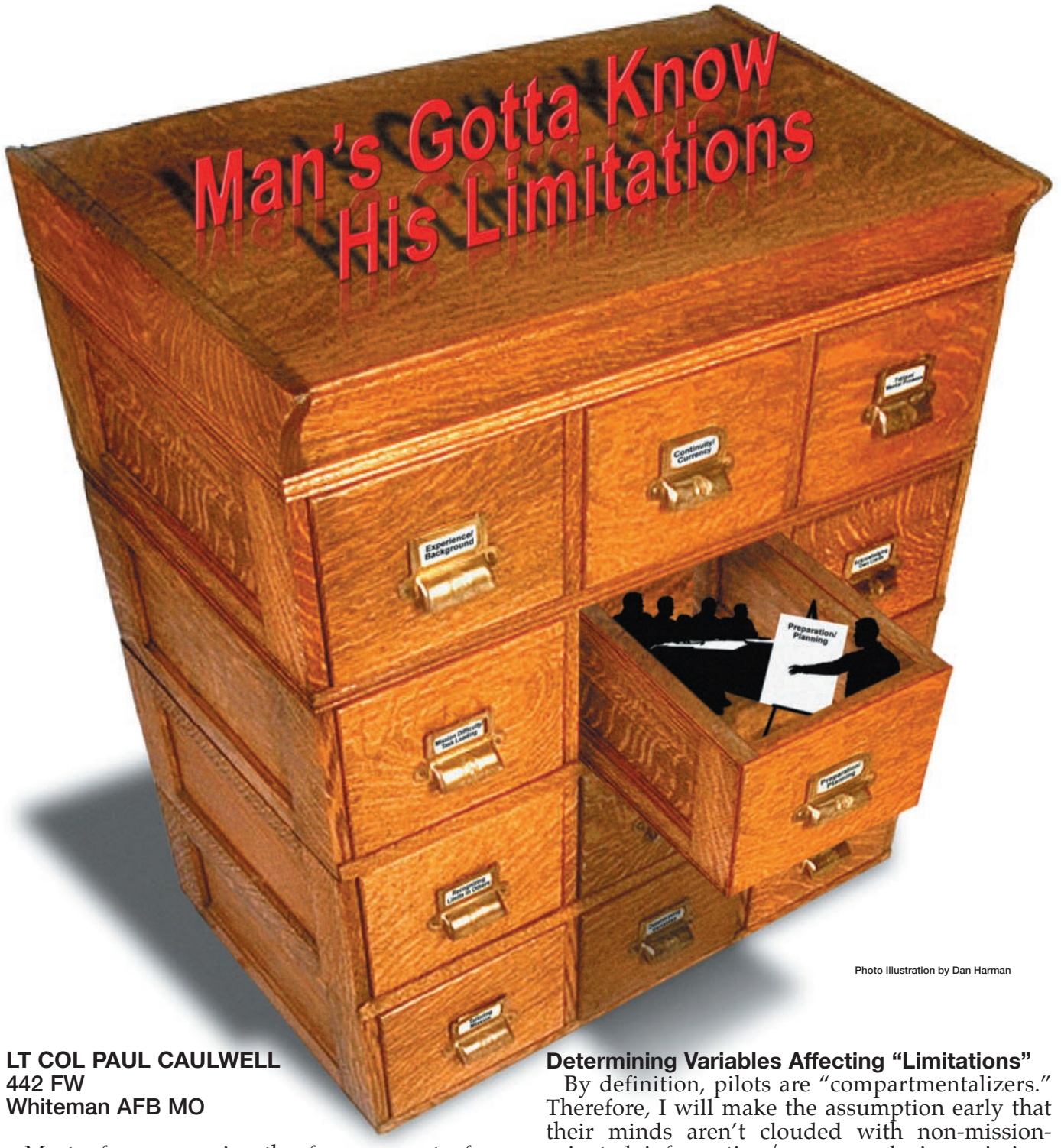


Photo Illustration by Dan Harman

LT COL PAUL CAULWELL
442 FW
Whiteman AFB MO

Most of us recognize the famous quote from "Dirty Harry" Callahan (Clint Eastwood) in the movie *Magnum Force*. Although an apparently simplistic and self-illuminating statement, it has far-reaching considerations into every facet of life, especially when focusing on combat aviation. While my background is extensively attack aviation, I have cross-trained into the civilian side of flying large airplanes as well in the past four years. I'll be using combat fighter/attack aviation examples primarily here, but the lessons learned and the general concepts are just as applicable in crew airplanes.

Determining Variables Affecting "Limitations"

By definition, pilots are "compartmentalizers." Therefore, I will make the assumption early that their minds aren't clouded with non-mission-oriented information/concerns during mission-related tasks. This may seem like a leap of faith, but I believe it's accurate when we climb in the cockpit. So what are we left with? What determines our limitations on a given day, place time, mission, and specific mission task? While there are many variables, I've narrowed the field to five major categories.

1. Experience/Background—Education/Training
2. Continuity/Currency—Recency of Experience
3. Preparation/Planning
4. Fatigue/Mental Prowess
5. Mission Difficulty/Task loading

Experience/Background—Education/Training

First and foremost, we tend to perform tasks the way we've been trained to do, or how we have reinforced them on subsequent training sorties. Hence, the adage "Train like you fight" is the only answer if you want to prepare yourself to fight effectively/safely, especially when the cards are stacked against you. Your experience and background—ultimately functions of your education and training—create the foundation for all of the other factors. They determine how you deal with the normal mission tasks, as well as your reactions to excursions from what you've already been exposed to. Your training, when combined with your specific performance level, determines your potential capability to perform during expected mission events, as well as unanticipated ones.

Continuity/Currency

Continuity and currency do not equal capability. Let's get that out of the way right now. Continuity and currency do offer a level of comfort and consistency in performance to the pilot. A lot less mental energy needs to be expended to perform a task that you have just accomplished recently to an acceptable standard. Some natural byproducts of continuity/currency, therefore, are fluid/polished performance and an increased level of flexibility. By definition, you have launched your mission with an inherently lower level of task loading.

Preparation/Planning

The amount of planning and preparation placed into a given sortie will directly influence the task loading. Generally speaking, if a pilot has thought through as many plausible scenarios as he can during the planning/preparation phase, it will enhance his ability to adapt flexibly, and execute seamlessly, when mission-related changes occur. The level of planning/preparation can, and will, vary as a factor of the other elements listed. In other words, to compensate for shortfalls in the other factors, the pilot tends to prep/plan more than he otherwise would.

Fatigue/Mental Prowess

The ability for your mind to process information and act upon it is directly affected by a multitude of factors. I have already made the assumption that the "machine" isn't being gummed up by non-mission-essential material (i.e., life stressors) due to aircrew "compartmentalization." Therefore, we are left with the operation of the machine itself. There are those who will argue for hundreds of variables affecting mental/physical interface, and this paper doesn't intend to dispute that fact or belittle their observations but to simplify the issue for us realists. If I'm not chronically fatigued and have had 6+ hours of sleep and a cup of coffee prior to my briefing, then I'm in my element. The point being that each individual has to determine how their personal performance criteria are affected based on their rest requirement.

Mission Difficulty/Task Loading

The higher the mission difficulty and task loading, the more evident a pilot's limitations can become. There are particular portions of any mission where the task loading on an individual can be a critical success/failure element, dependent upon pilot limitations at the time. The intent of training is to challenge yourself without exceeding your personal limitations. This leads to personal progression, added experience base, and growth. Performance tends to increase linearly with task loading until it hits a critical point where the mental/physical interface can no longer process and manage the load. It's at this point that task saturation occurs and performance begins to degrade. The rate of degradation in performance, again, is an individual factor, based on the other factors discussed.

Acknowledging Our Own Limitations

We have regulatory and restrictive guidance as to what type of missions we can fly, when, and the currency requirements. This guidance was put into place with recognition of the elements discussed above, as well as an acknowledgment of the perceived mission difficulty. Air Force leadership has attempted to assist those who haven't helped themselves in the past—the same reasons why most of our rules are written, in some cases in blood.

We are the *only* ones who can *accurately* assess our limitations in a given environment. You need to set the ego aside, look in the mirror, and determine what you are capable of in terms of performance level on a given mission. If you find yourself behind the "power curve," adjust mission elements accordingly—or fly a different mission. (I'll discuss this aspect further later on.) In training, we have this luxury, the intent being that we make necessary adjustments in additional training sorties and overcome these shortfalls, so that in combat we can bring a "full-up round" to the fight.

Recognizing Limitations in Others

Anyone having briefed a mission with another wingman or a crew will recognize several of these examples. They are basic instructor pilot indicators, and they should be common sense indicators to any flight lead/AC that things aren't what they should be. I've broken the indications down into Briefing and Flight.

Briefing:

- Preoccupation; stare; blank look; not all there
- The "pig-watching-a-TV" look
- Questions that show fundamental lack of understanding
- Head Nods (not in agreement with statements;

studying the inside of eyelids)
- Blood shot eyes; appearance of fatigue
- Uncharacteristic behavior

Flight:
- Poor/slow task transition
- Slow to answer communications
- Vocal inflection; confusion
- Having to repeat communications
- Haphazard element/task completion
- Airspeed slowing down on low level
- Poor/improper formation positions
- Poor Nav/plotting/ID

Tailoring Mission Type/Elements Accordingly

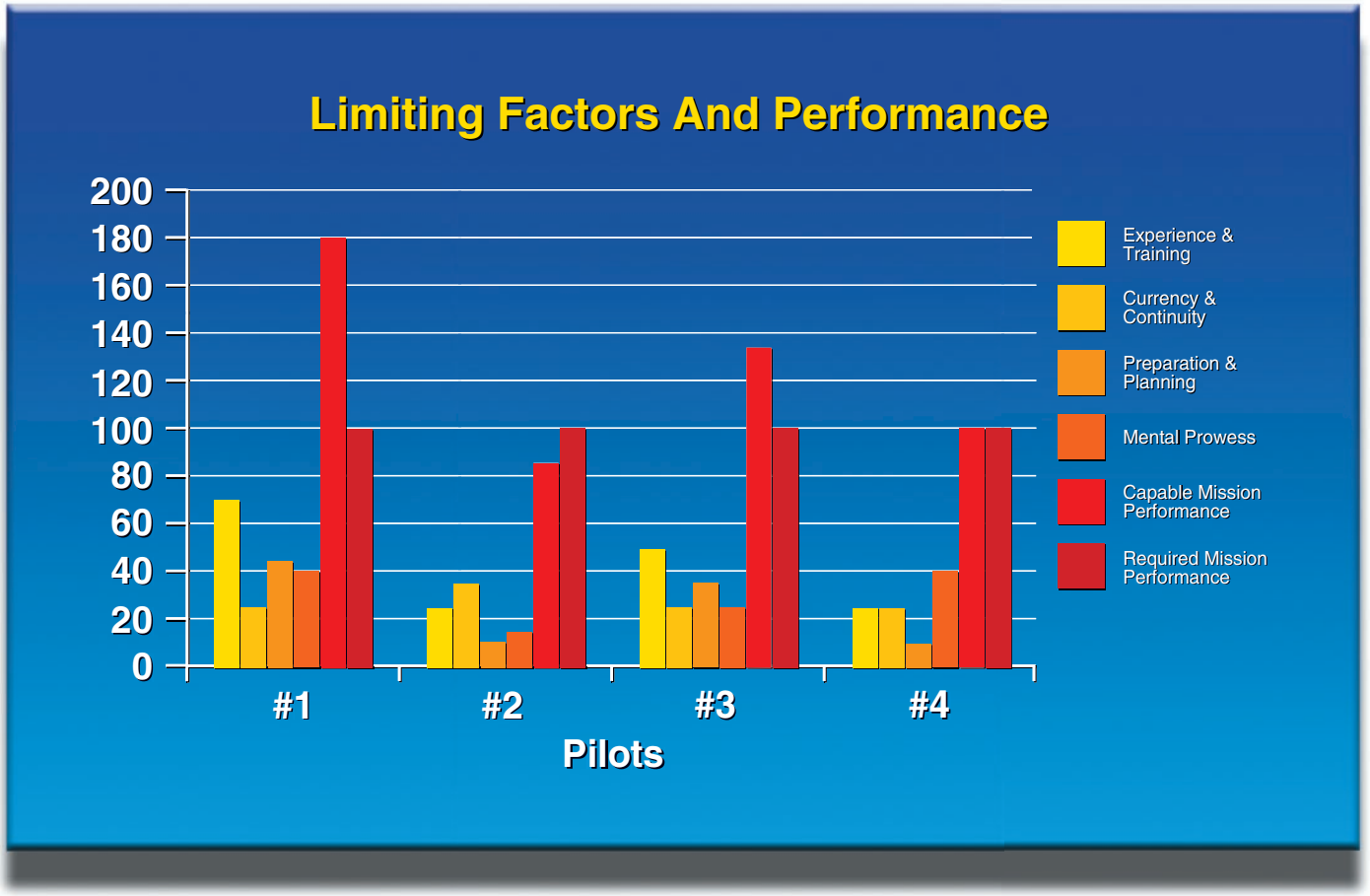
I'm one of those guys who has always said that Operational Risk Management (ORM) is just a fancy term for common sense. Even after attending the Safety School, I still stand by the fact that ORM is simply the formal decision process that encompasses everything we believe to be smart, comprehensive, and deliberate combat tactical planning. All the ORM process allows us to do is to quantify and prioritize aspects of a mission that may be altered or adjusted so as to enhance mission results while reducing risk. Smart tactical planning SHOULD return the same results. Unfortunately, sometimes common sense and smart tactical planning don't win out. Emotions, ego, pride, and, yes, even arrogance lead us down he wrong path, when in actuality we should have followed the path marked "sound tactical planning and execution."

Let's come up with a simple rule of thumb:

1. Experience/Background (Education/Training) = Exp
2. Continuity/Currency (Recency of Experience) = Cur
3. Preparation/Planning = Prep
4. Fatigue/Mental Prowess = Men
5. Mission Difficulty/Task loading = Diff

Where an individual's Limiting Factors determine a capable level of performance:

Exp + Cur + Prep + Men = Capable Level of Performance (Diff)



The chart depicts a specific mission element from an A-10 four-ship low-altitude, high-threat, surface attack mission. The mission element for the sake of discussion is a 300-foot AGL target ingress, culminating in an individual weapons delivery TOT requirement from a 10-degree pop delivery, followed by a defined/charted egress route. Individual characteristics of the pilots in the flight:

No. 1:

—Very capable high time A-10 IP
—Flown an average amount recently
—Well-planned mission


USAF Photo by MSgt Val Gempis

USAFE Photo

No. 2:
—Fairly new wingman
—Flown an above-average amount lately
—Showed up late for the sortie
—Non-participant in the planning
—Indications of fatigue
No. 3:
—Solid, experienced two-ship Flight Lead
—Flown an average amount recently
—Participated in the prep/planning
No. 4:
—Fairly new wingman
—Flown an average amount
—Non-participant in the planning
—Intuitive pilot—above average SA

First of all, we're never going to construct or see anything like this graph. It's merely a visual representation of an intuitive process that Flight Leads/IPs/ACs go through on every mission…

What did we recognize/observe in this case:

Chronologically:

1. Experience level and general capabilities of the pilots are already known by flight members based on past exhibited performance/qualifications in the squadron
2. No. 1 and No. 3 involved in Mission Planning process
3. No. 2 and No. 4 show late
4. No. 2 inattentive and unfocused during flight briefing

The question now becomes, "What actions can the flight lead take to mitigate some of the shortfalls?" He has already realized that No. 2 has had procedural problems in the past—and he's definitely not the best "stick" or the sharpest pencil in the bin, and he didn't make himself available prior to the sortie to enhance his SA during the mission planning process.

Recognizing that No. 2 isn't up to snuff today, the flight lead determines to bump the min altitude up to 500 feet AGL and fall back to visual deconfliction between elements for ingress, attack and egress, so that the timing and target acquisition elements will be simplified for No. 2.

Essentially, the flight lead decreased the Required Mission Performance for the entire flight with the 500-foot AGL min and No. 2's and No. 4's required mission performance by simplifying target acquisition and egress. In adjusting the required mission performance he has, in effect, allowed No. 2's capable mission performance to meet or exceed the required level of performance for the mission.

Finally, while compensation for low-level performance in any of these four areas can be accomplished by increasing the performance level in another area, there obviously exists a minimum level that each of the four areas is subject to.

For example, there are minimum levels of training, currency, planning, and mental prowess, such that an increase in level of any of the remaining three will not allow the pilot to overcome the shortfall and meet the required mission difficulty/task loading—regardless of how low we set the value.

So… What am I getting at?

The simple fact is that experienced pilots have used ORM and the process discussed in this paper intuitively for years. As instructors, we always look for new ways in which to pass on techniques locked in our minds, in a digestible format to less experienced pilots, that we've had to learn through blood, sweat, and toil. The process I've just discussed above is just a long-winded breakdown of my personal thought process when determining individual limitations. ORM formally defines the process for determining acceptable levels of risk for mission success. Ultimately, both processes are presented in their simplest form so that pilots without an established personal technique can digest and use the format until they have established their own intuitive techniques over time.


P30

Heed The Details.

USAF Photo

Safety Privilege, The Finer Points

Photo Illustration by Dan Harman

MAJ KEVIN PROSSER
411 FLTS
Edwards AFB CA

The safety privilege is that promise of confidentiality that the Investigating Officer grants to certain witnesses during a mishap investigation. The promise means that nothing said in that interview will be used for any purpose other than preventing mishaps. The purpose of this article is to help aircrew understand the promise a little better.

Personally, I thought I knew all there was to know about the safety privilege. I mean, how hard can it be? The rules have hardly changed in 40 years. We get annual briefings. What could be confusing? Well, the rules haven't changed, but technology has, and that alone has put a spin on how the safety privilege is perceived and used.

For example, in 1943, if an accident occurred, privileged testimony could be the only evidence available to the investigator. This would make the entire safety investigation privileged. Today, however, the investigator has access to ATC tapes, Flight Data Recorders, HUD video, Cockpit Voice Recorders, telemetry, ACMI data, and the list goes on. Privileged testimony is still valuable, but is an ever-smaller percentage of the total evidence available. As a result, less and less of that safety investigation is privileged. This fact alone could lead some to infer that the safety privilege has eroded over time.

Let's start with a small quiz to evaluate your knowledge of the safety privilege and to illustrate some of the finer details about the safety privilege.

Scenario 1: Capt "Hot" Schott, while performing Advanced Combat Maneuvering, inadvertently exits his assigned MOA due to improper HSI and TACAN radial setup. In his confusion, he goes heads-down and has a near miss with a KC-135 in an adjacent refueling track. The KC-135 crew submits a HATR. The HATR form states: "This information will be used solely for mishap prevention and will not be used for disciplinary action." No investigation takes place, and six months after the HATR is filed, Capt Schott notices his performance report has a derogatory comment about his airmanship. Was privileged information improperly used?

Scenario 2: Lt "Notso" Lucky misses a step-down fix on TACAN final in Korea. He is saved when his Ground Collision Avoidance System alerts him to the terrain, and he takes evasive action. Unfortunately, the evasive maneuver over-stresses the aircraft. Notso takes all the appropriate action, including discussing the event with the wing safety officer. All testimony given was done with the promise of confidentiality. The safety officer reviews ATC tapes and aircraft HUD video. Following his investigation, Notso is grounded and FEB proceedings are initiated. Was privileged information improperly used?

Scenario 3: Major "Happy" Ower inadvertently shuts down the left engine following illumination of the right engine fire light. Happy successfully restarts the engine, declares an IFE, and recovers uneventfully. The engine fire has caused extensive damage, however. The Interim Safety Board (ISB) investigator interviews Happy and grants a promise of confidentiality. Happy confesses to the investigating officer that he was out late the night before, drinking at Hooters, and did not get much sleep. He tells no one else of the late night events. No TOX testing was done, but the SIB determines

the blood alcohol level through interviews with the Hooters waitress and bar tab receipts. The SIB report identifies Happy's late night activities as a cause of the extensive fire damage due to delay in shutting down the correct engine. Three months later, Major Ower is court martialled, and the first witness called by the prosecution is the Hooters waitress who served Happy. Was privileged information misused?

Scenario 4: Lt "Slow" Learner incorrectly performs the functional check flight profile for F-15. Slow was just recently upgraded to FCF pilot. While attempting the rig check, Slow gets much too slow, adds rudder, and the jet departs. Slow misapplies recovery controls, and recovery is delayed until just prior to ejection altitude. Following the flight, Slow discusses the profile with the safety officer, with a promise of confidentiality. The next day, Slow is grounded by his Operations Officer for one week, ordered to brief the topic at the next safety day, and his FCF qualifications are stripped pending further training. Was the safety privilege misused?

Was the safety privilege misused in these scenarios? If you answered "no" to all of the scenarios, you are correct. NONE involved the improper use of privileged information. Surprised? Now, I'll admit the actions taken against these officers may not be appropriate, but we'll leave discussions of appropriate disciplinary action to the commanders to contemplate. The point is that the safety privilege was not misused in any of the scenarios. Let's look at each and see why.

In scenario number one, there was no promise of confidentiality. That's right, despite what the form says, there was no promise of confidentiality. Only members of a designated ISB/SIB (or ingle Investigative Officer (SIO) can offer the promise of confidentiality. A form has no such authority. The Air Force does, however, grant immunity from discipilinary action to the persons completing the HATR, if the following conditions are met:

a. No criminal activity;
b. No mishap resulted;
c. The event was properly reported; and
d. The violation was not deliberate.

This immunity is NOT a promise of confidentiality and since Capt Schott did not complete the form, he is not granted the immunity.

In scenario two, only the testimony given was privileged, not the factual information. In this case, the ATC tapes and HUD video provide sufficient factual information for the commander to take action without the need for privileged testimony. The safety privilege is not a promise of immunity. Confessing bad behavior to the safety investigator does not make you immune from disciplinary actions by other investigating authorities.

For scenario three, the testimony provided is indeed privileged and cannot be used for disciplinary actions. Once again, the confession does not grant immunity, and in this case, the witness list (which is not privileged) will be provided to the legal investigation. When the Safety Investigation Board (SIB) interviewed the waitress, they were required to provide the name and contact information of that witness to the legal board. Once the investigator for the legal board interviews the waitress, all information acquired is factual and not privileged. In fact, even without the witness list, the testimony provided by the waitress would likely not be privileged. The SIB investigator cannot grant the promise of confidentiality indiscriminately. Rarely will the privilege be needed or extended to disinterested witnesses. As a result, her testimony is not privileged, even in the context of the safety investigation. Any analysis done by the SIB, to include calculations of blood alcohol levels and impairment of performance, would be privileged. The legal board would be forced to do their own calculations and analysis. Also, while we're on the subject, the legal investigator is specifically prevented from asking blanket questions like, "What did you tell the safety board?" They must formulate their own line of questions and their own analysis.

In scenario four, no punitive actions were taken. Only the Commander can punish. Remember, privilege does not mean private; if it did, how could the knowledge be used to prevent mishaps? What this means to you is everything discussed will be available to the squadron leadership. Can you expect the Operations Officer to allow one of his pilots to continue flying profiles he is obviously not properly trained for? To the aircrew, however, this really feels like punishment. Actions as serious as Form 8 downgrades and removal from upgrade programs are generally not considered "punishment" for the purpose of the safety privilege. FEBs, Article 15s, and courts-martial are punitive actions.

Did these scenarios surprise you? All of the above situations actually happened (10 per cent rule applies), and in each case there was a widely held perception that the safety privilege had been misused. Keep in mind that the safety privilege was designed to help the Air Force prevent mishaps, not to make aircrew immune to punishment arising from their own errors. The most important thing for aircrew to know about the safety privilege is how to protect it. With access to privileged information, our responsibility is to ensure those who don't have access don't get access. If you find yourself involved in a mishap, rely on your own integrity to do the right thing to help prevent future mishaps, realizing that sometimes the right thing might mean taking a little heat for your error.

Your fellow aircrew are counting on you; fly safe!

The Interim Safety Board: Laying The Groundwork For A Successful Safety Investigation Board

LT COL JEFF THOMAS
HQ AFSC/SEFF

It's Friday afternoon. You've just arrived home, anticipating a kickback weekend to re-energize, when the phone rings. On the other end is the Command Post telling you one of the wing's jets has crashed short of the runway during recovery. You breathe a sigh of relief as the Command Post tells you the pilot successfully ejected and the fire department has responded to the scene. Heading back to the base, your mind begins to race with all that will need to be accomplished. Not only will the Disaster Response Force be standing up to respond to the mishap site, but an Interim Safety Board (ISB) will be convened to preserve evidence for the Safety Investigation Board (SIB) that the MAJCOM will form.

Fast forward to arriving at the Wing Safety office and breaking out the Wing's Mishap Response Plan (MRP). How will it play out? Have you covered everything that the SIB will need when they finally arrive to pick up the investigation? Push the pause button and let's have a look at some of the basics an ISB is chartered to accomplish.

At the risk of over simplifying, the ISB has three primary duties:

—Preserve perishable evidence
—Accomplish initial reporting
—Prepare for arrival of the SIB

As noted, one primary function of the ISB is to preserve evidence for the imminent arrival of the SIB, which, depending on where you're located, typically occurs approximately 72 hours after the mishap. But what evidence should you preserve? And what does it mean to preserve evidence?

Enter the Wing's MRP. Contained in the MRP you should find checklists for all appropriate Wing personnel with responsibilities following a mishap, such as: Wing Commander, Operations Group Commanders, Maintenance Group Commander, Civil Engineers, Public Affairs, Judge Advocate, Medical Group Commander, Support Group Commander, Security Forces, Safety, etc. These checklists provide the guidance on what each individual is tasked to accomplish and what evidence should be collected, if applicable. Also included in the MRP are specific checklists for each member of the ISB.

The ISB typically mirrors the composition of the inbound SIB. Members include an ISB President,

One primary function of the ISB is to preserve evidence for the imminent arrival of the SIB.

USMC Photo by Cpl Bryson K. Jones

ISB Investigating Officer (a misnomer we'll discuss later), ISB Pilot Member, ISB Maintenance Member, ISB Medical Member, and a Recorder. AFPAM 91-211, (*USAF Guide to Aviation Safety Investigation*) Chapter 2.3, details the basic composition and qualifications of the ISB. Not mentioned in AFPAM 91-211 with respect to the ISB, are other personnel who have data collection responsibilities important to the ISB's preservation of evidence. Also included should be checklists for the Weather Officer (weather at the time of the mishap will need to be ascertained), Air Traffic Control Officer (ATC tapes will need to be impounded), etc.

So, what should the ISB members' checklists include? Well, it depends on the role they are filling. Have a look at AFPAM 91-211, Atch 3, for what should be included in the detailed checklists. (Technique: Compare this to what you've got written in your Wing's MRP.)

With that direction, let's cover a couple of items the checklists should not include. Remember, this is called the Interim Safety Board, not the Interim Safety Investigation Board, hence the misnomer on assigning an Interim Investigating Officer. The purpose of the ISB is to preserve evidence, not to investigate the cause of the mishap. Although most ISBs understand this, MRP checklists oftentimes don't reflect this. For example, while doing HHQ level evaluations of various wings' MRPs, I've come across the following direction embedded in the ISB checklists:

- Evaluate adequacy of planning, preparation and execution of the mission—Pilot Member
- Determine what technical representatives or assistance may be required to accomplish the investigation—Investigating Officer/Mx Member/SE
- Remove from the site for detailed examination those components that failed before impact—Maintenance Member
- Review and analyze ATC training qualifications and experience of personnel in contact with mishap aircraft—Airfield Operations Officer

Bottom line: ISB checklists should never direct any member of the ISB to evaluate or analyze anything. That is the job of the SIB. (Hint: Look for these types of issues in your MRP.) You might be asking, "What does it matter if the ISB lead turns the analysis?" Remember, one charter of the ISB is to preserve perishable evidence. Stated another way, the ISB is to "impound and seal without alteration" items used in planning the mission, training/qualifications records, aircraft maintenance records, the equipment involved in the mishap, etc. Depending on how you interpret "evaluate or analyze," valuable evidence could be altered before the SIB arrives. For example, on the ISB the Maintenance Member decides to pull and reset circuit breakers on a mishap aircraft trying to "simulate the malfunction." This has the possibility of giving the SIB an altered starting point with regard to what began the mishap sequence, possibly misdirecting the investigation. Conversely, if a mishap pilot has the opportunity to review a HUD tape prior to the ISB impounding it, this could lead to a skewed recollection of events when the SIB conducts interviews with the pilot. So, the ISB is to "impound and seal without alteration" items relevant to the mishap.

Several years ago, the problems with ISBs accomplishing the mandates of the above paragraph had become so diluted that a MAJCOM Commander released the following guidance to his Command:

"…AT NO TIME PRIOR TO THE HAND-OVER OF EVIDENCE TO THE SIB BOARD PRESIDENT SHOULD ANY PIECE OF EVIDENCE BE REVIEWED, COPIED, TAMPERED WITH, OR MODIFIED. THE INTEGRITY OF EACH PIECE OF EVIDENCE IS CRUCIAL TO THE SUCCESS OF THE INVESTIGATION AND THE AIR FORCE'S MISHAP PREVENTION PROGRAM…"

Going hand-in-hand with preserving perishable evidence and preparing for arrival of the SIB is the accomplishment of initial interviews. Although this would seem to be a rather straight-

forward process, common weak areas reoccur from time to time. First among them is not reading the privileged (or non-privileged) statement as found in AFI 91-204, Safety Investigations and Reports, to those being interviewed by the ISB and ensuring the statements are recorded onto the interview tape. AFI 91-204, Chapter 3.2.6.2, directs, "If a promise of confidentiality is offered and accepted, it must be documented. Use the sample witness statement format in Figure A3.2. for written statements. Read, record, and transcribe the statement in Figure A3.3. for recorded interviews of witnesses." The same is also true for non-privileged interviews, with the guidance found in paragraph 3.2.6.3.

Second, when accomplishing the initial interviews, as a technique, just let the interviewee talk. Turn on the tape recorder, make sure the privilege (or non-privilege) statement is read onto the recorder and just say, "Tell me what happened." Let them tell their story uninterrupted. If you do have questions, hold them until the end of the interview. The participant's best recollection of the event for SIB analysis will most likely come from this initial interview. Hence, the desire to let them tell the story in its entirety and without interruption.

However, all the above with regard to interviews is meaningless if the interviews don't successfully make it onto the tape. Too often, ISBs fail to preflight the recorders to see if they can actually pick up audio, or they fail to determine the best distance to place the recorder from those being interviewed to record the conversation, etc. So, pre-flight the audio equipment! Nothing is more frustrating to a SIB than a box of initial interview tapes that contain nothing more than static or every third word captured simply because the ISB didn't properly record the interviews.

Lastly, with regard to interviews, keep track of who was interviewed when, and which tapes contain what interviews. Document it on an Excel spreadsheet for turnover to the SIB. It's very frustrating to SIB members when they arrive, only to be handed a box of unlabeled tapes from interviews the ISB accomplished. Interviews can be done on analog recorders (mini-cassette tapes) or on digital recorders. If done on analog recorders, a good technique is to use one tape per interview. Again, label the tape with the interviewee's name and the date the interview occurred. This makes it much easier for the SIB to figure out which interviewees are on which tapes, which interviews have been accomplished and, when transcribing, where the tapes can be found. Similarly, with digital recorders, download compiled .wav files for each interview onto a CD-ROM or similar media, and label each interview with the name of who was interviewed and on what date. Again, asking the SIB to wade through multiple interviews listed only as DWA-0002.wav, DWA-0003.wav, etc., is not helpful. Lead turning this issue for a SIB will help free up valuable time during the 30-day investigative process and may preclude ISB members from having to return to sort out the mess for the SIB.

Bottom line: What the ISB does or does not accomplish immediately following a mishap will have a significant impact on the SIB and their investigative efforts. Referencing the same MAJCOM Commander message we looked at above:

"MISHAP PREVENTION AFFECTS COMBAT CAPABILITY. THE ABILITY OF A SAFETY INVESTIGATION BOARD (SIB) TO RECONSTRUCT THE SEQUENCE OF EVENTS LEADING TO A MISHAP IS CRITICAL IN MISHAP PREVENTION, PRESERVATION OF COMBAT ASSETS, AND MOST IMPORTANTLY, THE SAFETY OF OUR PEOPLE. INITIAL ACTIONS TAKEN BY THOSE RESPONDING TO A MISHAP BEFORE THE ARRIVAL OF THE PERMANENT SIB ARE CRUCIAL TO THE SUCCESS OF THE BOARD TO ACCURATELY DETERMINE WHAT HAPPENED, AND TO RECOMMEND ACTIONS TO PREVENT A RECURRENCE."

Make sure your ISB is laying the groundwork for a successful Safety Investigation Board.

USAF Photo

LT COL JAY FISHER
Joint Staff J-34

USAF Photo by MSgt Val Gempis
Photo Illustration by Dan Harman

About 10 years ago, I received the best illustration of inflight safety in my short (seven years at the time) AF career. I had been an instructor and evaluator in the B-52 and MC-130, so needless to say, I thought I had a pretty good idea on how to be safe in the air. (I remember when I decided to become a navigator in the Air Force, a family member told me the old cliché, "There are old crewmembers and bold crewmembers, but there are no old, bold crewmembers.")

As an evaluator, I attended aircrew certification boards to make line crewmembers into instructors/evaluators/aircraft commanders. (For simplicity, I'll refer to this group as instructors.) The usual lineup for certification boards included training, stan/eval, safety, and then the Squadron DO (Lt Col Gary Hogg, now retired). Each office gave their inputs to the newly ordained instructor. The MC-130 crewmember experience level was deep. Our pool of personnel flowing to AFSOC consisted of instructors, evaluators, and flyers with approximately 1,000 hours of tactical low-level operations. By the time crewmembers were ready to become instructors in AFSOC, they possessed experience in AFSOC and approximately 1,500 hours. The DO always spoke last and gave his words of congratulations followed by wisdom/guidance.

Lt Col Hogg explained his concept of flight safety as three concentric circles. Each circle represents the limits/capabilities of three factors of inflight safety. The three circles, from the innermost outward, are the aircrew, the instructor, and the aircraft (Figure 1). As long as the circles remain

Figure 1

somewhat concentric, the aircraft and crew should remain in a safe position. The goal of the newly appointed instructor is to allow the aircrew bubble to "float" within the boundaries of his own capability bubble. Situations develop when one of the circles infringes into the next layer. For example, when the aircrew capabilities exceed those of their instructor, they could put the aircraft in a precarious position. As Figure 2 illustrates, the aircrew's

Figure 2

capabilities exceed those of their instructor, but not the limits of the aircraft itself. This situation will result in an exciting debrief: Who's to blame? The aircrew? The instructor? It's not cut and dried. Was the instructor complacent? Or did someone on the aircrew accomplish an action before the instructor could react to it? Either way, the crew is lucky and need to extensively debrief the situation.

As a new instructor, your ring should start out only slightly larger than the aircrew's. This permits learning at all levels and allows you to instruct on a safe level while keeping the aircraft in a safe condition. A good analogy to this situation is an annual evaluation…you should learn on every checkride, but if you learn too much, you are Q3.

Most aircrews can fly around accomplishing normal tactical/proficiency training and not scare anyone. However, things happen when the crew attempts to push the limit of an AFI, threat maneuver, weather, etc. Most squadrons with crew-type aircraft fly with a wide variety of aircrew experience on every flight. In fact, our MC-130 Squadron flights in the past flew young copilots or engineers with experienced pilots...it just made sense. Over the years, this common sense has been called CRM, Quality, and now ORM. I've always called it just plain good leadership (from the aircraft commander to the squadron commander).

As your time increases in the airplane and you understand the aircraft's capabilities, your instructor ring should grow close to that of the aircraft. My question to you is this: Since you are a seasoned instructor, will your ring be close to the aircraft's on every flight? Obviously, the answer is "no." If you said "yes," let's think about your choice. There are too many variables to permit a static ring. These variables include, but not limited to, the following influences: sleep, diet, medication, deployments, location of flight, and home life. But wait a minute. Don't those safety guys tell you to run a "personal checklist" before stepping? Hmm, could it be the old IMSAFE thought process (Illness, Medicine, Stress, Alcohol, Food and Emotions)? Unless you can guarantee to bring your "A" game on every flight, your instructor circle size will be dynamic.

Your ring should also be dynamic inflight. Your personal proficiency will dictate the limits you place on the crew. If you haven't accomplished certain events in a few flights, then your instructor ring for those areas should shrink. Your instructor capabilities may be stronger in certain phases… expand your ring. Your final consideration should include when events occur in the sortie. Is your weakest event occurring six hours into your sortie? Use your brain and good ORM before you act.

The aircraft ring is the final boundary. The limits of the aircraft are set for the aircrew by the Dash-1 with other safety factors detailed in each MDS 11-2 Volume 3 series AFI. In the previous paragraphs, I discussed the consequences of permitting an inner circle to overlap an outer circle. What occurs when the instructor or aircrew circle extends through the aircraft limits? Only bad words result…these include over-G, over-torque, destruction of aircraft, injury, loud metal noises, and even deaths of crewmembers or ground personnel. Is it worth it? Our squadron leadership insists they will tell us when it is necessary to push the limits for a particular mission. Make no mistake; this "pushing" will only occur during a contingency. The current AF buzzword is ORM. Once again, I'll go a step further and add great leadership. Flight ORM starts from above and is executed by the crewmembers.

Every instructor must evaluate his or her state of readiness before each flight (both physical and mental). Know who you are flying with, and know your leadership's thought (ORM) process. It doesn't help when you are ready to execute a mission if you don't understand the amount of risk your leadership is willing to accept for that specific mission. Finally, you must know the capabilities of the crew you are flying with. Combining all the above knowledge permits you to determine the size of the two inner circles.

Fly smart, understand your crew's capabilities, and your leadership's ORM. Sounds easy, right? Then a 50 percent reduction of inflight Class A mishaps is truly attainable!

Safety Second?

MAJ SEAN MCGLYNN
436 AW
Dover AFB DE

USAF Photos

"Mission first, safety second." It was refreshing to hear this from the Air Force Safety Center in the first days of the Flight Safety Officer Course. If it was "safety first," we would never climb into the plane, or even leave our house in fear of getting in a car accident on the way to work. That motto has always taken away from previous safety programs. It was nice to finally hear from the Air Force what we have all known since swearing in. We fly planes and by nature it has risk. We are mission hackers, can-doers, and not completing the task at hand is taken as a personal failure when the mission does not go as planned.

Safety is a buzzword for some—thrown around when supervisors are present. You know the drill. A not-so-uncommon opinion regarding ORM: another quality program that got someone promoted, another mandatory checklist I have to fill out before takeoff, or the stuff that gets in the way of me getting the mission done. It is the "group hug" throwing off the sequence of events before takeoff.

My paradigm has shifted with a "safety second" and ORM approach. We have all seen the safety scare tactics: the finger torn off by a ring or the guy who briefs the squadron for an act of stupidity. A more in-depth discussion of risk management has made me realize that there are many aspects of ORM that are not written in the AFI, and that it is here to stay. What has changed my opinion? The process makes sense just like "safety second." Like any process it has its flaws, but it's a better approach than how we have gone about it in the past. It has made me realize that proper prevention is tough to acknowledge, how vital it is for leadership to set the tone, and how a little ORM could have kept me out of trouble earlier in my career.

Proper prevention is almost never rewarded. You need to be satisfied just knowing you made the right call. It is tough because the result usually has a *short-term* negative impact on mission accomplishment. "Great job canceling the mission last night," and "thanks for getting us that late takeoff" are not really the atta-boys we strive toward. There's a laundry list of why we might take unnecessary risks; fear of reprisal, "no-go" label, or organizational pressure (real or perceived) makes it a tough call—especially when it is not the popular opinion. You'll have to answer some mail, and the path of least resistance is to suck it up and press. These pressures are not more important than the task being accomplished. Accepting the proper amount of risk for the benefit gained makes much more sense than "safety first." Risk management must be a mindset throughout the organization.

Risk management will not happen without leadership. A unit's organizational culture toward risk management is driven by the people in leadership positions. A situation earlier in my career is a great example. As a hand-picked banked pilot fresh out of pilot training, I found myself assigned to the Mobile Flight in the Aerial Port Squadron at Charleston AFB, SC. My first deployment was as the officer in charge (OIC) of 30 personnel to Cairo West AB for the Aerial Port during the redeployment of forces out of Somalia. On the last day of closing down the base, we encountered a loading

problem for one of the last planes out. For whatever the reason, we could not drive a stairtruck onto the C-5 we were loading and did not have any way to put it on a K-loader. A few of the Airmen began to brainstorm and engineered a plan. With dissimilar forklifts, we positioned one on each side of the stairtruck and proceeded to slowly lift it in the air. With the two different types of forklifts and the higher center of gravity on the stairtruck it started to lean to the left and then to the right as the forklift drivers carefully orchestrated the lift. Once the stairtruck was high enough in the air, a third person drove the K-loader between the two forklifts and under the stairtruck. The forklift drivers then lowered the stairtruck onto the K-loader so it could be driven onto the airplane.

This Darwin Award act of stupidity obviously was no exercise in proper ORM. The most important lesson from that incident for me was how important leadership is in establishing an ORM culture in the organization to manage risk. I was a very inexperienced aerial porter at the time and I was surrounded by loading experts; however, I was still the person in charge. Mission failure to me on that day was not getting that plane loaded. One of those Airmen could have been killed on the ramp that day in Cairo. Sure, we moved the mission that day, but we failed in so many other ways. My biggest failure, out of many, in this event was that I set the tone for that deployment. My message was to get the job done—period. The Airmen driving the vehicles knew it was dangerous, but were willing to take the risk because of the "get-the-mission-done-at-all-costs" tone that I had set.

Leaders at all levels must employ risk management. The tone you set is what many of those you supervise will follow. In hindsight, "Good job leaving the stairtruck in Cairo" would have been mission accomplishment that day. Looking back at this event in the study of ORM has helped it make much more sense.

Did I have common sense back then? I would like to think so, but this scenario doesn't really paint a good picture. I was relying on my individual experience, or *in*experience in this case, for mission accomplishment. The systematic approach of ORM would have provided a more logical decision-making process. Minimal knowledge of the ORM principles and process may have prevented this buffoonery.

Principle number one is accept no unnecessary risk. Unnecessary risk comes without corresponding return. Common sense, sure, but it forces you to stop and think what exactly is the benefit gained by this risk. It helps detach you from "being a mission mover" just for the sake of getting done and completing what you set out to do. The risk of injuring those Airmen far outweighed the benefit of loading the stairtruck that day. A quick assessment of the obvious hazards involved makes me think that much more about how bad things could have turned out. Given this fact, there were numerous risk control measures that could have been taken to mitigate the obvious risks on that day. ORM is not perfect, but this logical process would have been very helpful to a deployed lieutenant with minimal supervisory and technical experience. This is why it's paramount that commanders ensure subordinates know how much risk is acceptable at their level and when they need to elevate the decision.

The fact that the mission is completed does not make it a success. If we don't complete the mission today because the risk outweighs the benefits—it is a success. ✈

Photo Illustration by Dan Harman

MAJ ROB POCHERT
92 ARW/SEF
Fairchild AFB WA

STEP ZERO: ?
STEP ONE: Identify the Hazards
STEP TWO: Assess the Risks
STEP THREE: Analyze Risk Control Measures
STEP FOUR: Make Control Decisions
STEP FIVE: Implement Risk Controls
STEP SIX: Supervise and Review

Operational Risk Management (ORM) is designed to be a continuous process to detect, assess and control risk while enhancing performance and maximizing combat capability. The Air Force developed a systematic six-step process to analyze the risks and assess hazards that does a good job of evaluating these factors. But our ORM process makes one critical assumption that must be addressed in order to obtain a full Risk Management assessment. The assumption is *the action being evaluated is worth the effort.* This takes us back to the third of the four basic ORM Principles:

1. Accept no unnecessary risk.
2. Make risk decisions at the appropriate level.
3. Accept risk when benefits outweigh the costs.
4. Integrate ORM into operations and planning at all levels.

The Air Force ORM Fundamentals course says, "In order to perform a good mission task analysis, first you must know what's at risk." I disagree. In order to perform a good mission task analysis, first you must know what the reward is. In other words, "What is the payoff for the assumed risk?" We humans make judgments based on a risk vs. reward model. This is how we are hard-wired to think in the brain. Understanding this primary decision-making driver is key to understanding why we continue to make poor decisions. The problem is human beings are really bad at assessing what the risks actually are (this is where the ORM process is really helpful), and we are really bad at assessing what the rewards actually are. This is the weak link in the six-step ORM process and is the weak link in the three-step Personal Risk Management process. In other words, do we have a *reward assessment model?*

STEP ZERO: Why am I doing this? (What's the reward?)

People are motivated to assume risk based on a reward. Joining the military has a level of assumed risk—very few jobs assume that you can get killed as a regular course of pursuing your occupation. Police officers, firefighters, race car drivers, airline pilots, bus drivers, factory workers, farm workers (and accountants, doctors, office workers, etc.) all share the fact that in order to achieve the reward (pay, personal satisfaction, public recognition, etc.) there is an assumed level of risk. For certain activities, the risk is the same. Base jumpers and accountants share the same risk driving to work.

How we assess the reward in relation to how we assess risk is the key to successful decision-making. In the flying community, successful aviators are usually described as having good situational awareness (SA). I have been asked in many Crew Resource Management seminars, "How would you define SA?" Over the years, I developed the following answer: "Situational Awareness: When your perception of reality matches reality."

When aviators' perception of the environment in which they operate matches the actual conditions, they are able to correctly assess what needs to be done. They can then successfully implement a course of action. This is called "having good SA." Conversely, the further one's perception of reality deviates from (actual) reality, the greater the probability of something going terribly wrong. No one deliberately flies an aircraft into the ground, but controlled flight into terrain (CFIT) continues to be a leading cause of aviation mishaps. Why? Perception does not match reality. The result is bent metal and broken people.

The same problem exists in risk management decision-making. Someone who can accurately assess the reward and the risk can make successful decisions about whether or not a specific action should be accomplished. Over- or under-estimates of the actual risk/reward values can lead to poor decisions. This is true regardless of how well you perform Step 1 through Step 6 of the ORM process. So, why do we make poor decisions? We are wired that way.

Psychology and Behavioral Factors

The assumption that human decision-making is based on a rational assessment of the situation and a dispassionate implementation of a course of action is one of the biggest fallacies we must overcome. The application of psychological and behavioral sciences research shows why we make poor decisions. Interestingly, most of the recent research in this area hasn't been done in the aviation community for safety reasons. It's been paid for by Wall Street for profit reasons.

Investment research into psychological and behavioral factors has yielded some significant theories that explain the swings in the stock market. The idea is that if you understand what is driving the stock market (i.e., human decision-making) then you can exploit these factors and make a lot of money. This same research can be applied to risk management. Professor Daniel Kahneman and Dr. Amos Tversky developed a model called *prospect theory* to explain how people actually make decisions. First published in 1979 and later revised, they attempted to explain how people actually make decisions rather than to determine how people *should* make decisions. Later researchers have expanded on their ground-breaking theories and developed a useful picture of what is really going on when we humans are trying to make a decision. Here's the "Reader's Digest" version:

First and foremost, people associate a loss with a greater amount of pain than the amount of pleasure they get from an equivalent amount of profit. A rational person would view a $1 loss with the same weight as a $1 gain, but we don't. Empirical research shows a loss "stings" twice as much as a comparable gain feels "good." We have an irrational tendency to be less willing to gamble with profits than with losses. Stated another way, we are willing to accept more risk to avoid a loss, than we are willing to risk for an equivalent profit/gain. This is one of the key subconscious drivers of our decision-making.

Second, decision-making is reference level dependent. Most people don't consider the long-term or overall objective. Decision-making is based on a change in the status quo. The problem is we become comfortable with a certain level of risk exposure after a period of time. This is called diminishing sensitivity, and we see it every day in the operational theater. After 4 1/2 years of combat operations, many missions that were considered "high risk" now seem routine to the operator. This leads to complacency.

A whole field of study has opened up looking at the concept of "framing." Saving 20 percent on a $100 purchase sounds a lot better than saving only 10 percent on a $200 purchase; the reward, however, is exactly the same…$20. The way a choice is presented is often just as important in the decision-making process as the facts. Doctors like to discuss a patient's chance of survival in the terms of a "survival rate" rather than a "death rate." Studies have shown people are more likely to accept a treatment option that has a 30 percent survival rate rather than a 70 percent failure (e.g., death) rate, even though the statistical probability of survival is the same.

Third, human decision-making is based on a subjective assessment of probabilities rather than an assessment of *actual* probabilities (i.e., a qualitative assessment). The big problem is that our

ability to collect information, process data, and then apply statistically correct data to make daily decisions exceeds the capacity of our brains. As a result, we make assumptions about our daily lives to make the decision-making process simpler…so our minds can work in a timely manner.

For normal (civilian) day-to-day life, these assumptions work and the impact of these assumptions don't normally have a significant impact on our lives. These are the typical shortcuts we make:

1. We tend to give too much value to recent events and extrapolate them to evaluate future events.
2. We see order where it doesn't exist and interpret accidental success to be skill.
3. We are overconfident in our abilities. We tend to focus on our successes and overlook our failures.
4. Small probabilities are often assumed to be equivalent to a zero possibility.

The problem is, in the aviation community these assumptions can get you killed. A great example of shortcut No. 4 is United 232. United Captain Al Haynes found out the hard way that a small probability does not equal zero possibility on 19 July 1989. The DC-10 airliner had a triple-redundant, hydraulic flight control system that *should* never fail. Captain Haynes was once told the flight control system had a one-in-a-billion chance of failure. As a result, the engineers never thought about total flight control failure, and the aircrews were never trained to handle it. Despite the extremely low probability of occurrence, total flight control failure happened. Captain Haynes and his flight crew did their best and, amazingly, 184 of his 296 passengers and crew lived.

Another key factor that contributed to the high number of survivors at Sioux City is the local community's Disaster Preparedness coordinator. The Sioux City area held an exercise to simulate the crash of a large commuter airliner at the very airport where Captain Haynes (crash) landed. Despite the fact that Sioux City airport did not cater to large commuter aircraft (i.e., a low probability of occurrence) and the fact that an airliner hadn't crashed in Sioux City before (are we starting to see a pattern…), they planned for the worst case. In fact, not only did they have a plan, but they had recently exercised it!

Once word came that an airliner was about to crash, the community response network was energized, and emergency responders were waiting on the tarmac for United Flight 232. Luck also played a role. Since shift change was occurring at the time of the accident, the area's emergency response network kept workers on duty. Area hospitals were double-staffed. Many people owe their lives to the fact as soon as they (literally) hit the ground; medical professionals were there to triage and transport them to area hospitals that were ready and waiting.

ORM Step Zero

So, how do we apply this to ORM? First, we should accept the fact that we desire to take action based on an emotional and flawed perception of the situation. This should drive us to take a step back and ask, "What is the long term objective?" Overall, you should consider what is the desired result or end-state. Is it a combat objective (operational)? Is it a fully-trained pilot (training)? Is it saving the life of a critically injured patient (medical evacuation)? Hopefully, planning and command elements have already considered this. Sometimes they don't.

Then we have to ask, "What reward am I seeking, and how does that support the answer to question 1?" Since we have identified the goal, you then establish what the reward actually is for the action being considered. The key is ensuring the action will yield the expected reward. That reward will, in turn, support your overall objective.

Finally, ask the question, "Has the reward been rationally and dispassionately assessed to determine the actual probability of a gain?" This is the hard part of reward assessment. Research into investment decision-making show most people believe the stock market will continue to go down after a significant loss and that it will continue to go up after a serious run-up. This belief runs counter to the basic investing principle of buying low and selling high. This also runs counter to a statistical analysis of the stock market's performance.

Warren Buffet, Bill Gross and Jim Cramer all have made piles of money by making a dispassionate assessment of a company's value and then made rational decisions based on those assessments. Anyone who has seen Cramer's "Mad Money" program might argue he isn't dispassionate, but don't confuse the energy and enthusiasm of his delivery with the content of his analysis. They are quite different.

This is where we should then pick up the six-step ORM process and look at hazards and risks. We should apply reward analysis not just for ORM, but for all of our Risk Management processes. This is a useful and vital first step for Operational Risk Management and Personal Risk Management, because the idea is based on the risk versus reward model used by everyone whether you are in the air, on the ground, on-duty or off-duty.

FY06 Flight Mishaps (Oct 05-June 06)

16 Class A Mishaps
0 Fatality
7 Aircraft Destroyed

FY05 Flight Mishaps (Oct 04-June 05)

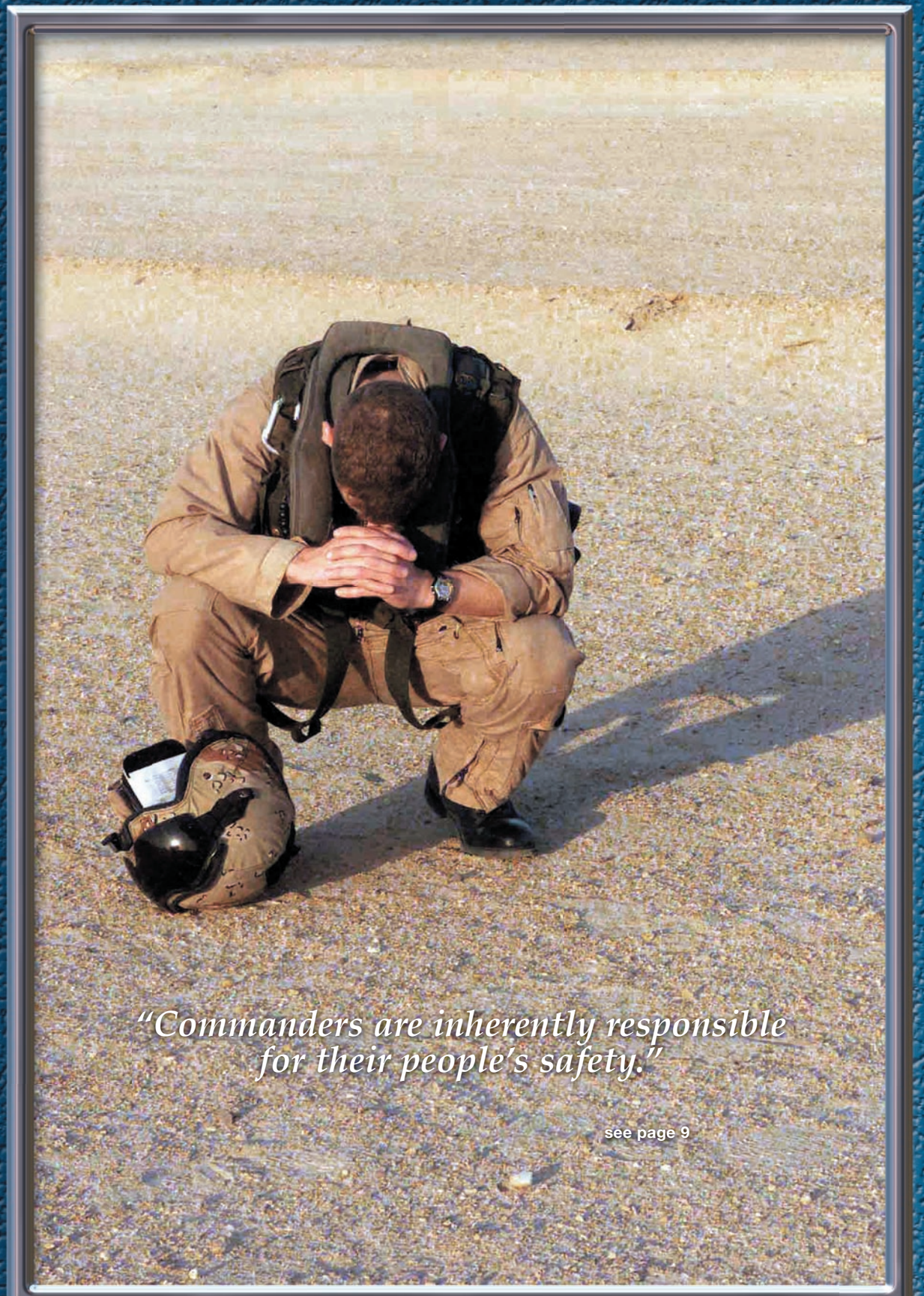
29 Class A Mishaps
12 Fatalities
11 Aircraft Destroyed

09 Oct		An F-16C departed the runway on landing rollout; pilot egressed safely.
20 Oct	✶	An F-22A ingested an NLG safing pin into the #2 engine; no intent for flight.
21 Oct	✶	An MQ-9L landed short of runway; gear collapsed.
24 Oct	✶	An Aerostat was destroyed during a hurricane.
28 Oct		An F-16C departed the runway on landing rollout; pilot egressed safely.
02 Nov		A C-5A had a #2 MLG bogie fire after landing.
17 Nov		A C-17 had a #4 engine compressor stall and fire.
28 Nov		An F-16C departed the runway on landing rollout; pilot egressed safely.
06 Dec	✶	An A-10A had a landing gear collapse on takeoff.
13 Dec	✈	A T-38 had a bird strike; aircraft crashed, pilots ejected safely.
17 Jan	✈	An F-15C crashed into the ocean; pilot ejected OK.
14 Mar	✈	An F-16C experienced buffeting and uncommanded pitch/roll; pilot ejected safely.
30 Mar		An F-16C crashed; pilot ejected safely.
30 Mar	✈	A T-38C landed short of runway.
03 Apr	✈	After an emergency RTB, a C-5B landed short of runway, aircraft destroyed.
05 Apr	✈	An F-15C crashed into the ocean; pilot rescued with multiple injuries.
11 Apr	✈	An F-16C crashed after takeoff; pilot ejected with minor injuries.
21 Apr		An F-16C sustained engine damage from bird strike on takeoff; RTB OK.
08 May		A B-1B landed gear-up.
23 May		A C-5B suffered a hard landing.

Editor's note: The 20 Apr mishap and the 2 May mishap were downgraded to Class B.

- A Class A mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.
- Reflects only USAF military fatalities.
- "✈" Denotes a destroyed aircraft.
- "✶" Denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Ground" mishaps that are shown here for information purposes.
- Flight and ground safety statistics are updated frequently and may be viewed at the following web address: http://afsafety.af.mil/AFSC/RDBMS/Flight/stats/statspage.html.
- **Current as of 19 Jul 06**.

U.S. GOVERMENT PRINTING OFFICE 2005-560-493-41012



"Commanders are inherently responsible for their people's safety."

see page 9