



THE NEW YEAR'S EDITION
EDGE
DECEMBER 1999

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THE COMBAT EDGE

Air Combat Command
Safety Magazine

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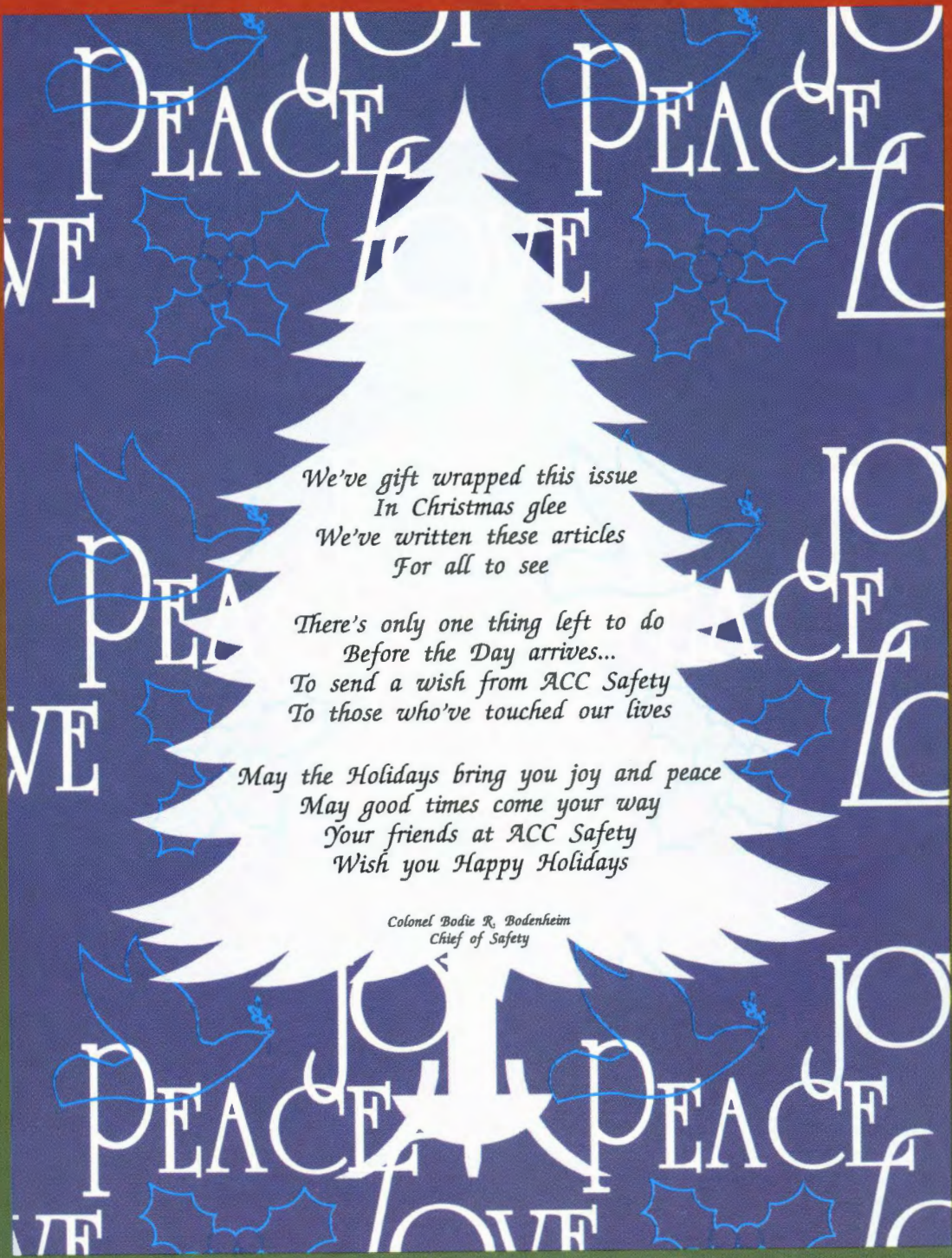


DEC92

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VOLUME 1

ISSUE 7



*We've gift wrapped this issue
In Christmas glee
We've written these articles
For all to see*

*There's only one thing left to do
Before the Day arrives...
To send a wish from ACC Safety
To those who've touched our lives*

*May the Holidays bring you joy and peace
May good times come your way
Your friends at ACC Safety
Wish you Happy Holidays*

*Colonel Bodie R. Bodenheim
Chief of Safety*

Safety can **DANGEROUS**

safety can be dangerous



Lieutenant General Michael A. Nelson
Commander, 9 AF
Shaw AFB SC

I tell you, safety can be dangerous. Sound crazy? Like something only a guy recently out of the Pentagon could come up with? Let me explain. It's not the objective -- safety -- I worry about, it's the misleading notion represented by the word itself, that makes me nervous. Too often I think we view safety as a thing, something we can bottle and sell. And if you buy enough of it -- have a good safety office and a good safety program; for example, the outcome will be satisfactory. Well, a good safety office is helpful and so is a good safety program, but safety -- the objective -- is much, much more. It is a way of thinking about our jobs and our lives, and that way of thinking is pervasive and inclusive. It's an "all waking hours" thing with no beginning, no end and certainly, no package. To the extent we think of safety as a package, it too easily becomes somebody else's responsibility, and then it gets dangerous. It's not the safety officer's responsibility (solely), it's not the commander's responsibility (solely), it's ours, yours and mine. And it's not something you and I can relegate to safety briefings or commanders calls. Avoiding processes and behavior that put our equipment and our people at undue risk should be ingrained as much as any other highly prized virtue such as honesty, integrity and dedication.

Just as those virtues, which we so correctly admire, call for courage to bring them to reality, so, too, does safety. Courage and safety, you say? Got it backwards? Safety is caution and therefore timidity? Wrong. I would argue that the attitude we want that results in the safety objective requires frequent applications of courage.

Consider but one example: It is the eve of a long awaited deployment to your unit's Checkered Flag base. You are number three, deputy lead, of the first four ship of 12 aircraft.

be



Through the past six months, you have been a key player in the organization and planning of this deployment, and you have worked hard to secure this position in the flight line up. You are good at what you do, best in weapons employment, and you won the Top Gun award during the recent wing Turkey Shoot. Things couldn't be better. All preparations are complete, the birds are configured and the crews have been briefed. Tomorrow is the big day. You retire for the night on an emotional high, filled with enthusiasm and anticipation.

It was a bad night. Your two year old twins contracted the flu and kept both you and your wife up for most of the night. You were able to get only one hour of real sleep; you are tired, not fully up to speed, and internally, as you watch the clock time inexorably question if you should handle the pending nine hour flight in the cockpit.

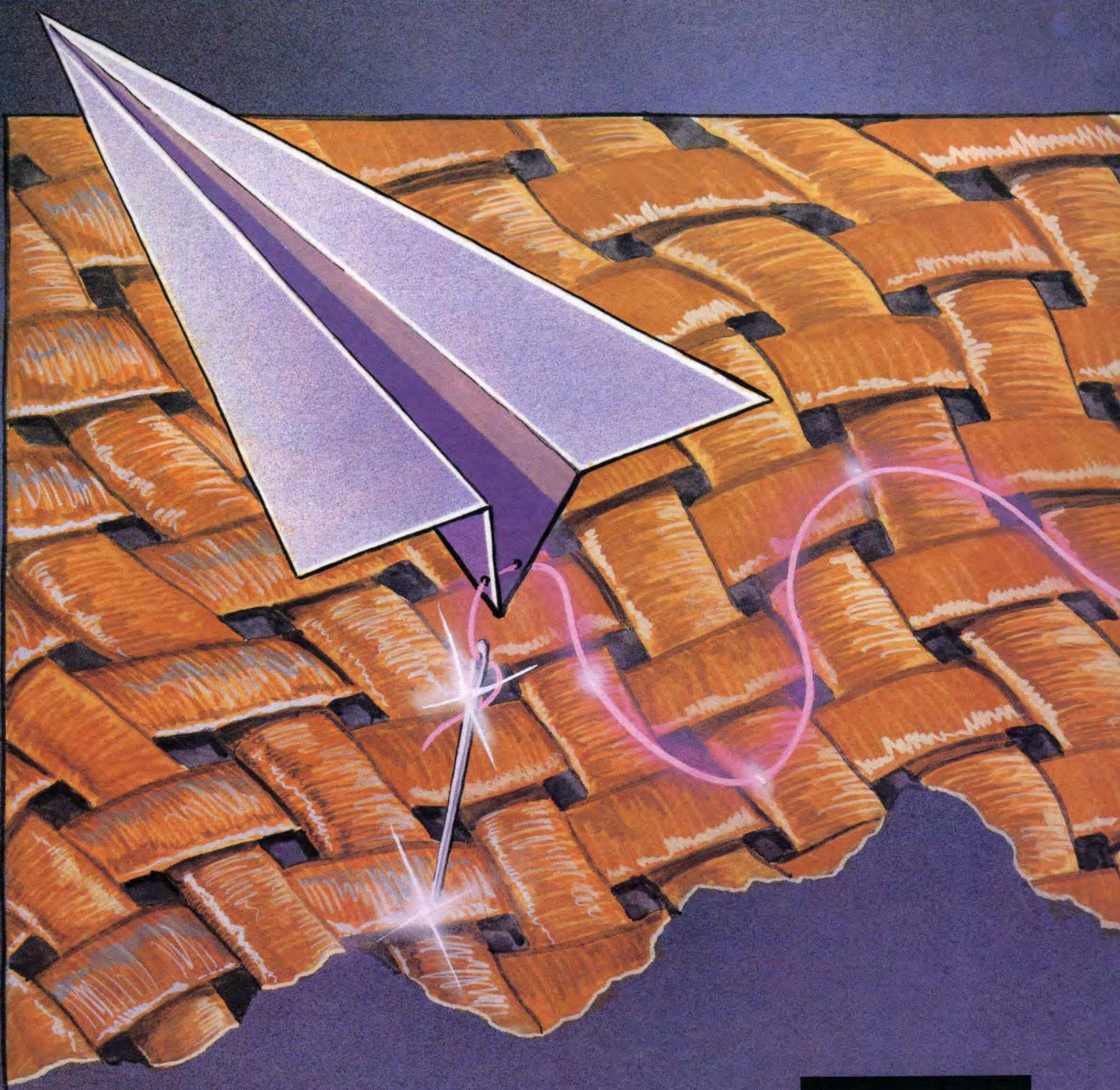
This is purely a hypothetical situation, of course, yet it is like situations that all of us have faced. You agonize over your dilemma -- you worked hard for this deployment, you want to be in that first four-ship, you don't want to let your boss and fellow pilots down. Above all, you don't want to be a wimp. But you also realize that you are not mentally or physically up to speed. In the end, you make the right decision and phone your supervisor to request that your name be removed from the deployment schedule.

It took courage to make that decision even though it was the right one. And your supervisors also made a wise decision when they fully supported

Accepting that responsibility means occasionally standing up to be counted when it may not be easy to do that.

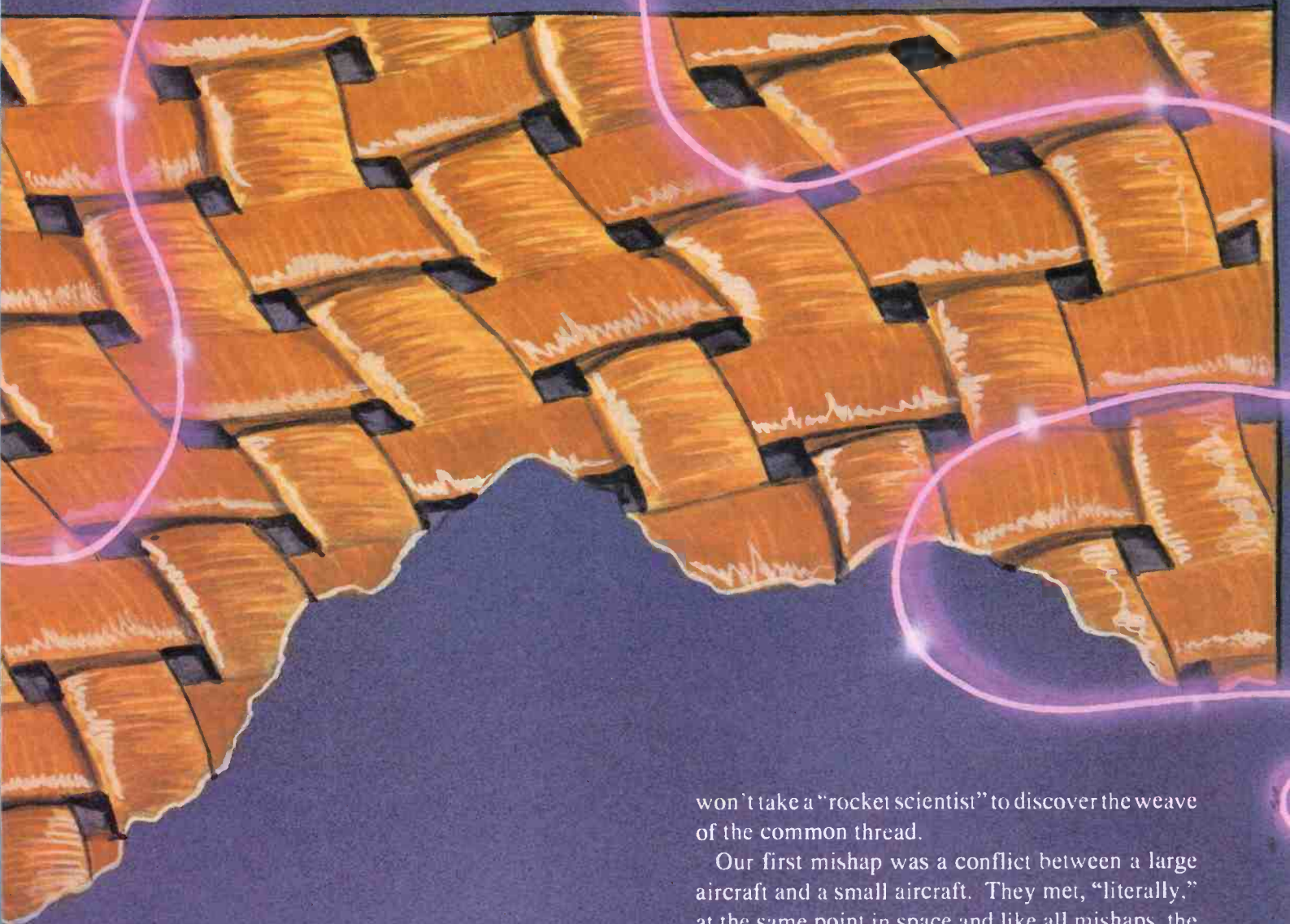
your request and replaced you on the flight schedule. They exhibited their own courage by not urging you to drink some coffee and "see how you feel" - and by establishing the atmosphere in the squadron where you will not be reminded of your choice later on. The courage to make the right decision and the courage to support that decision at all levels are absolutely necessary in our daily approach to how we do business.

So, the safety-related message I bring to 9AF and ACC is that there isn't one. There is an attitude message we all need to pay attention to. No one escapes responsibility. And accepting that responsibility means occasionally standing up to be counted when it may not be easy to do that. That you have and will continue to do so is what makes us a powerful, effective (oh, and by the way, safe) Air Force. ■



*Lt Col James D. Teigen
HQ ACC/SEF
Langley AFB VA*

Weaving A Common Thread



If you stand too close to a work of art, you may see the detail; but you lose sight of the overall effect the artist is trying to convey. This concept also applies in mishap investigations; stand too close to the intimate details and you lose perspective on the overall underlying reasons for the mishap. Some may call it hindsight, the observance of the common thread, because hindsight improves with distance and space. Call it what you will, but the truth of the matter on identifying trends is to look for the common thread. It's always there in mishap investigations, and lately it's been weaving through too many of our mishaps. Let's spend some time looking back; and if you're like me, it

won't take a "rocket scientist" to discover the weave of the common thread.

Our first mishap was a conflict between a large aircraft and a small aircraft. They met, "literally," at the same point in space and like all mishaps, the bigger, heavier aircraft "won." The thread from this story starts with the mishap chain of events. As it unfolds there were some interesting factors in the chain. Seems that the mission briefing was not exactly pure. Lots of short cuts and liberties taken with the pre-mission briefing, what we as aviators know is an item that can make or break a sortie. Couple this with compressed duty days, lack of supervision, procedures, regulations, and flight maneuvers that were not strictly adhered to, result: heavies one - fighters zero.

Moving on to the second mishap the thread continues; see if you can pick it up. The crews of the heavies met to discuss the plan. The flight profile was given based on a higher headquarters plan, but the hows and ways were left to "local interpreta-

tion.” This started the mishap chain of events. Couple this with incomplete briefings, assumptions concerning responsibilities, flying maneuvers not in accordance with regulatory guidance and a distinct lack of supervisory involvement and the mishap chain of events becomes stronger and stronger. On the day of the mishap, the crews were uncertain, at best, on some of their procedures and some aircrews took actions on their own because “it just didn’t look right.” Some of the aircrews broke from the cobbled up plan, and survived, aircraft intact. Did they admit this or announce it to their formation buddies? NO! Onward the mishap sequence went until it was very uncomfortable for the mishap crew members. Still nobody spoke up with enough persistence to stop the mishap sequence, and then the mishap aircraft met at the single point in space. But on this day we were “lucky.” According to the experts in aerodynamics, a couple of feet higher or closer together and there would have been some more widows to interview. The weave pattern is coming together; the thread continues.

In the third mishap, the thread involves a forward operating location. The crew has flown from the base several times, but now we build the mishap chain of events with a prominent dose of “get home-itis” and throw in some weather to complicate the scenario. Throughout the approach and landing phase several opportunities were available to stop, think and collect their wits; but the mishap crew continued. Blame it on a myriad of human factors, stressors, and compounding situations, but the bottom line was that a crew flew an aircraft to a wet runway and landed downwind. The chain of events could have been broken, but for several reasons perfect braking did not occur. The mishap aircraft ended up, as

Call it what you will, but the truth of the matter on identifying trends is to look for the common thread. It's always there in mishap investigations, and lately it's been weaving through too many of our mishaps.

the song goes, slip sliding away. Was it preventable? You bet, but the common thread didn’t stop there; it just kept on going.

The last example is the hardest to take. It seems all aviators know it takes the actions of only a couple to ruin it for the rest of us. Impromptu airshows have lost more than just privileges, they have repeatedly cost us fellow aviators and aircraft. That thread just kept weaving along and passed through another mishap. Disregard of rules and regulations, a lack of regard for trust and airmanship, and a slip in supervision that couldn’t or didn’t foresee the trend coming. All in all the weave is clear once you step back from the picture.

Throughout these mishap scenarios there has been a common thread. Did you pick it up?

Actually, there were numerous common threads; weren’t there? There was the mission planning thread, either through lack of proper planning, planning a maneuver that wasn’t applicable to the situation, planning that didn’t look at all the possibilities including weather, human factors, and the last one that planned a flight that shouldn’t be done. But that’s not the only thread; there were others.

There was the thread of disregarding procedures/regulations. This thread is a thick one throughout these mishaps. In some of the instances, the aircrews didn’t apply the rules as they were written. In failing to follow procedures and rules of formation flying, a fighter was lost. Failure to follow procedures nearly cost us two other aircraft and did cost us a third. The weaving of the thread is not complete, not yet.

The last important thread is that of

supervision or the lack of it. Throughout all of these mishaps the question could be asked "Where was supervision?" The question is a valid one. We routinely look at the role of supervision in mishaps and must comment on the adequacy of supervision in each and every investigation. You might counter with the comment of "How could supervision stop a mishap half a world away?" The answer is simple. By strong supervision and leadership around the clock in the unit, when the crews are half a world away, the supervision is still there, looking over their shoulder. In the case of the airshow, what was the home pattern looking like? Did the aircrews routinely live on the ragged edge of the limits, or did they adhere to the rules and guidance provided? There might have been warning signs. Were they investigated and

**Airmanship
has to start
from within
each and ev-
eryone of us.
There can be
no exception.**

followed up? If infractions were discovered, were they dealt with or swept under the rug, so to speak?

The weave is there in the pattern of these and other mishaps. The question is what can we, all of us, do about it? Crew Resource Management (CRM) gives us the framework, the tools to deal with it in the air and on the ground. Strong leadership is key, on the ground and in the air. Airmanship has to start from within each and everyone of us. There can be no exception. The rules and the Tech Orders were built out of the wisdom of our leadership and sometimes on the blood of those who went before. Don't lean too far forward in the saddle trying to impress folks; for as you can see, the weave of a common thread is not over with. No, it appears to be a full spool of thread and the looms are still running. ■

**Mistakes are a fact of life.
It is the response to error that counts.**

Nikki Giovanni

Although, as Francois Truffaut says, "Airing one's dirty linen never makes for a masterpiece." we feel it is important to admit our mistakes. In our September 1992 issue we made an oversight error in our centerfold. We forgot to list the F-111 Safety Project Officer (SPO). The F-111 SPO is Maj Mike Shively, DSN 574-3814, who is also the Chief, Studies and Analysis. Our apologies to the F-111 community. We did not intentionally neglect nor slight your dedication and contribution to the ACC mission.

-Ed.

SAFETY

Whose Job Is It?

Everyone keeps telling me that it's mine. Why me? Well I'm Chief of Safety, so that makes it my job, right? Wrong! Safety doesn't come from an office, and it can't come from a few people; it has to be a team effort. Only if everyone is involved, can we stop all those senseless accidents that destroy people's lives and property. If people just followed some simple "DOs", we would all reap the benefits; everything from cheaper insurance rates to less broken hearts due to the tragic death of a loved one.

DO GET INVOLVED.

We are all responsible for each other. If you see someone doing something dangerous, stop them. Don't ignore it or call safety to tell us about it after the fact. So many times we hear, "I knew he was doing something wrong, but what the heck, it's his neck." The Air Force is a family. You wouldn't intentionally let someone in your family get hurt, just so you could say, "I told you so."

DO ASSUME RESPONSIBILITY.

Safety begins with the individual. You can't go through life expecting others to make safety happen. Safety personnel do the best they can, but they can't see everything nor be everywhere. The "pass the buck"

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*Maj Bob Sampson
502 ABW/SE
Maxwell AFB AL*

syndrome often occurs with children. Parents must be the first line of defense regarding the safety of their children. Even though we try to make a base 100 percent safe, we can't. Keep your children away from those construction sites. Check out their play areas. If you see a nail or a broken bottle, pick it up.

DO CALL FOR ASSISTANCE.

This is where it all comes together. You watch out for the other person. You take responsibility for yourself and your children, but still you find a situation where you need help. Call safety and tell us about that broken slide. Let us know what you have seen so that we can fix it. You become safety's eyes.

Is that all there is to it? Simple in theory, difficult in execution. Almost every accident I've seen could have been prevented if action was initiated earlier. In most cases people knew about the unsafe conditions but failed to act. One of the things I value about the Air Force is the sense of belonging to a big family. We must all look out for each other and show that we are a family not just a collection of people that happen to work together.

SAFETY! MAKE IT HAPPEN!



Recent OSHA investigations in private industry have revealed shortcomings in Control of Hazardous Energy (Lockout/Tagout) procedures that resulted in fatalities. The common factors in most indicate that no matter how intense your Lockout/Tagout training program is, there is always room for improvement. As a result, recommendations emphasizing that visual lockouts are not adequate substitutes for mechanical checks or test equipment checks, especially when dealing with voltage, are under review. One such incident involved the death of a maintenance welder.

The established procedure was to disconnect a switch at floor level by positioning the handle to the "off" position and installing a padlock keyed only by the person locking the device. Company policy directed that, if more than one person was on the job, each person had to install their lock. This particular job required two people. Therefore, both locks were installed after the disconnected switch was placed in the "off" position. The two men proceeded with the task, which was to weld steel brackets on the runway support beam opposite the main line conductors. Thirty minutes into the job, the welder moved to the other

WHAT YOU SEE ISN'T WHAT YOU GET

Safe
Lockout
Procedures

*SMSGT Jerry K. Clineman
HQ ACC/IGIO
Langley AFB VA*

side of the runway and came into contact with the "de-energized" main line wires and was electrocuted. First thoughts by the investigation team were that the locks had been removed. A quick check of the disconnect switch revealed that both locks were still in place. The locks were removed and the truth was obvious. The outside handle was in the "off" position, but the three copper knife blades were still engaged in the power source at the top of the disconnect switch. Further investigation revealed that the linkage was broken between the outside handle mechanism and the knife blade rotation arm inside the switch. The only foolproof lockout procedure is to open the switch and verify that power is off by checking the output lines for voltage with a voltmeter.

"Assuming" that the power is disconnected can only result in an unsafe condition. We all know what "assuming" means and what it has led to in the past. In this case, "assuming" resulted in a death.

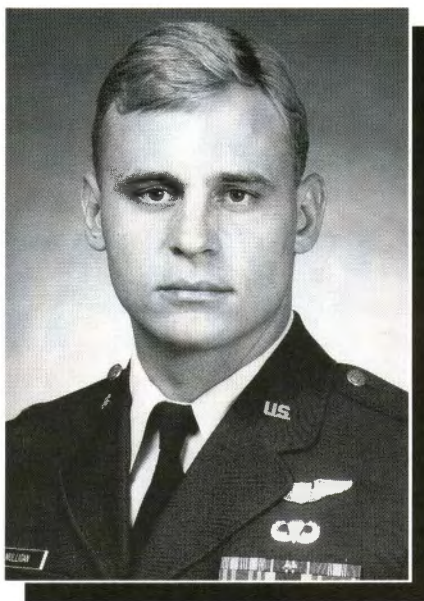
OSHA is taking a hard look at a change to the CFR which will require voltage checks of energized circuits after lockout is accomplished to ensure all hazardous energy is controlled. I recommend this incident be incorporated into your Lockout/Tagout Procedures training. ■



Pilot Safety Award of Distinction

"I stepped out of my emergency procedure checkride in the simulator feeling prepared to handle any F-16 emergency. Of course, it was just a sim; we all know it'll never really happen to us..."

Two days later, Lt Mulligan took off as number 2 for a 2-ship close air support sortie for simulated maverick missile attacks. Both aircraft were D-models, so each had a passenger in the back seat for an orientation ride. After entering the local MOA and contacting the OA-10 forward air controller, the flight set up a holding pattern and began copying target information. At this point, Lt Mulligan's external centerline gas tank had emptied, but the wing tanks were not feeding to the internal system, so he called a Knock-It-Off and climbed to deal with the trapped fuel. While working the fuel problem, he noticed a slight engine vibration and immediately focused on the oil gauge. All the engine instruments read normal and the vibration disappeared. As he started to monitor the fuel again, the vibration returned. It was worse than before, and a look at the oil pressure gauge, showed it winding down towards zero with the hydraulic/oil pressure warning light illuminated. Lt Mulligan immediately started a climb direct to Myrtle Beach AFB, 22 NM



First Lieutenant Mathew J. Mulligan
33 FS, 363 FW
Shaw AFB SC

away. The vibrations were becoming more violent and flight lead, the squadron commander, directed him to emergency jettison his external stores. Lead then performed all the radio coordination with Myrtle Beach tower for an emergency landing. This allowed Lt Mulligan to concentrate fully on

flying his jet. He computed the flame-out approach numbers since he felt the engine was going to quit any second. As he reached his 1:1 glide ratio into Myrtle, the airplane shook violently and the engine seized at 12,500 feet. Lt Mulligan was in a good position abeam the field and the jet was gliding smoothly--now it was simply a matter of flying a good flameout approach. He turned south over the Atlantic and put himself on a modified base key to Runway 35. When he turned north to final, he initially stayed high to ensure he'd make the field and miss the amusement park at the approach end. On final he needed to lose that extra altitude to make the landing, so he aimed short of the runway, put out the speedbrakes, and used the alternate landing gear extension to put the gear down. With the gear down and locked, he broke the descent, crossed the threshold on speed and landed 1,000 feet down the runway. Flight lead had seen smoke and flames exit the tailpipe area of number 2's jet several times and recommended an emergency ground egress. No matter how minor the problem, "climb to cope" is still the best course to take in any aircraft malfunction. Having "been there and done that," nothing replaces that dry run in the simulator!

Aircrew Safety Award of Distinction



On June 25, 1992, Colonel Terry J. Klungseth, RF-4C Aircraft Commander, and Captain Matthew J. Dickerson, Weapons System Officer, were flying a single ship visual surface attack sortie. While descending to 500 feet AGL at 480 knots ground speed, a large bird struck the left side of the center windscreen. The impact shattered the center windscreen, bent the canopy bow and ruptured the forward canopy. Col Klungseth was not injured, but was momentarily stunned by the wind blast and flying debris in the cockpit. Capt Dickerson immediately assumed control of the aircraft since no flight control movement was felt, as

briefed in the crew coordination briefing. While initiating the climb, Capt Dickerson assessed the damage and declared an inflight emergency with Flight Serve and Center. Capt Dickerson elected to initiate a divert. When Col Klungseth assumed control of the aircraft, he was unable to communicate with Capt Dickerson or hear ground communications due to the wind blast. Upon assessing that the face curtain ejection handle had been extended approximately 10 inches due to impact/windblast and that forward visibility was only available through the quarter panels with his helmet partially in the slip stream, Col Klungseth elected to return to Bergstrom AFB rather than divert. Rationale to return to home station rather than divert was based on the possibility of an inadvertent ejection over the Houston area and not being familiar with the runway environment at either Chase NAS or Ellington ANG Base. Col Klungseth conveyed his intention to Capt Dickerson by using the pilot override of the INS as briefed in the preflight briefing. Enroute to the field, Capt Dickerson broadcast their intent to the Bergstrom Command Post on the HF radio and their need for a chase aircraft,

all in the blind. Both crew members were unable to hear each other or ground communications until the aircraft was slowed to configure. Col Klungseth performed a flawless landing and approach end arrestment in a critically damaged aircraft. After egress personnel disable the front ejection seat, the crew ground egressed. The timely actions of this crew in analyzing the situation and performing the emergency recovery, as well as displaying exemplary aircrew coordination, prevented the loss of a valuable ACC resource. Col Klungseth and Capt Dickerson have earned the Aircrew Safety Award of Distinction.



*Colonel Terry J. Klungseth
Captain Matthew J. Dickerson
67 RW
Bergstrom AFB TX*

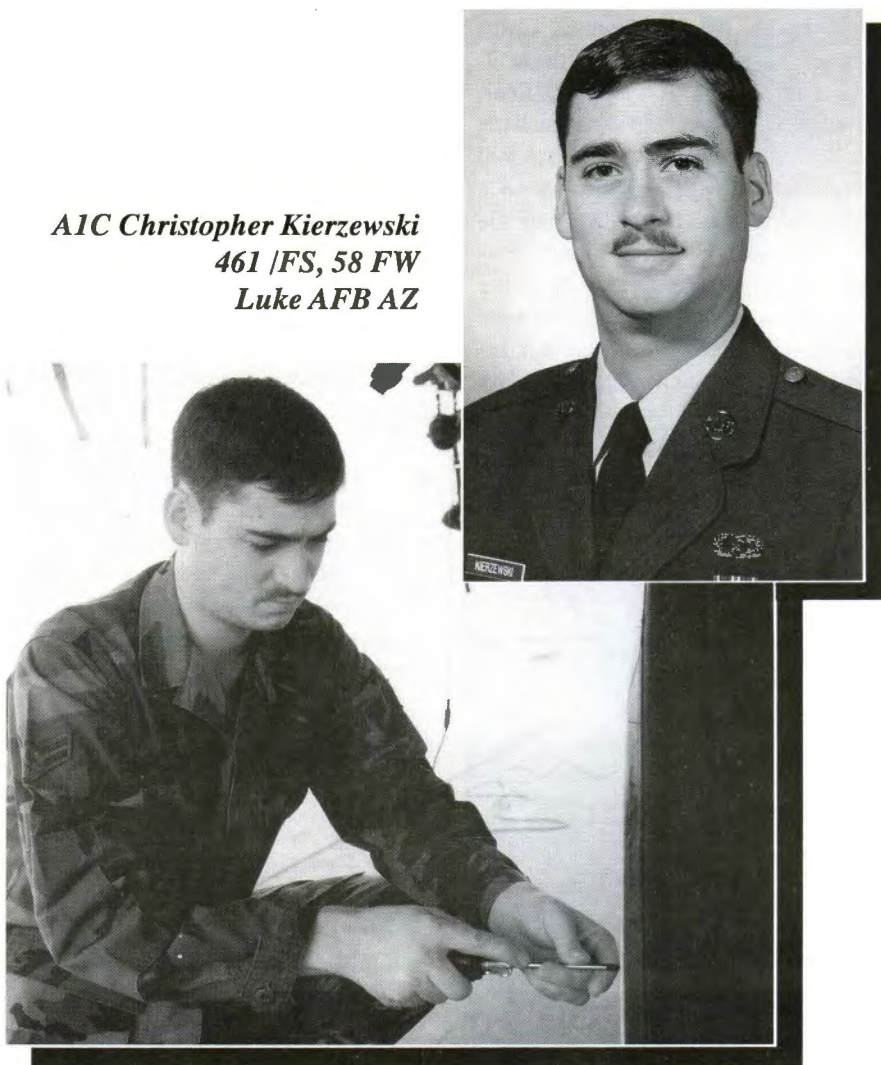




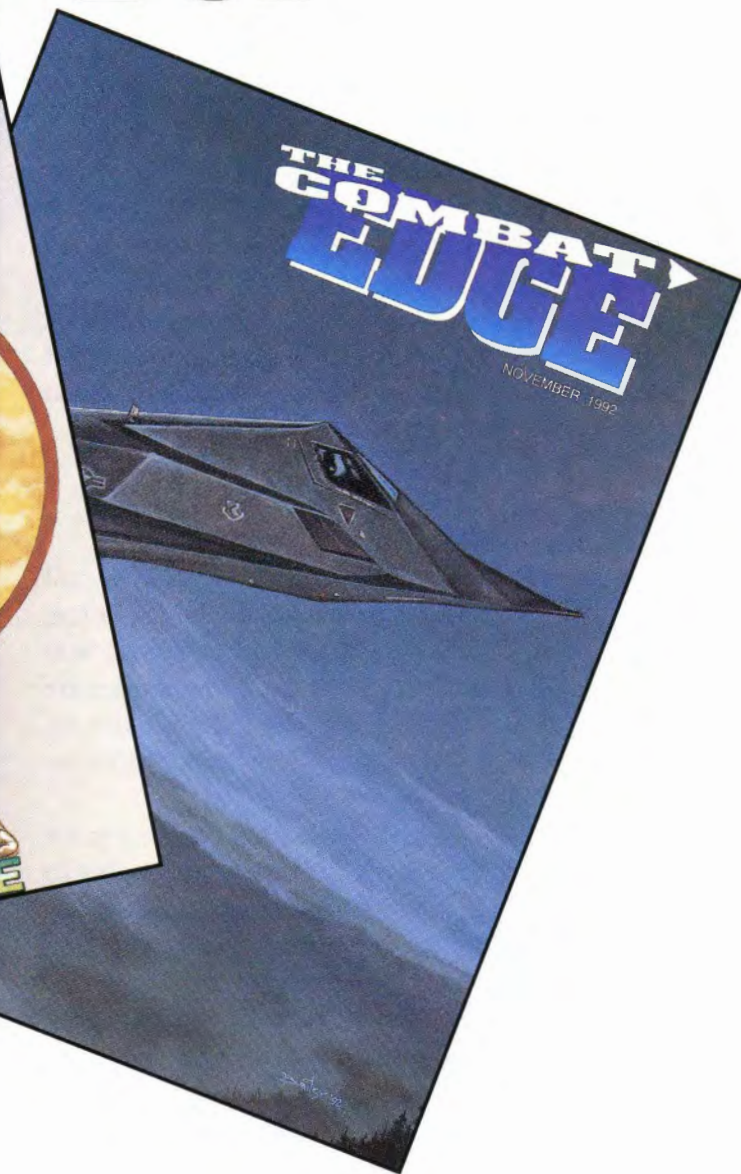
Crew Chief Excellence Award

On August 17, 1992, during a basic post flight inspection, A1C Christopher Kierzewski found a bolt protruding from a drain hole in panel 95L. Further search found that the bolt had come from the engine compressor inlet variable vane mount bushing. A borescope of the synchronizing ring revealed two other mount bolts were backing out. Subsequently, the engine was removed and repaired. His attention to detail and in-depth inspection techniques prevented possible engine damage and potential loss of the aircraft.

*A1C Christopher Kierzewski
461 /FS, 58 FW
Luke AFB AZ*



Writing An Article For



The Combat Edge is Air Combat Command's mishap prevention magazine dedicated to providing command personnel with flight, weapons and ground safety information. It is ACC people writing about their experiences for their fellow ACC team members. Your articles are the fuel needed to keep the magazine running.

When you write an article for The Combat Edge, you're writing for a world-class publication. We

print and distribute over 20,000 magazines each month for a reader population estimated at 200,000 people. Our audience includes Air Force, other military services (Army, Navy, Marines), DoD, private industry and allied foreign national readers. We routinely receive requests from other safety agencies and magazines including foreign magazines and schools to reprint our articles. Writing an article for The Combat Edge is truly an opportunity to become "world famous."

Our mission at The Combat Edge is mishap prevention through information. In short, our purpose in life is to educate -- to stimulate thought in order to learn from the pages of a magazine rather than from painful personal experience or the pages of a mishap report. By working together, we can make ACC safer and more effective. The best way to do that is by sharing your experiences with others.

Remember -- The Combat Edge is YOUR magazine! It will only be as good as YOU make it through YOUR articles, inputs and feedback. If you aren't seeing a particular type of article -- it's because you haven't written it. We are committed to giving you the best quality product possible, but we can't do it alone -- we need YOUR ideas to continually enhance the ACC culture of safety.

THE STORY

How do people talk to each other? They tell stories and compare experiences. In the Air Force, we often refer to these shared experiences as "war stories" or "there I was ..." stories. War stories are experiences that have left a lasting impression on you. Everyone has a war story because that's how we learn -- by experience.

People like to trade these stories because it gives them a chance to share experiences and possibly to learn things they haven't encountered before. Sometimes we find ourselves in an emergency situation and our readers want to find out how we handled it. What were we thinking about? What was our first impression? What would we do differently if it happened again? Answering these kind of questions holds the reader's attention. However, you don't have to be flat on your back, running out of airspeed and ideas or in the middle of a fully loaded bomb dump surrounded by a raging fire to have a valid war story. Many times we have an emergency or a problem; and although nothing exciting happens, a lesson is learned. These first hand experiences are extremely effective in teaching, proving a point or supporting your way of doing things; and everyone can identify with them.

Sometimes we don't have a war story but, rather a thought or idea about a better way to do some-

thing. Again, share these ideas and thoughts with others. If your thoughts or ideas are safety related in any way, write them down and send them to us. Don't pre-judge the applicability of your article -- we get paid to make those calls. Send us the material, and we'll decide if the theme is appropriate for The Combat Edge.

HOW TO WRITE THE STORY

Remember, you are writing for people just like yourself. How do you tell a story to your friends, your family or around the coffee bar? It's the same for the magazine. Most people don't talk about the energy scaling of phase-conjugate solid-state lasers and the ramifications on eye protection while operating laser test equipment. So, don't write like that for the magazine.

Don't be afraid to tell it like it really happened. You get more points for spreading the word than you lose by admitting to an error. Tell the reader why you think you made a mistake. Give a good reason. No one has ever gotten into trouble by writing an article for The Combat Edge.

Which of the following styles would make you want to read the story?

The Military Unique Work area is impacted by OSHA standards and their application.

or

"Can't Do!!" is NOT a PROACTIVE attitude, especially when dealing with safety issues and deficiencies. When a safety deficiency is discovered, there is usually something that can be done to correct or minimize the hazard.

Weapons safety is important in Air Combat Command.

or

As we step forward into Air Combat Command, we take with us history and tradition which have thrived on continuous improvement as well as a culture of

safety that is unparalleled. The three disciplines of the Weapons Safety Program will remain familiar and unchanged. We will continue our efforts to develop "all-up-round" munitions and pursue safe and reliable munitions designs that are less sensitive to heat and shock trauma.

Emergencies are very serious and can be dangerous.

or

There are three judges that sit on the Aviation Court of Last Resort: Mind, Senses, Hand. If you have an emergency and slowly or quickly enter the court, these judges will determine whether you live or die. One thumbs-down and you'll be sentenced to death.

Write accordingly -- the goal is to communicate!

In summary, if the article logically and interestingly communicates the experience or idea intended and is written in an appropriate tone with acceptable English -- send it to us!

SUBMITTING ARTICLES

There are no regulations, supplements or directives concerning the submittal of articles. We are completely dependent on voluntary submission of articles written by people who care and have something to share with their team members. The magazine, however, has 32 pages each and every month and needs many more stories than we receive. Since emergencies, learning experiences and great ideas occur on a less than regularly scheduled basis, it is best to submit articles as incidents occur or ideas are conceptualized.

We have no requirement that articles be routed through any OPR or review process other than from the author directly to us. However, be sure to check with your chain of command as to the acceptability of this process. We will look at any article sent to us, no matter where it originates or who writes it.

In planning on specific topics, keep in mind that it takes 2 to 4 months to get an article into print. The hot weather/heat stress article we receive in August

doesn't help until the following May.

Drafts should be submitted double-spaced and typewritten. Feature length articles of approximately 1000 words or about 4 double-spaced pages normally allow us to do a 2 page layout with artwork. Longer is acceptable as is shorter. The bottom line -- use whatever length is necessary to tell your story. When we receive your article, we will send you a letter acknowledging receipt and explaining our article review process. As your article progresses toward publication, you will receive periodic updates on its status. If at any time you have a question concerning your submission, give us a call. Remember to include some information about yourself and your organization. Pictures and drawings are fantastic additions to any story. A stunning picture from your files may find its way to our cover! You'll never know until you send it in. All pictures, drawings and artwork will be returned, undamaged, after the magazine is published.

ANONYMITY

The question of anonymously written articles has arisen in the past. We prefer to use the author's name and organization so that they can be appropriately recognized and rewarded for their efforts. However, if you feel anonymity is essential, send us the article along with your name and phone number so we can contact you concerning any questions about the article. When the article is published, your anonymity request WILL be honored and your identity protected.

If you still have questions about your article or need to refine your approach to a subject, pick up the phone and call the editor. If I can't give you at least 4 different ways to approach your topic or some suggestions for articles, then I'm not doing my job.



I WANT



YOUR ARTICLE

Send **YOUR** stories to:

Editor, The Combat Edge
HQ ACC/SEP
130 Andrews St Ste 301
Langley AFB, VA 23665-2786

Flightline Safety Award of Distinction



On 17 April 1992, these individuals were completing the follow-on maintenance operational checkout of the landing gear on an F-16. While starting the hydraulic test stand, SSgt Moyer immediately noticed a zero pressure/flow rate condition with sparks coming from behind the flow meter. He immediately closed the throttle on the unit to shut it down. As soon as the RPMs dropped, the unit started to shake violently and he saw flames and smoke inside the unit. At this point it must be noted that these four individuals, all in unison, began to respond to a very serious situation. A1C Dagostino shut down the electrical power from inside the aircraft. SSgt Hiller disconnected the test stand from the aircraft and moved it away with A1C Dagostino's help. At the same time, SSgt Moyer opened the doors to the unit, while SSgt Winford charged the fire extinguisher. SSgt Winford extinguished the flames as the others began to move the unit farther

away from the aircraft. At this point SSgt Moyer noticed that the hydraulic fluid from inside the unit had caught fire again. SSgt Winford sprayed more agent on the flames until the fire was completely extinguished for a second time. Their quick and decisive action not only prevented the loss of an expensive piece of equipment, but also averted the possible loss of life and an aircraft. Inves-

tigation revealed that a locking key had failed, allowing the yoke to spin on the input shaft of the gearcase. The driveline broke free from the input shaft and spun around, breaking hydraulic lines and electrical wiring. When the hydraulic fluid sprayed on the hot metal, it ignited. These four individuals, working as a team, have earned the Outstanding Safety Achievement Award.

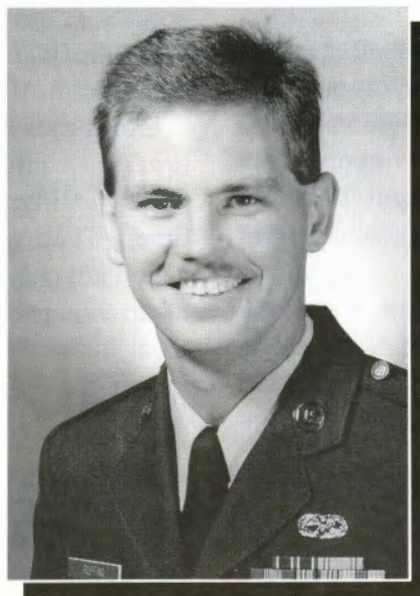


***SSgt Timothy H. Hiller, SSgt Kirk A. Moyer
SSgt Gregory D. Winford, A1C Harry N. Dagostino
314 FS, 58 FW
Luke AFB AZ***



Ground Safety Individual Award of Distinction

On April 2, 1992, Sgt Ruffing was towing a nitrogen cart to the Cryogenics plant. When he arrived at the plant, he stopped his vehicle in close proximity to the servicing area where a liquid oxygen servicing operation was in progress. When he turned off the ignition, the dashboard started smoking and within seconds, the cab was completely filled with smoke. Sgt Ruffing immediately called for help while simultaneously finding a fire extinguisher and spraying under the dashboard to prevent the smoldering wires from igniting. Then he quickly disconnected the nitrogen cart while directing members of the liquid oxygen servicing crew to assist him pushing the bobtail outside the plant's perimeter and to notify the proper authorities. Sgt Ruffing's quick thinking and decisive response prevented a catastrophic event and earned him the Ground Safety Individual Award of Distinction.



***Sgt Slade W. Ruffing
58 MS, 58 FW
Luke AFB AZ***

Unit Safety Award of Distinction



The 56th Supply Squadron sets the standard for an excellent ground safety program. There is no secret to their success -- striving through self-discipline to "Live Safety" rather than the unacceptable approach of taking safety for granted. The squadron's multifaceted responsibilities span from processing over 9,500 supply computer issue transactions monthly to receiving over 4,300 pieces of property, delivering over 3,600 pieces of property to customers and issuing more than 2.4 million gallons of fuels/cryogenic products. Their safety statistics have been phenomenal considering the type and amount of work performed by the 285 professionals in the unit. Only one minor reportable government motor vehicle mishap occurred while driving in excess of 280,000 miles, including congested flightline areas. The Fuels Management Flight palletized, transported and marshalled 1,122,581 pounds (561.3



**56 SUPS, 56 FW
MacDill AFB FL**

short tons) of Fuels Mobility Support Equipment (FMSE), one-fifth of the wing's tonnage total, in support of Operations DESERT SHIELD/STORM. This significant accomplishment was completed with 25 percent of the flight deployed to Saudi Arabia in support of these operations and without a single safety violation, error or incident. These notable achievements are the result of an aggressive, effective and comprehensive safety program which is

essential to the health and safety of personnel and to mission accomplishment. All flights have outstanding ground safety management books and very detailed AFOSH briefing guidelines which contribute to their high standards of job safety. The personnel of the 56th Supply Squadron greatly enhanced the effectiveness of both the unit and wing safety programs. Their sustained superior daily performance, sincere interest and efforts made "safety" an integral part of the "supply" mission. "Outstanding" is synonymous with the distinctive accomplishments of the Squadron as evidenced by being selected as the 1991 Ninth Air Force Daedalian Supply Effectiveness Award winner. The 56th Supply Squadron's superb contributions to safety and accident prevention through professional performance, knowledge and devotion to duty, have earned them the Unit Safety Award of Distinction.

WHAT YOU'VE ALWAYS ABOUT ALTRVs BUT

*AIFC Staff
Castle AFB CA*

What are **your** responsibilities when using altitude reservations (ALTRVs)? Does anything change between U.S. and international airspace? Where can you find clear-cut guidance on using these unique procedures? If you're a little fuzzy about the answers to these basic questions, maybe you should read on.

Today, four separate organizations process ALTRVs. These organizations are:

CARF (Central Altitude Reservation Function): This FAA office coordinates and approves ALTRVs in U.S. controlled airspace.

ARU (Air Reservation Unit): This Canadian Department of Transportation office coordinates and approves ALTRVs in Canadian controlled airspace.

EUCARF (European Central Altitude Reservation Facility): This military office, manned by USAF personnel, coordinates with appropriate air traffic control (ATC) agencies responsible for airspace east of the CARF/ARU areas.

PACMARF (Pacific Military Altitude Reservation Facility): This military office, again manned by USAF personnel, coordinates with appropriate ATC agencies responsible for airspace west of the CARF/ARU areas.

It is important to note that CARF and ARU control airspace in their respective areas of responsibility. EUCARF and PACMARF do **NOT** control airspace. EUCARF and PACMARF fulfill a coordination function only.

ALTRVs are not available on a world-wide basis. The map in FAAH 7610.4H shows the areas available for ALTRV operations, but the areas covered by PACMARF and EUCARF change on a regular basis. For example, Iran remains pictured as an area of ALTRV coverage, but this area is probably not available. Now that we know where ALTRVs are available, let's look at some rules. ALTRVs were developed by the U.S. to handle large scale military operations and deconflict them from civil aviation. The source document for ALTRVs is FAAH 7610.4H, Chapter 3. This FAA directive only applies to operations in U.S. controlled

S WANTED TO KNOW T WERE AFRAID TO

airspace. ALTRVs in U.S. controlled airspace begin when you receive clearance from Clearance Delivery prior to takeoff. You are cleared to fly the ALTRV's route, altitudes, and maintain the ALTRV's timing thanks to CARF's work. However, you must still make the radio calls mandated by other regulations. For example, you must check in with each assigned ATC controller, and you must acknowledge changes to altimeter settings. In contrast, altitude changes and/or delays included in the ALTRV do not require radio calls. These altitude changes and delays are part of the original clearance you receive prior to takeoff. In effect, an ALTRV is a wrench thrown into the ATC standard operating procedure of deconflicting traffic using altitude control. Knowing this, if you make a courtesy call advising ATC of your altitude changes, you can help the controller maintain his situational awareness and better serve other aircraft operating near your ALTRV. Your actions can create a safer operation for everyone in or near the ALTRV.

ALTRVs in Canadian airspace are very similar to ALTRVs in U.S. airspace. Like CARF, ARU follows specific guidance in an effort to coordinate ALTRVs. Their source document is the Canadian Department of Transport Air Traffic Control Document (ATCD)-14, Parts 812 through 862. Currently, this directive contains one significant difference in procedures: air refueling in Canadian airspace requires an ALTRV approval. However, look for a change in the near future when the Canadians publish standard air refueling tracks. Like the U.S., the formal clearance you receive from Canadian Clearance Delivery or ATC prior to takeoff reflects approval to fly the route, altitude and timing in the ALTRV. This is identical to U.S. FAA procedures.

When we operate outside of the airspace controlled by CARF and ARU, we often get ourselves in trouble. PACMARF and EUCARF are both USAF military offices; they control NO airspace. They fulfill a coordination function only. AFR 60-16, Chapter 1, states that when we operate in ICAO airspace, we will follow ICAO procedures and any procedures as modified by an ICAO member. ICAO does not recognize ALTRV

WHAT YOU'VE ALWAYS WANTED TO KNOW ABOUT ALTRVs BUT WERE AFRAID TO

procedures. Inflight we **MUST** continue to follow ICAO procedures. PACMARF and EUCARF can coordinate special bilateral agreements with specific ICAO member nations, but keep in mind, these agreements are not standardized and may not even resemble military or FAA directives. What this means is that an ALTRV APVL in the PACMARF or EUCARF areas of coordination may be nothing more than an expected route of flight for ATC's planning. There is no source document that compiles existing bilateral agreements on ALTRV operations. Your best approach to this problem is fly the ALTRV APVL, in EUCARF and PACMARF areas, the same way you fly a DD Form 1801, International Flight Plan. The international flight rules remain the same with, or without, an ALTRV. DoD publishes these flight rules in FLIP. Be sure to check the theater, region, FIR and country supplements for exceptions to the standard ICAO flight rules. Also know where the boundaries are between theater, region, FIR, and countries, since each line can change the rules under which you are flying.

With these facts in mind, here are some guidelines that may keep you out of trouble:

Don't fly using an ALTRV Approval Request (APREQ) as your authorization -- use only the ALTRV APVL! The ALTRV APREQ is only a request. The ALTRV APVL contains the routes and timing CARF, ARU, EUCARF and/or PACMARF coordinated for you. You'll be betting your wings if you don't have an ALTRV APVL, and attempt to fly using an ALTRV APREQ.

Make sure you have all the pieces of the puzzle. If you join or depart "Coronet East 92," you'd better have a copy of the ALTRV APVL for "Coronet East 92," as well as your tie-in route. If other aircraft join your ALTRV APVL, you'd better know where, when and at what altitude. If possible, get a copy of their ALTRV APVL, too. Remember, these are

MARSA operations! ATC does not have a requirement to coordinate with you prior to allowing planned aircraft in your block.

The format for your route of flight found in Block D of the ALTRV APVL is in the point, time, and action format unless otherwise clearly stated. An example of this exception is "LVLOF by ALB 2910870011." Don't use this exception to establish your standard for reading the rest of the ALTRV APVL. Know what the abbreviations mean, and take action at the appropriate points and times! FAAH 7610.4H contains a table that can help decipher the abbreviations, and FAAH 7340.1M Contractions has all recognized contractions within the FAA system.

Base your timing on the ALTRV APVL. All other documents take a back seat to the ALTRV APVL. The elapsed time listed from your takeoff is the only ATC timing reference and must match the timing on your international flight plan.

ALTRVs do not delete your requirement to make radio calls. Make all the radio calls you normally make when you're not on an ALTRV. If you identify yourself as part of the ALTRV operation, you will also help ATC (e.g., "on ALTRV Coronet East 92...").

Make sure you know what to do when you reach an Individual Flight Plan From Point (IFPPF). This is a clearance limit. Beyond the IFPPF, the route listed on the ALTRV APVL is your expected route. Prior to passing the IFPPF, you must talk to ATC to receive clearance for your expected route.

Hopefully, this article has clarified ALTRV operations for you and you'll feel more comfortable the next time you're tasked to fly the dreaded ALTRV. As always, when you need that tough instrument question answered, call the Advanced Instrument Flight Course at DSN 347-4571. ■

Feagle

'T WAS AN HOUR FROM TOUCHDOWN,
THE NIGHT WAS CALM AN' STILL.
I COULD SEE THE LIGHT OF MORNING,
OVER A DISTANT, SILENT HILL.

I THOUGHT AS I FLEW,
OF THE SUCCESS OF MY TRIP.
WHEN WITHOUT ANY WARNING,
MY RADAR GAVE A BLIP.



THEN AT MY NINE,
A STRANGE SHAPE CAME IN VIEW.
IT WAS RED BUT NOT VERY LONG,
AND LOPED AS IT FLEW.



I QUICKLY MOVED IN CLOSER,
WITHOUT A HINT OF FEAR.
AND TO MY GREAT SURPRISE,
IT WAS POWERED BY REINDEER.



THE PILOT WAS CLAD,
IN A SUIT OF BRIGHT RED.
AND AS I PULLED IN BESIDE HIM,
HE CALMLY TURNED HIS HEAD.



HE WAVED TO ME IN FRIENDSHIP,
I GREETED HIM WITH A SMILE.
AND WE FLEW SIDE BY SIDE,
IN THE MORNING FOR A WHILE.



THEN HE TURNED NORTH,
WHILE I CONTINUED EAST.
HE FLEW LIKE A SEASONED PRO,
WITH THE EIGHT, ANTLERED BEAST.



I HEARD HIM CALL BACK,
AS HE FLEW FROM MY SIGHT.
MERRY CHRISTMAS MY FRIEND,
AND HAVE A GOOD FLIGHT.



ACColades



Units without a "Command-Controlled" Class A Flight mishap
since the stand-up of ACC on 1 Jun 92:

1 FW
4 WG
5 BW
7 BW
9 WG
23 WG
24 WG
27 FW
28 BW
31 FW
33 FW
42 BW
55 WG
56 FW
57 FIS
57 FW
79 TEG
92 BW
93 BW

96 WG
99 TTW
102 FW
103 FG
104 FG
107 FG
110 FG
113 FW
114 FG
116 FW
117 RW
119 FG
120 FG
121 FW
122 FW
124 FG
125 FG
127 FW
128 FW

131 FW
132 FW
138 FG
140 FW
142 FG
144 FW
147 FG
148 FG
149 FG
150 FG
152 RG
156 FG
158 FG
159 FG
162 FG
163 RG
169 FG
174 FW
175 FG

177 FG
178 FG
180 FG
181 FG
182 FG
184 FG
185 FG
187 FG
188 FG
191 FG
192 FG
301 FW
319 BW
325 FW
347 FW
354 FW
355 WG
363 FW
366 WG

379 BW
384 BW
388 FW
410 BW
416 BW
419 FW
442 FW
475 WEG
482 FW
507 FG
552 ACW
906 FG
916 AREFG
924 FG
926 FG
930 FG
944 FG

Accolades

QUESTIONS OR COMMENTS
CONCERNING DATA ON THIS
PAGE SHOULD BE
ADDRESSED TO HQ ACC/SEA,
DSN: 574-3814

	TOTAL			ACC			ANG			AFR		
	OCT	THRU OCT		OCT	THRU OCT		OCT	THRU OCT		OCT	THRU OCT	
		FY93	FY92		FY93	FY92		FY93	FY92		FY93	FY92
CLASS A MISHAPS	1	1	2	1	1	2	0	0	0	0	0	0
AIRCREW FATALITIES	0	0	1	0	0	1	0	0	0	0	0	0
* IN THE ENVELOPE EJECTIONS	1/0	1/0	1/0	1/0	1/0	1/0	0	0	0	0	0	0
* OUT OF ENVELOPE EJECTIONS	0	0	0	0	0	0	0	0	0	0	0	0

* (SUCCESSFUL/UNSUCCESSFUL)

CLASS A MISHAP COMPARISON RATE

(CUMULATIVE RATE BASED ON ACCIDENTS PER 100,000 HOURS FLYING)

ACC	FY 92	3.4	1.9	2.0	2.5	2.0	2.0	2.0	2.3	2.5	2.4	2.6	2.5
	FY 93	2.0											
1 AF	FY 92	0	0	0	0	0	0	0	0	0	0	0	0
	FY 93	0											
2 AF	FY 92	0	0	0	0	0	0	0	*	29.1	16.4	11.2	7.8
	FY 93	0											
8 AF	FY 92	0	0	0	0	0	8.9	7.6	6.6	7.9	5.8	4.4	5.2
	FY 93	0											
9 AF	FY 92	4.4	2.4	3.4	2.6	2.1	1.7	2.2	2.6	2.4	2.7	2.4	2.0
	FY 93	5.2											
12 AF	FY 92	0	0	0	1.5	1.3	1.0	.9	.8	1.4	1.3	1.8	2.1
	FY 93	0											
ANG	FY 92	0	6.7	6.3	8.8	7.1	6.6	5.6	5.5	4.9	4.9	4.9	4.9
	FY 93	0											
AFR	FY 92	0	10.9	7.7	5.7	4.7	3.9	6.7	8.7	7.8	7.0	8.4	7.7
	FY 93	0											
TOTAL	FY 92	2.3	3.7	3.5	4.3	3.5	3.3	3.3	3.6	3.5	3.4	3.6	3.4
	FY 93	1.3											
MONTH		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP

* (HOURS NOT AVAILABLE)

WHERE DO YOU TURN FOR ANSWERS?

**WE'VE BEEN THERE, DONE IT...OR
ARE DOING IT NOW!**

The Air Force is going through some of its most turbulent times. In this rough sea, when you find yourself in a pitching boat, it's sometimes hard to know where to seek answers, or at least find someone who may have rowed that boat before. Now before you go saying we've got the big head, we don't. We will be the first to admit we don't have all the answers, and would be doing you a great disservice if you come away thinking that we've done it all. However, if you'll keep reading, you may ascertain that we can be a source of information.

Recently, the boss was wondering if the people in the field really knew that there was a place where folks could call if there was a problem. Thus, the birth of this article.

So your boat is pitching about, you're taking on water and just don't know where to turn. After you've talked to your Numbered Air Force, call us (DSN: 574-7031). **We've BEEN THERE, DONE IT... OR ARE DOING IT!**

Now I know you're wondering, are we really qualified to perform the task? Well, we'll let the facts speak for themselves. Collectively, the 9 of us have over 146 years of service and over 40 years of safety experience -- we've probably seen it before.

We've held just about every safety job you can have including: Additional Duty Flight Safety Officer for 3 years, Squadron Assigned Flight Safety Officer (SAFSO) for 4 years, 8 months, Wing Flight Safety Officer for 7 years, 6 months, Chief of Flight Safety for 4 years, 2 months, Chief of Safety for 10 months, MAJCOM Safety staff for 18 years, 1 month, and Air Force Safety Agency for 2 years, 6 months. We've seen it; we've lived through it; we've experienced it.

We've investigated, worked, written, read, reviewed and tracked literally thousands of Class C's, High Accident Potential's (HAP's) and Hazardous Air Traffic Reports (HATR's) over the years. We've personally investigated 10 Air Force mishaps, in conjunction with a formally convened mishap board,

and been a part of a Navy investigation and a National Transportation Safety Board investigation. We've also worked technical issues and provided technical assistance for over 120 formal mishap investigations. We've worked the Command Indorsement program to review, ensure completeness and establish the command's position on over 120 formal mishap investigations. So, we've been around the block on some of the issues you face.

We've got over 27,500 operational flying hours in a variety of aircraft including: T-33, T-37, T-38, AT-38, A-7, A-10, F-4C/D/E/G, RF-4, F-15A/B/C/D, F-16A/B/C/D, F-106A/B, F-111A/E, F-117, KC-10, KC-135, B-52D/F/G/H and additional hours in the AT-37, G-91, MB-326, MU-2, B-1B. We've got over 10,000 Instructor hours combined in some of those previously listed aircraft.

What we're really trying to say, is that it's rare that somebody can ask a question that could stump us; but it has been done and probably will be done again. But, we probably know who to call, or who can help. There are things we're getting into now, situations and training/employment that are new; and, as such, as soon as we left the cockpit our experience is for naught. But, the beauty of the system we have is it does adapt to change. An example is Night Vision Goggles (NVG). All the fighter guys were lamenting recently that they had no experience with NVG's. That's where the collective system comes into play, and what I'm trying to relay in this article. We do have an individual who was in the aircraft and has flown with, trained with and used NVG's. Of course, this guy flew heavies; but the knowledge is there. All we have to do is take off our heavy versus fighter perceptions and remember that we're all in this together. Of course, there are new issues, new technologies, new applications; but **together** we can solve our problems.

Together we can solve these problems because...we've **BEEN THERE, DONE IT... OR ARE DOING IT NOW!**

Keeping The

STRIKE EAGLE

Under Control At High AOA

*Captain Thomas J. Plumb
336 FS
Seymour Johnson AFB NC*

As the F-15E weapon system matures, we are learning how it can best be employed, as well as its limitations. This article will concentrate specifically on the effects of the conformal fuel tanks (CFTs), particularly in high AOA flight, in order to increase our awareness in this area. It will point out some confusing areas in F-15E publications, highlight the stability effects of the CFTs, and look at our training for some special considerations.

Aircrews flying a new airframe such as the F-15E need to understand the Dash 1, as well as the limitations in the information found there. One such limitation is that much of the handling information found in Chapter 6, "Flight Characteristics," is based on F-15A-D testing and data -- not F-15E testing. This is because there have been many more high

AOA envelope tests done on these models, and the changes in the E model were not expected to have significant effects in this area. As our most recent Chapter 6 demonstrates, F-15E unique qualities are now being documented. Another thing we must keep in mind when reading the Dash 1 is that as F-15E crews we typically refer to a "clean" aircraft as one that has CFTs and no other tanks or pods. This can lead to confusion when reading the Dash 1, since it uses the terminology of "clean" and "basic" aircraft to mean an airframe that does not have CFTs. Also, while CFT fuel is considered external fuel, the CFTs are not considered to be external tanks.

One of the changes that occurs from carrying CFTs involves the relationship of the Center-of-Gravity (CG) to the aerodynamic center (AC). Remember that positive static stability, where the aircraft

tends to return to level flight after a disturbance, is related to how far the CG is ahead of AC. The CFTs affect this relationship by moving the AC forward, resulting in less positive longitudinal (pitch) stability. This is why **all** F-15s with CFTs are a lot more sensitive in pitch, and rotate, flare, and aerobreak with less stick movement than non-CFT aircraft. During maneuvering flight, the CFTs increase the maximum AOA capability by about 4 units; and this increases the time it takes to bring the nose down once established at the higher AOA's.

The causes of departures in the F-15 are listed in the Dash 1 as: lateral asymmetry, 37-44 units AOA region, aileron schedule, inappropriate lateral control inputs, cross controlling, and asymmetric thrust. The last cause listed, asymmetric thrust, will not be discussed since it is not significantly affected

by the CFTs.

Lateral Asymmetry. While lateral (roll) asymmetry is typically associated with asymmetric loads, such as a nav pod, the CFTs can also produce this problem. CFT fuel system feeding anomalies such as slow feeders and reverse feeding on one CFT can produce the lateral asymmetry. (Other CFT feeding anomalies such as improper fuel scheduling and retention in the aft CFT compartment cause aft CG movement -- decreasing pitch stability.)

37-44 AOA Region. The reduced directional

stability area of 37-44 indicated units (true area 40-44) is of concern due to the effects of the CFTs. As discussed, the CFTs raise the AOA that the aircraft can achieve; and this allows us to enter the reduced directional stability AOA regime more easily. Not only do we get there easier, but once there we can expect to stay there longer than the non-CFT F-15 aircraft. High AOA tests done at Edwards AFB on the F-15E show rolls with CFT aircraft generate more sideslip than rolls without CFTs. This extra sideslip increases the E model susceptibility to departure while maneuvering in the 37-44 indicated unit region.

Aileron Schedule. The aileron schedule could also lead to departures. The F-15 mechanical flight control system contains a mechanical aileron washout schedule that was designed to reduce allowable aileron at high AOA. This system, designed for non-CFT aircraft, schedules aileron based purely on stick position, without any AOA input. Since the aileron washout is not based on actual AOA, the scheduling system does not recognize the higher AOA that the E model can achieve as a result of the CFTs. Additionally, the ARI will not blend in sufficient rudder for this aileron deflection. This means that CFT aircraft have an aileron deflection capability that exceeds the ARI ability to coordinate flight. Simply put, the aircraft generates more adverse yaw than



it was meant to when rolling with lateral stick in high AOA regimes. When flying above 35 units, the adverse yaw created from a lateral stick deflection (roll) may cause an aircraft to actually roll opposite the direction of stick deflection.

Inappropriate Lateral Control Inputs/Cross Controls. In higher AOA regions, rapid lateral-directional inputs are appropriate and can increase the chance of a departure. The potential for cross control inputs (lateral stick opposite rudder) to lead to a departure are increased in the high AOA regions, due to the aileron scheduling and AOA capability previously described.

Now that we know some areas of concern, how do we apply this knowledge to our training? First, we should keep in mind that sustained flight above 30 units AOA is not aerodynamically optimum and is a poor tradeoff in terms of turn rate versus energy depletion. When we fly into this regime and we have a real need to continue operating there, the key is awareness. The F-15E can certainly be flown safely at AOAs greater than 30 units, but we need to be smart about our stick and rudder inputs in this regime. Here are some high AOA flight rules to live by!

Up to 30 AOA units. Maneu-

vering with lateral stick only (without rudder input) provides faster and more controllable roll. The ARI will blend in sufficient rudder to coordinate turns.

Above 30 AOA units. The Dash 1 presently states that lateral stick rolls at higher AOA should include coordinated rudder to prevent sideslip buildup. But, recent tests at Edwards indicate that in some cases where the roll is commanded with lateral stick, there is insufficient rudder available to counteract the adverse yaw sideslip effects. Rudder only turns, on the other hand, will not only give a better roll rate, but also eliminate adverse yaw. If you insist on lateral stick inputs at higher AOAs, you **must** add rudder for coordinated flight. All flight control inputs should be applied smoothly and not excessively.

A simple, safe, and effective plan is to use hands only (lateral stick) to maneuver below 30 units, and feet only (rudder) above 30 units AOA.

An effective way to maneuver with the rudders is as follows. Initiate the maneuver with full rudder; then back off to control the roll rate. Use opposite rudder to stop the roll.

If rudder is used to start the

roll, the rudder MUST also be used to stop the roll. Trying to stop a rudder roll with lateral stick is likely to cause a departure.

Consideration should be given to decreasing the high AOA then commencing the desired rolling maneuver. It is important to give the aircraft time to break the AOA after moving the stick forward. Rapidly moving the stick forward and applying lateral stick (during an improper jink, for example) while the aircraft is still at a high AOA will induce adverse yaw and an immediate departure.

Also, we must realize that if cross control inputs are made, aggressively pushing the stick forward under these conditions will aggravate the departure conditions.

In summary, the F-15E CFTs can give us control problems that are not found in the F-15A-D models. It is easier to enter high AOA regimes and takes longer to get out of them. While in this area, we have departure characteristics which require additional knowledge and increased flight control awareness. We should also keep in mind that many times we can get better performance from the aircraft by flying below 30 AOA units and avoid the area of concern in the process. ■



