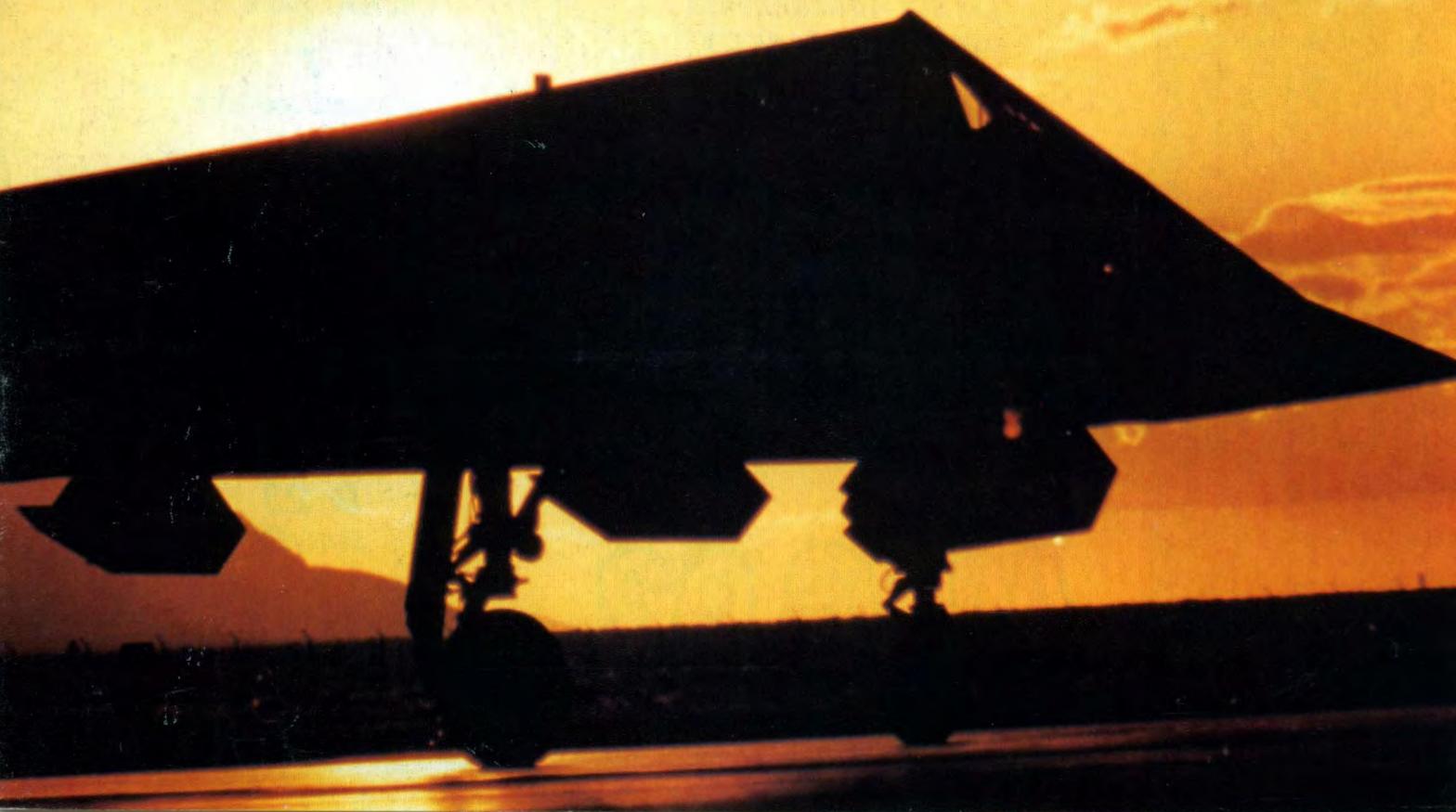


THE COMBAT EDGE

AUGUST 1993





THE COMBAT EDGE

Air Combat Command
Safety Magazine



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SAFETY -- PRESERVING COMBAT CAPABILITY

*Col Robert R. Jones
Chief of Safety
Langley AFB VA*

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SAFETY AND ANGER

In both work and home environments, a double portion of anger is unloaded because the problems were not solved at the place of origin in a timely and professional manner.

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ABOUT THE COVER

A Lockheed F-117 Stealth Fighter taxis down the runway as dusk falls on the desert.

ACCent on Safety

Some tasks are easier than others and repetition of most tasks provides better performance. Everyone knows that; it's called the learning curve. However, in my Air Force life there is one task that never gets easier or better no matter how often it's repeated -- saying goodbye. For me it's that time again.

The past two years as your Chief of Safety have been a uniquely rewarding experience in my career. I found safety to be a world of intense highs and lows -- the nervous excitement of watching days, weeks, and even months pass without a mishap; or the sad reality of the investigation board briefing after a mishap. One of the most frustrating things about safety is that success is almost impossible to measure, but its failures are hard and cold.

I'd like to take this opportunity to introduce your new Chief of Safety, Col Bob Jones. He has been the Chief of the Operations Training and Tactics Division (HQ ACC/DOT) for the last year and brings a wealth of operational knowledge and expertise to safety. I'm confident his broad experience combined with his commitment to continuous improvement will lead the ACC culture of safety to even greater successes.

Safety is most effective when it is an integral part of routine operations -- not just a slogan. Our safety culture minimizes risk by modifying our actions and behavior until the safe way becomes second nature. We do things the safe way without even thinking about it, and we train our new people to do the same. Teamwork, leadership, involvement, and caring form the foundation of this culture. Each of us must build upon that foundation to make our safety culture the best it can be.

Our culture of safety is real! Folks are actively doing things the safe way because it is the right way to do business. The quality of your safety efforts over the last two years, both on and off the job, has been truly remarkable. With dedicated professionals continuously seeking to improve the ACC culture of safety, I'm looking forward to your continued success. To each of you -- **be proud!** You have helped build the best command in the United States Air Force -- keep making it better. Thank you for a great tour!



Colonel Bodie Bodenheim

SAFETY - -

Preserving Com

Colonel Robert R. Jones
ACC Chief of Safety
Langley AFB VA

The Combat Air Forces are at one of the most critical times in the history of the Air Force and mishap prevention. Not since the inception of aviation has safety had the opportunity to make as great an impact on the combat capability of our force and the security of our nation as it does today. Budget reductions, force resizing and realignments, and chaotic world events affect how and where we do business. Our reductions in forward basing have heightened awareness on the need to maintain our presence throughout the world. Today, ACC forces continue to serve around the globe and, as Brig Gen Cole, AF/SE, said at our recent ACC Safety Conference, "If there was ever a time we could ill-afford to lose people and airplanes -- it is now!"

Our task, regardless of the factors affecting us, is to be prepared to rapidly project air power anywhere in the world at any time -- the basic premise behind *Global Reach - Global Power*. The Air Force's five contributions to national security outlined in *Global Reach - Global Power* all require the availability and readiness of people and equipment. Hence, the role of safety -- preserving combat capability by saving lives and equipment. As we reduce and change the size and character of the Air Force, each individual and each piece of equipment becomes more important to the task.

A proactive approach to safety and mishap prevention remains the key to preserving our capability. Everyday we must ask ourselves, "How can we prevent accidents and halt the tragic loss of life and equipment?" If we are proactive in preventing mishaps, we won't have to apply fixes after an accident. In every safety discipline, flight, ground and weapons, we must actively seek more and better ways to be proactive. We already have some tools that are working quite well (you're reading one of the best) such as, "WE CARE," 101 Critical Days, Aircrew Attention Awareness Management Program (AAAMP), Cockpit Resource

Combat Capability



Management (CRM), Video Notams, Blue 4News, and the Command Nuclear Surety Working Group. However, we can't rest on our past successes with these quality efforts. We must always strive to be better; to improve what we have and add to it. The time and effort we devote to prevention will reduce and eventually eliminate the necessity for after-the-fact fixes.

Human factors continues to be the leading cause of mishaps and injuries to ACC personnel and equipment. Too often we wish to ascribe such mishaps to "Murphy's Law." Although Murphy may be alive and well, he should not be the easy scapegoat for occupational injuries and mishaps. When a mishap occurs, we must ask several questions such as, "Why did we do that?"

In spite of our best intentions, we continue to occasionally make incorrect and sometimes even fatal decisions. Mishap investigation boards must then spend many days in an attempt to understand why those mishaps occur. The understanding of "WHY?" is essential to an effective safety investigation. The answer to "WHY?" provides us with valuable information to be used in future efforts to reduce human factor mishaps. Unfortunately, however,

The human factors area is ripe for the application of proactive mishap prevention efforts. Once we imprint the "step in and break the chain" mentality, we can attack the causes and reduce all of our mishap rates through prevention.

this is not the proactive approach we need to promote in developing our safety culture--prevention is the key.

Commanders, supervisors, and workers all have a part in reducing human factor mishaps. We must be cognizant of human factors not only in the decisions we make, but in the way we view our daily duties. We need to ask ourselves and others "WHY?" in more depth, and more often, to find lessons we can use to prevent future mishaps rather than just gather the facts to brief after a mishap occurs.

For example:

Is the level of supervision adequate for the skill level involved and the task to be accomplished?

Are our people following tech orders and operating instructions, or are they taking shortcuts around the regulations?

Are supervisors providing the proper level of training and the right equipment to do the job?

Are we using the right people for the job?

Is something "legal by regulation," but not really the prudent thing to do?

If the answer to any of the above questions is "no," then take action -- step in and "break the

chain" before something unfortunate occurs. The human factors area is ripe for the application of proactive mishap prevention efforts. Once we imprint the "step in and break the chain" mentality, we can attack the causes and reduce all of our mishap rates through prevention.

During DESERT STORM and numerous operations since, we proved we are without question the most capable Air Force in history.

Our equipment is the best and our people the brightest, most motivated, and best trained ever. We have the capability to literally reach out and exact lethal retribution if required for transgressions by an enemy anywhere in the world. The foundation of that capability has been an unflinching dedication to realistic training. However, realistic training must not be construed as taking unnecessary risks. To continue to provide the strong foundation upon which we build combat capability, we must continually balance risk against the effort to optimize our training intensity -- this is the real definition of realistic training. Do we need to fly at the lowest allowable low-level altitude immediately after qualification, or should we spend some time at the highest reasonable altitude and then step down incrementally? Are our newest, youngest, least experienced aviators expected to accomplish the same tasks with the same proficiency as our more experienced flyers? Why? Are we rushing into the corners of the envelope too fast, too soon with no immediate tactical need? If we are asking our crewmembers to exceed their experience level -- to run before they walk, then we are starting the "chain of events" toward a potential mishap. Don't let it happen -- again, step in and "break the chain." We need to let our people know that it is all right to add

a safety pad to their activities in training and as much of one as possible in combat.

Proactive mishap prevention and realistic training require that we consider these issues and continuously review our crew training to ensure we aren't taking unnecessary risks and pressing safety limits in an overzealous drive to enhance combat capability. Remember, without people and equipment, we have no combat capability.

If the ACC culture of safety is truly the automatic, reflexive reaction to situations that heighten awareness and break the chain of events that could result in a mishap, then zero mishaps is an obtainable goal.

As I take over as Chief of Safety for ACC, I would like to express my sincere thanks and gratitude to Col Bodie Bodenheim for his mishap prevention efforts. Under his stewardship, safety continued to be an integral part of the way we have done business in the Command. The ACC culture of safety was built on a solid base of teamwork, leadership, and caring -- trademarks of his style throughout. All of us appreciate and applaud the significant impact Bodie made on ACC and safety during his tour here -- Godspeed and keep the mach up Bodie!

My initial charge to everyone in ACC is not to let our safety awareness be dulled by relatively low mishap rates and past successes. Low mishap rates are not good enough. We cannot accept death, injury, or the loss of equipment as a natural by-product or cost of doing our business. If the ACC culture of safety is truly the automatic, reflexive reaction to situations that heighten awareness and break the chain of events that could result in a mishap, then zero mishaps is an obtainable goal. We must continue to improve our safety culture through hard work, good communications, discipline, and responsibility. The challenges are great -- the rewards are even greater -- increased combat capability and improved Global Power for America!

What is a **FIRE?**

A fire is the result of a combination of certain elements in the proper proportion and an uninhibited chain reaction. Used correctly, fire is essential; but mishandled or out of control, a fire is deadly.

Four components are necessary for the ignition and continued burning of a fire:

1. Reducing agents (fuel):
wood, gasoline, grease, paper
2. Oxidizing agents:
atmospheric oxygen, LOX
3. Proportioning:
flammable range, heat
4. Uninhibited chain reaction:
collision of molecules

The absence or removal of any of these components will terminate the fire process. Based upon this principle, fire extinguishers operate in one of the following manners:

1. Modify the reducing agents:
Dilute gasoline
2. Modify the oxidizing agents:
Deplete oxygen supply
3. Reduce heat:
Cool with water
4. Inhibit chain reaction:
"Blow out" with explosives

Certain extinguishing agents are not compatible

with some types of fires. For this reason, fires have been divided into four classes based on their action and similarities:

CLASS A (Green Triangle):

Ordinary combustibles such as wood, paper, rags, etc.

CLASS B (Red Square):

Flammable liquids such as gasoline, MEK

CLASS C (Blue Circle):

Energized electrical circuits such as circuit breaker boxes

CLASS D (Yellow Star):

Combustible metals such as magnesium

It is important to recognize what type of fire you are dealing with so the proper type of extinguisher can be used. A few examples of what can happen with the incorrect extinguishers are:

1. A pressurized water extinguisher used on a Class C electrical fire can result in electrocution of those in contact.
2. A dry chemical extinguisher that is not compatible with a Class D metallic fire can result in increased intensity of the fire.
3. A pressurized water extinguisher used on a Class B gasoline fire may only splash and spread the burning fluids around.

Every fire extinguisher has a clearly marked listing of compatible classes of fire. Learn the symbols now so you don't make a deadly mistake in the future.

■

Branch of Service/Agency _____ Rank _____ AFSC _____ Age _____ Sex: M F
 Duty Status _____ Time in service _____ Education (highest level completed) _____
 Job title/description _____

1. How often do you read this magazine?
 - a. Very often (every issue)
 - b. Often (most issues)
 - c. Sometimes (some issues)
 - d. Seldom (very few issues)
2. How do you normally obtain this magazine?
 - a. Official USAF distribution (PDO)
 - b. GPO subscription/direct mail
 - c. Library
 - d. Co-worker, associate, friend
 - e. Other
3. How much of each issue of this magazine do you read?
 - a. All
 - b. Most
 - c. About half
 - d. Some
 - e. A little
 - f. Look at but seldom read
 - g. None
4. How many other people read/share the copy of this magazine you receive?
 - a. None
 - b. 1-3
 - c. 4-6
 - d. 7-9
 - e. 10 or more
 - f. Don't know
5. After reading this periodical, what do you do with it?
 - a. Keep it
 - b. Discard it
 - c. Pass it on
6. How soon do you see a copy of this magazine after it is published?
 - a. One week or less
 - b. One to three weeks
 - c. Three weeks to a month
 - d. A month or more
7. What magazines or newspapers do you regularly read?

We are interested in your assessment of **The Combat Edge** magazine. When choosing an answer, write in the number corresponding to the extent you agree or disagree with each statement.

- | Strongly Agree | Agree | No opinion | Disagree | Strongly Disagree |
|-----------------------|--------------|-------------------|-----------------|--------------------------|
| 1 | 2 | 3 | 4 | 5 |
8. **The Combat Edge** satisfactorily presents safety information.
 9. **The Combat Edge** is as interesting as other publications I read.
 10. **The Combat Edge** is as informative as other publications I read.
 11. The level of reading in **The Combat Edge** should not be higher.
 12. The articles in **The Combat Edge** are technically accurate.
 13. Overall, the appearance of **The Combat Edge** is good.
 14. Coverage of flight safety issues is adequate.
 15. Coverage of ground safety issues is adequate.
 16. Coverage of weapons safety issues is adequate.
 17. The number of photos, illustrations and charts in **The Combat Edge** is sufficient.
 18. **The Combat Edge** articles are informative.
 19. **The Combat Edge** articles are interesting.
 20. **The Combat Edge** magazine is useful to me personally.
 21. Article topics are in tune with important trends.
 22. **The Combat Edge** is an effective mishap prevention tool.

For the areas listed below, please rate each using the following scale:

- | Poor | Fair | Satisfactory | Good | Excellent |
|-------------|-------------|---------------------|-------------|------------------|
| 1 | 2 | 3 | 4 | 5 |
23. Covers
 24. Layout (professional appearance)
 25. Article quality
 26. Photographs
 27. Illustrations
 28. Information value
 29. Use of color
 30. Thought provoking nature
 31. Type (size and style)
 32. General interest/entertainment value
 33. Article thoroughness
 34. Article variety
 35. Awards coverage
 36. Usefulness in my job
 37. Timeliness of articles/issues
 38. Accuracy
 39. Usefulness in increasing professional expertise
 40. Attractiveness
 41. Overall value

42. Has a **Combat Edge** article ever saved your life or kept you from doing something dangerous? If so, briefly describe the situation.

43. How would you rate this magazine in comparison with other publications dealing with the same or similar subject matter?

- | | | |
|---------------------|--------------------|---------------|
| a. The best | c. Average | e. The worst |
| b. Better than most | d. Worse than most | f. Don't know |

Please tell us how you would improve **The Combat Edge**:

What kinds of articles should we print **more of? Less of? Additions?**

Other comments:

----- FOLD -----

----- FOLD -----

C
U
T

Official Business

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

KOREN KOLLIGIAN, JR., TROPHY PRESENTED FOR FY 92



Major Mark E. Kennedy, 56th Training Squadron, 56th Fighter Wing, MacDill Air Force Base, Florida, is the recipient of the Air Force's Koren Kolligian, Jr., Trophy for Fiscal Year 1992. The trophy is awarded annually to recognize outstanding feats of airmanship by an aircrew member. It is presented for extraordinary skill, alertness, ingenuity, or proficiency in averting or keeping the seriousness of flight mishaps to a minimum.

General Merrill A. McPeak, Chief of Staff of the Air Force, presented the trophy to Major Kennedy in a ceremony attended by the Kolligian family on 23 July 1993.



DEPARTMENT OF THE AIR FORCE

CITATION

TO ACCOMPANY THE AWARD OF THE KOREN KOLLIGIAN, JR., TROPHY TO MARK E. KENNEDY

On 14 November 1991, then Captain Mark E. Kennedy distinguished himself by meritorious action as an F-16 instructor pilot. Just after takeoff, the F-16D in which Captain Kennedy was instructing suffered a complete loss of thrust. Captain Kennedy immediately took control of the aircraft from the upgrading front seat pilot and observed an illuminated engine warning light, decreasing RPM, and heavy smoke in both cockpits. Realizing that an airstart was not feasible, nor was a flameout landing on the departure runway possible, Captain Kennedy traded what little excess airspeed he possessed for maneuvering altitude. A quick assessment of the airfield revealed an unoccupied taxiway as a possible landing surface. Despite heavy smoke in the cockpit and the normally restricted visibility from the rear seat of the F-16D, Captain Kennedy skillfully maneuvered his aircraft to a flawless flameout landing on the vacant taxiway. Total time from engine failure to touchdown was less than a minute. The distinguished accomplishments of Major Kennedy reflect great credit upon himself and the United States Air Force.

MERRILL A. McPEAK, General, USAF
Chief of Staff

AIRCREW SAFETY AWARD OF DISTINCTION

*Capt Anthony J. Smith, Capt Quinten L. Miklos, Capt James D. Labombard, Capt Kenneth G. Bock
37 BS, 28 BW, Ellsworth AFB SD*



A conventional bombing mission suddenly turned into a life threatening flight when a unique series of equipment failures challenged this Ellsworth B-1B crew. While rolling through 30 degrees of bank and belly up to a ridge, the aircrew heard a loud bang accompanied by a violent shudder. This was immediately followed by illumination of the master caution, multiple caution lights, and the forward weapons bay door lights. Correctly identifying the never before seen emergency as separation and loss of the 20,000 pound internal forward stores bay fuel tank, they diverted into Hill AFB for an emergency landing. The aircraft began to vibrate, and the

number three and four engines showed signs of compressor stall and had to be shut down. In addition to the loss of two engines, the aircraft was flying without one generator, two hydraulic systems, and numerous subsystems. On short final, strong fuel fumes entered the cockpit causing the crew's eyes to water severely. The instructor pilot was unable to see, but through precise coordination with his crew, he was able to smoothly transfer aircraft control to the copilot at approximately 100 feet AGL. The copilot safely landed and stopped the aircraft. Post-flight inspection revealed additional damage from the departed fuel tank debris to the number one and two engines.

CREW CHIEF EXCELLENCE AWARD

SSgt Robert G. Harnum, Jr., 34 FS, 388 FW, Hill AFB UT



While depaneling an F-16 aircraft for a number three phase inspection, SSgt Harnum noticed a piece of metal protruding from between the number two rotary actuator. With a scribe, he dislodged the piece of metal. A quick inspection of this piece of FOD determined it was some type of shim. He immediately initiated a thorough search of the surrounding area to determine where the part was from, and if any damage had occurred. No damage was identified; however, he recognized the presence of a dried pink substance used by fuel shop personnel to detect aircraft fuel leaks. This substance was behind the left

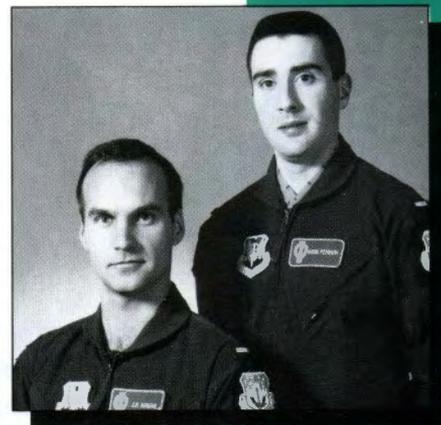
number one to number two rotary actuator torque tube. Realizing that when a fuel leak occurs in this area, all components in front of the wing spar must be removed to gain access to this area; he intensified his search to this area. His detailed inspection revealed that the matrix assembly was reinstalled without the shim and the wing paneled up. SSgt Harnum's attention to detail and vast F-16 experience enabled this potential FOD and safety hazard to be eliminated without any damage to the aircraft. The installation of the shim was completed and the aircraft returned to a safe condition.

ICBM CREW SAFETY AWARD OF DISTINCTION

*1Lt James P. Homan, 2Lt Mark E. Ferrari
490 MS, 341 MW, Malmstrom AFB MT*

Approximately one hour into the alert at Mike-01 Missile Alert Facility, Crew R-121 dispatched the Alarm Response Team (ART) to Mike-09 (LF) for an outer zone (OZ) security indication. After determining that the OZ was non-resettable, they coordinated the dispatch of a camper alert team (CAT) from the Malmstrom Support Base. Approximately two hours later, Nomad 15, the CAT, arrived at Mike-01 to refuel and gather more information from the flight security controller (FSC). Within minutes, the FSC notified the crew that the external electrical wiring on Nomad 15's vehicle had caught fire. The crew immediately directed the FSC to have the camper moved away from the vicinity of the gasoline

pumps and quickly referenced their Contingency Checklist. Fortunately, the fire was quickly extinguished and the team members did not experience any injuries. After gathering information on the event from the FSC and the team chief, the crew notified Malmstrom Command Post. They also directed Wing Job Control to dispatch another CAT to Mike-09, then requested a mobile transportation team to assess the damage to the vehicle; it was determined to be unsafe to drive. Eventually another CAT arrived at Mike-09 LF for the hardened OZ, and all remaining security situations were resolved.

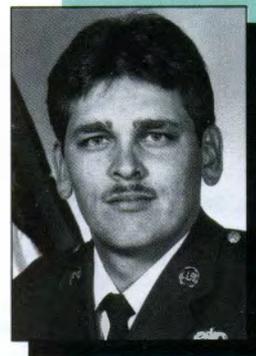


ICBM SAFETY AWARD OF DISTINCTION

SSgt Jeffery S. Crisp, 564 MIS, 341 MW, Malmstrom AFB MT

"While conducting my daily site checks at Missile Alert Facility (MAF) Quebec, one of the site security police notified me that he smelled smoke in the Flight Security Controller's (FSC) office. When I entered the office, I smelled smoke coming from the ceiling tiles. As I lifted a ceiling tile I saw flames in the space above the drop ceiling. I immediately told the FSC to sound the fire alarm and notify the Missile Combat Crew Commander and the base fire department. I then turned around and switched off the commercial power breaker, isolating the power source to the area of the fire, and extinguished the fire. I then isolated power to the PMRT rack and the Super

High Frequency Satellite Terminal rack. This allowed me to restore power to the MAF's water pumps in case any further fire fighting should become necessary. I then discovered a power spike had occurred causing a surge protector for the PMRT rack to short circuit, catch fire, and burn the associated wiring, ceiling tiles, and insulation. The whole incident took less than two minutes. With a few more minutes of delay, the fire could have quickly become uncontrollable. All of my training in emergency situations became focused in those two minutes and enabled me to avert possible loss of life and damage or loss to AF equipment."





FLIGHTLINE SAFETY AWARD OF DISTINCTION

*AIC Steven D. Colegrove
59 FS, 33 FW, Eglin AFB FL*

"I was performing Immediately Prior to Launch procedures on an F-15. Both engines were running and everything seemed normal. After pulling the safing pins from the right side of the aircraft, I headed towards the aft end of the centerline pylon to pull its pins and then proceed to the left side of the aircraft. Prior to going around the pylon and under the JFS exhaust, I ran my arm under the JFS to ensure the JFS was turned off. As I passed my arm under the JFS, a ball of yellow flames came out of the exhaust and hit my arm. I immediately came out from under the aircraft to get a fire bottle. Observing the entire proceedings from the front of the aircraft, SSgt

Templeton had unwrapped the fire bottle hose by the time I got to it. He charged the hose as I went under the aircraft to the nearest JFS air intake. I sprayed Halon into the left side first and saw that there were still flames on the other side. I then went to the other side and sprayed Halon into the right JFS intake area. The pilot was instructed to shut down the engines. After the engines were completely stopped, a fire fighter told me to spray the JFS one more time. It was then determined that the fire was completely extinguished; the ground emergency was over. I checked myself over and found that only the hair on my arm had been singed."

GROUND SAFETY INDIVIDUAL AWARD OF DISTINCTION

*MSgt Dennis R. McMenemy
131 CAMS, 131 FW, Bridgeton MO*



MSgt McMenemy was in the phase dock office when an individual ran in and said, "call the fire department." He asked what happened, and the individual said a liquid oxygen cart had fallen off a fork-lift. He saw the LOX cart laying upside down and LOX escaping from the cart's dump vent. He immediately called the aircraft maintenance environment shop to have them cap off the LOX cart dump vent. He returned to the scene of the mishap and noticed that a fog had created from the evaporating LOX. When LOX becomes contaminated with hydrocarbons, oil, grease,

or fuels, there is the possibility of a violent explosion or fire. MSgt McMenemy cautioned all spectators to move away from the fog, went to a parked pickup truck, and pushed it out of the way. He also moved a fork-lift to reduce risk. His next concern was to ensure all personnel remained clear of the area until all the LOX had completely evaporated. Only after the LOX had evaporated would he allow vehicles to be moved and the cart turned over onto its wheels. MSgt McMenemy's safety training and reflex actions prevented a serious mishap from becoming a major catastrophe.

UNIT SAFETY AWARD OF DISTINCTION

*34th Fighter Squadron, 388 FW
Hill AFB UT*

The 34 FS "Rams" view safety as the first consideration of any job. The Rams have created a very aggressive off-duty safety program. This is done with Safety Grams, bi-weekly safety briefs, and a 101 critical day package. The 34 FS believes that to have a quality squadron, you need to have a quality safety program that covers all on and off duty, 24 hours a day, 365 days a year. This concept is illustrated as follows: The 34 FS has had no reportable weapons mishaps during the first three quarters of FY 93. Zero Class A, B, and C flying mishaps during the first three quarters attest to the emphasis the squadron places on safety. Commander, supervisor, and safety

personnel involvement throughout the squadron is evident by a constantly improving safety environment. A "one team" concept, improving the quality of the 34 FS safety program was developed by the commander, flight safety officer, and ground safety NCO. Newcomers are briefed on safety policy letters, goals, hazards on- and off-duty, and general safety information for the state of Utah. The 34th Fighter Squadron's superb contributions to safety and accident prevention through professional performance, knowledge, and devotion to duty, have earned them the ACC Unit Safety Award of Distinction.

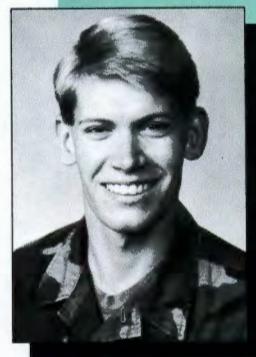


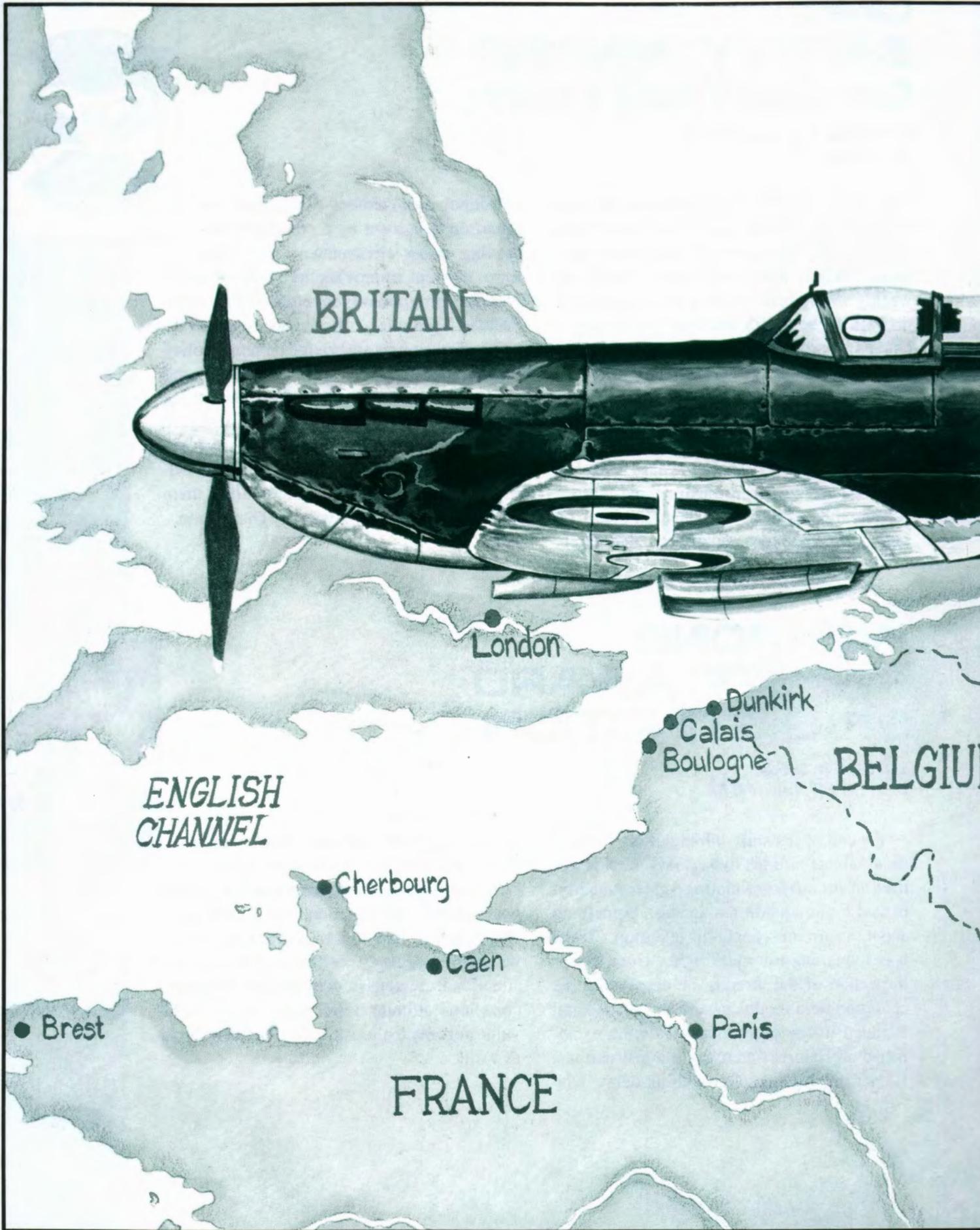
WEAPONS SAFETY AWARD OF DISTINCTION

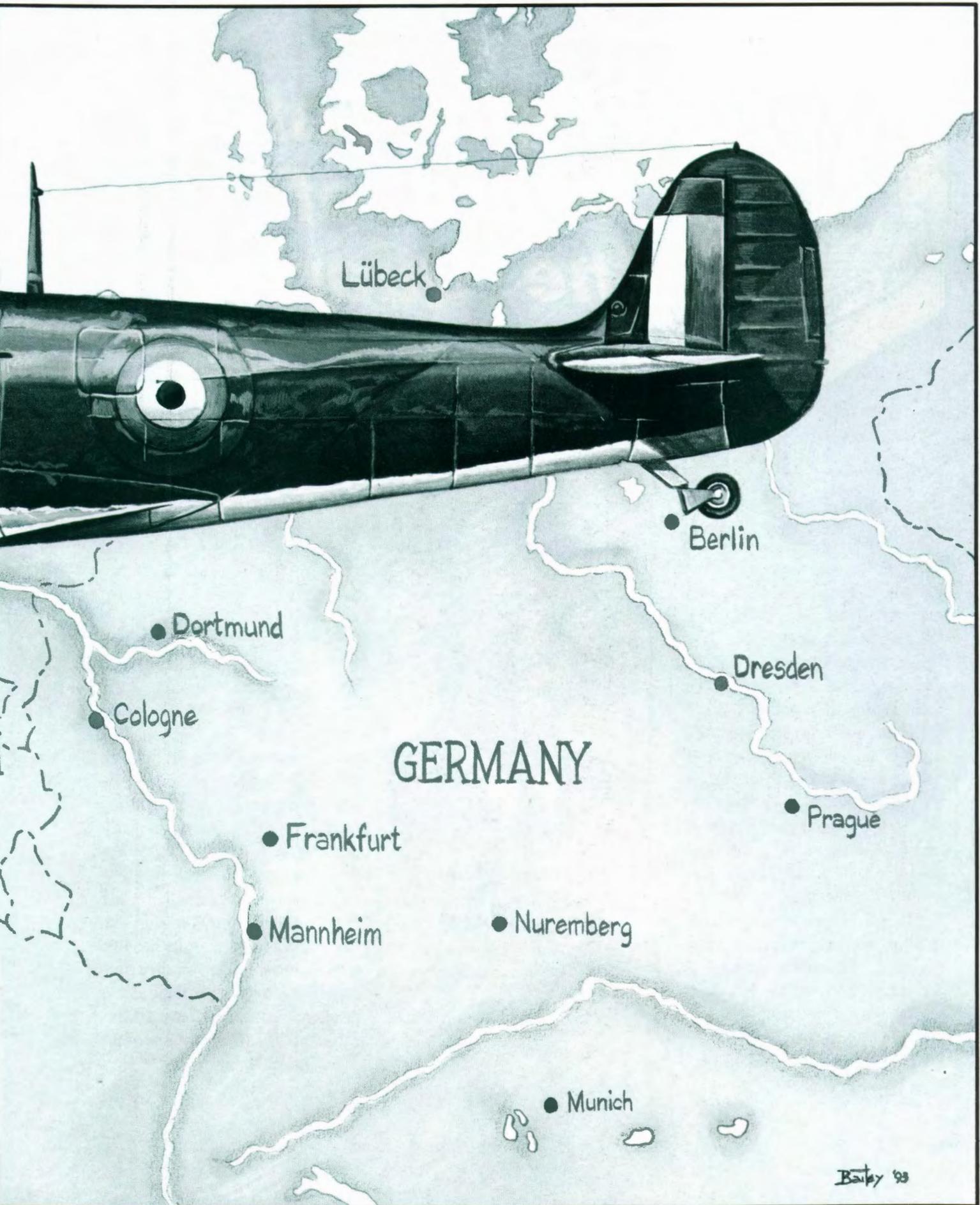
*A1C Chris D. Larkin
4 FS, 388 FW, Hill AFB UT*

At the end of his shift, while putting his personal effects into his locker, A1C Larkin noticed an aircraft from another fighter squadron parked in his squadron's hangar. Something about the aircraft caught his attention. There was something not quite right. Upon closer inspection of the aircraft, he discovered the chaff and flare modules were still loaded and installed in the jet, contrary to wing established procedures and operating instructions. He notified his expediter without delay, who

immediately coordinated the modules' download with the responsible squadron. Left undetected and uncorrected, the mishap potential of this situation could have been catastrophic, had the munitions detonated within the confines of the hangar. A1C Larkin's situational awareness, coupled with his safety conscious attitude, reflects his monumental value not only to this squadron, but to the wing as well!







Lübeck

Berlin

Dortmund

Dresden

Cologne

GERMANY

Prague

Frankfurt

Mannheim

Nuremberg

Munich



Flight Safety Award of the Quarter

While successfully integrating the 9th Fighter Squadron's F-4s into the wing's safety program, Capt Hebert's flight safety program has come to serve as a model for the other squadrons. He has developed programs such as the "Ten Minute Book" designed to get flight safety information to the aircrews in a concise and effective format. He is also involved in the wing program, organizing and tracking annual flight inspections for the entire wing. Capt Hebert has researched and produced the most complete trend analysis program on base, with a database extending back well over five years. On the basis of this, he briefs the aircrews on potential trend problems, not just what has occurred. His safety program is pro-active, not reactive. His close working relationship with civilian maintenance has resulted in a zero Class A/B rate. Not content with



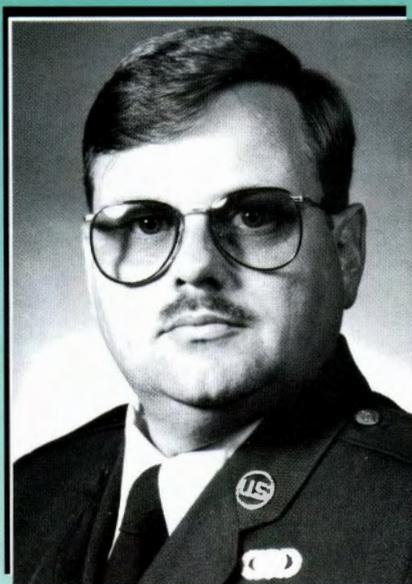
***Capt Matt Hebert
9 FS, 49 FW
Holloman AFB NM***

the easy answer, Capt Hebert always produces the most thorough, in-depth reports. These reports are used as models for the rest of the squadron FSOs to follow. His safety investigations have resulted in many new TCTOs and changes to the F-4 Dash 1. In a recent 49th FW flight safety inspection of all six assigned flying units, Capt Hebert's was the only one rated "Outstanding." Capt Hebert has a strong safety awards program to recognize his unit's personnel. He has gained his aircrew two Wing Quarterly Flight Safety Awards and one ACC Aircrew of Distinction Award. He is a positive, energetic professional. Capt Hebert's working relationship with his squadron commander has fostered an environment of "do it right and safety will be a natural by-product." His efforts have a direct result on the safe operations of the 49th Fighter Wing.

Ground Safety Award of the Quarter



TSgt Moon is a dynamic Ground Safety Technician. His branch was awarded the National Safety Council's "Outstanding Ground Safety Performance" award. He greatly increased ground safety presence throughout the base through extensive interaction between commanders, supervisors, and the base populace. He established a new base-wide Confined Space Entry Program bringing the base into compliance with OSHA and AF regulations. He established an outstanding "We Care About You" program. This proactive program keeps safety ahead of the ball game and has become the standard for 8th Air Force. He revitalized the lock-out-tag-out program to ensure people are not injured. His interface with local and state law enforcement agencies ensures 100% seat belt compliance. McConnell AFB was recognized by Kansas for this outstanding seat belt effort. Sergeant Moon aggressively tracks oppor-



*TSgt Michael R. Moon
384 BW
McConnell AFB KS*

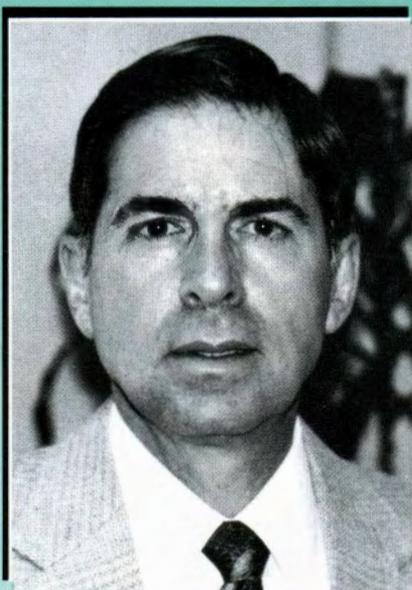
tunities to enhance his skills for the wing's benefit. He is the wing's expert in OSHA regulations. When a shortfall developed in the wing's confined space training program, he assembled local OSHA experts, developed a detailed lesson plan,

presented a day-long confined space orientation at the base theater, and essentially developed a base program that is now the command standard. His idea for a base-wide safety fair involving many disparate base units and off-base organizations such as Kansas Gas and Electric and highway patrol, served as our summer "101 critical days" safety push. His outstanding efforts and leadership were recognized by the wing commander. Sergeant Moon is actively involved in every facet of office productivity. Mishap findings, causes, and recommendations are always thorough and effective. His efforts directly contributed to the recent reductions in our on- and off-duty accident rate. Sergeant Moon is a leader who, when he sees a problem, develops a solution, and implements that solution. The base has, in many ways, directly benefited from TSgt Moon's work. He sets the standard through leadership by example.



Weapons Safety Award of the Quarter

Mr Al Simpson has been a key player in building outstanding ICBM programs for many years. He was selected to serve as the Weapons Safety Officer (WSO) for the AFLC Peacekeeper program here at the 90 MW. His AFLC successes were recognized when his program won numerous Air Force level weapons safety plaques. When the local Peacekeeper programs were consolidated, he along with his program, transferred to the 90 MW. As a member of the Mighty Ninety safety staff, Mr Simpson is actively involved in identifying and developing new initiatives that affect all levels of the safety program. He is involved in initiating and managing several safety office initiatives including the 90 MW Safety Expo and our safety recognition programs. As a member of the weapons safety staff, he is actively involved in both mission accomplishment and reduction of mishap costs and non-productive



***Mr Albert N. Simpson
90 MW
F.E. Warren AFB WY***

efforts. In one recent Dull Sword investigation, he demonstrated the value of his extensive ICBM background by suggesting a new approach to a maintenance prob-

lem. His personal effort facilitated the successful initiative suggested by normal maintenance practice. This initiative was coordinated with 20 AF and saved the Mighty Ninety \$300,000. In another instance he provided the background paper that resulted in ACC-wide elimination of a mandated, but "no value" inspection requirement. Mr Simpson has demonstrated exceptional ability to build, maintain, and document award winning programs. This combination has resulted in the Mighty Ninety winning both the Air Force Nuclear Surety Plaque and the Air Force Missile Safety Plaque each year since Mr Simpson returned to the Mighty Ninety. Mr Simpson's nomination packages for 1992 culminated in Air Force level plaques in all three weapons safety programs, the ACC Safety Office of the Year and the ACC Distinguished Chief of Safety. Mr Simpson is a worthy recipient of this Weapons Safety Award.

FAREWELL

The Air Combat Command Safety Awards program, founded in October 1992, was complemented by the joining of our Intercontinental Ballistic Missile (ICBM) force. As we traveled down the road together for the past months, we've enjoyed recognizing the outstanding missiliers. Effective 1 July 1993 ICBMs became part of AFSPACECOM—we hope you continue to get the recognition you deserve.

The ICBM awards featured in this month's magazine are winners that were selected at the July Awards Board, but actually cover periods up to and including 30 June 1993.

We at ACC bid them a fond farewell and wish them good luck in their future endeavors as they become part of the AFSPACECOM community. As they say in the missile world—keep'm in the green!

TAKE THE "PAIN" OUT OF BACK INJURIES

After the common cold, back injuries are responsible for more absences from work than any other injury or illness. While you may not be able to prevent catching a cold, there is much you can do against painful and costly back injuries.

STEP ONE: ELIMINATE BENDING.

Bending is the source of many back injuries. When you must bend over to pick up an item, you greatly increase your chances of incurring a back injury. Therefore, it makes sense to reduce the need to bend on the job.

STEP TWO: USE LIFTING DEVICES.

The liberal use of overhead hoists will also reduce the number of back injuries from heavy lifting. Whenever possible, objects that weigh more than 30 pounds should be lifted with an overhead hoist.

STEP THREE: FOLLOW ESTABLISHED LIFTING TECHNIQUES.

Finally, you should follow these basic rules for back safety:

1. Don't lift manually unless absolutely necessary, and get help when needed.
2. Make sure the weight you're lifting is as close to your body as possible.
3. Rely on the strength of your legs, not your back for lifting.

Don't allow yourself to become one of the eight out of ten people who will experience back pain during their lifetime. Use your brain to avoid strain. Plan your lift! ■

*MSgt Gary R. Reniker
442 FW/SEW
Richards-Gebaur AFB MO*

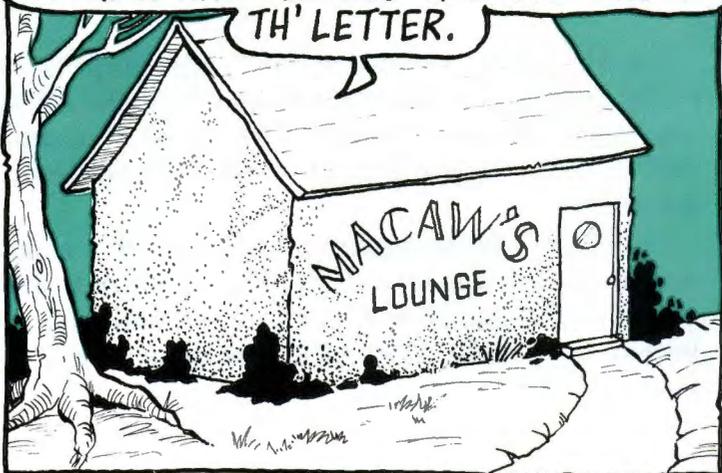
Fleagle

I SURE DO MISS TH' OLD DAYS, FLEAGLE.

IN WHAT WAY, TINY?



THERE WAS NEVER NO DOUBT 'BOUT WHERE YOU STOOD WHEN IT COME TO ORDERS. YOU READ AN' FOLLOWED REGULATIONS TO TH' LETTER.

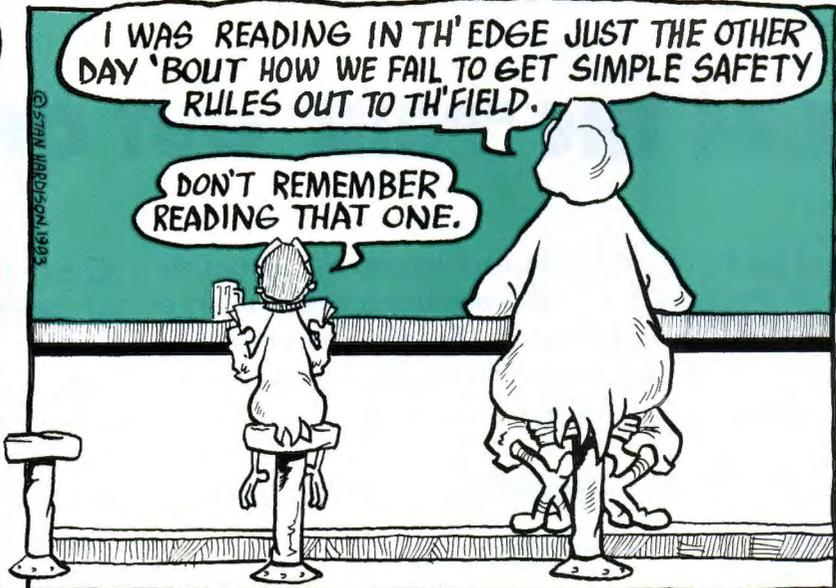


OH BOY... HERE COMES ANOTHER SPEEL 'BOUT LIFE AMONG TH' OLD PROP AN' CREEP CROWD.



I WAS READING IN TH' EDGE JUST THE OTHER DAY 'BOUT HOW WE FAIL TO GET SIMPLE SAFETY RULES OUT TO TH' FIELD.

DON'T REMEMBER READING THAT ONE.



HOW 'BOUT THEM CHANGES IN OPERATIONS POSTED ON TH' BOARD YESTERDAY?

DIDN'T NOTICE.



I SURE DO MISS TH' OLD DAYS.



HARRISON

Branch of Service/Agency _____ Rank _____ AFSC _____ Age _____ Sex: M F
 Duty Status _____ Time in service _____ Education (highest level completed) _____
 Job title/description _____

1. How often do you read this magazine?
 - a. Very often (every issue)
 - b. Often (most issues)
 - c. Sometimes (some issues)
 - d. Seldom (very few issues)
2. How do you normally obtain this magazine?
 - a. Official USAF distribution (PDO)
 - b. GPO subscription/direct mail
 - c. Library
 - d. Co-worker, associate, friend
 - e. Other
3. How much of each issue of this magazine do you read?
 - a. All
 - b. Most
 - c. About half
 - d. Some
 - e. A little
 - f. Look at but seldom read
 - g. None
4. How many other people read/share the copy of this magazine you receive?
 - a. None
 - b. 1-3
 - c. 4-6
 - d. 7-9
 - e. 10 or more
 - f. Don't know
5. After reading this periodical, what do you do with it?
 - a. Keep it
 - b. Discard it
 - c. Pass it on
6. How soon do you see a copy of this magazine after it is published?
 - a. One week or less
 - b. One to three weeks
 - c. Three weeks to a month
 - d. A month or more
7. What magazines or newspapers do you regularly read?

We are interested in your assessment of *The Combat Edge* magazine. When choosing an answer, write in the number corresponding to the extent you agree or disagree with each statement.

- | <i>Strongly Agree</i> | <i>Agree</i> | <i>No opinion</i> | <i>Disagree</i> | <i>Strongly Disagree</i> |
|-----------------------|--------------|-------------------|-----------------|--------------------------|
| <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
8. **The Combat Edge** satisfactorily presents safety information.
 9. **The Combat Edge** is as interesting as other publications I read.
 10. **The Combat Edge** is as informative as other publications I read.
 11. The level of reading in **The Combat Edge** should not be higher.
 12. The articles in **The Combat Edge** are technically accurate.
 13. Overall, the appearance of **The Combat Edge** is good.
 14. Coverage of flight safety issues is adequate.
 15. Coverage of ground safety issues is adequate.
 16. Coverage of weapons safety issues is adequate.
 17. The number of photos, illustrations and charts in **The Combat Edge** is sufficient.
 18. **The Combat Edge** articles are informative.
 19. **The Combat Edge** articles are interesting.
 20. **The Combat Edge** magazine is useful to me personally.
 21. Article topics are in tune with important trends.
 22. **The Combat Edge** is an effective mishap prevention tool.

For the areas listed below, please rate each using the following scale:

- | <i>Poor</i> | <i>Fair</i> | <i>Satisfactory</i> | <i>Good</i> | <i>Excellent</i> |
|-------------|-------------|---------------------|-------------|------------------|
| <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
23. Covers
 24. Layout (professional appearance)
 25. Article quality
 26. Photographs
 27. Illustrations
 28. Information value
 29. Use of color
 30. Thought provoking nature
 31. Type (size and style)
 32. General interest/entertainment value
 33. Article thoroughness
 34. Article variety
 35. Awards coverage
 36. Usefulness in my job
 37. Timeliness of articles/issues
 38. Accuracy
 39. Usefulness in increasing professional expertise
 40. Attractiveness
 41. Overall value

42. Has a **Combat Edge** article ever saved your life or kept you from doing something dangerous? If so, briefly describe the situation.

43. How would you rate this magazine in comparison with other publications dealing with the same or similar subject matter?

- | | | |
|---------------------|--------------------|---------------|
| a. The best | c. Average | e. The worst |
| b. Better than most | d. Worse than most | f. Don't know |

Please tell us how you would improve **The Combat Edge**:

What kinds of articles should we print **more** of? **Less** of? **Additions**?

Other comments:

----- FOLD -----

----- FOLD -----

C
U
T

Official Business

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

ACColades

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

	TOTAL			ACC			ANG			AFR		
	JUN	THRU JUN		JUN	THRU JUN		JUN	THRU JUN		JUN	THRU JUN	
		FY93	FY92		FY93	FY92		FY93	FY92		FY93	FY92
CLASS A MISHAPS	3	16	23	1	8	11	2	7	9	0	1	3
AIRCREW FATALITIES	0	6	11	0	5	2	0	1	6	0	0	3
* IN THE ENVELOPE EJECTIONS	5/0	16/0	11/1	2/0	7/0	5/0	3/0	8/0	5/1	0	1/0	1/0
* OUT OF ENVELOPE EJECTIONS	0	0	0/1	0	0	0	0	0	0	0	0	0/1

* (SUCCESSFUL/UNSUCCESSFUL)

CLASS A MISHAP COMPARISON RATE

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

	FY	CUMULATIVE RATE											
		92	93	94	95	96	97	98	99	00	01	02	03
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	3.1	2.2	1.6	1.8	2.1	1.8	1.8	1.9			
1 AF	FY 92	0	0	0	0	0	0	0	0	0	0	0	0
	FY 93	0	0	0	0	0	9.5	7.9	6.8	6.0			
2 AF	FY 92	0	0	0	0	0	0	0	*	29.1	16.4	11.2	7.8
	FY 93	0	0	0	0	0	0	0	0	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	5.2	3.7	2.8	2.2	1.8	1.8	1.8	1.8			
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	6.7	6.5	4.4	3.3	3.9	3.2	2.6	2.2	2.6			
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	0	0	0	0	0	0	0	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	2.2	2.9	2.1	3.5	2.9	3.1	2.7	3.4			
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	0	8.0	5.9	4.8	4.0	3.4	3.0	2.7			
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	2.7	2.6	2.1	2.5	2.5	2.3	2.2	2.4			
MONTH		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP

* (HOURS NOT AVAILABLE)

Stand Anger

an·ger (ăng'gər)

Anger is a powerful emotion a person feels when they are rejected, accused, insulted, attacked, irritated or dominated by individuals or events.

Ted was sitting in his spare plane. After aborting two airplanes, he was hot, thirsty and in a hurry to join his flight. Ted had a hard time understanding the new command post trainee on the radio. He repeated things two or three times in a heavy drawl. His hesitancy and lack of understanding about Ted's problem irritated the young Lt greatly.

Cathy was upset at her supervisor for checking up on her too many times in the last hour. Was she not a competent crew chief and NCO? She had missed dinner, had to report for drug testing early in the morning, which interrupted her sleep, and her BAQ was taken away. Cathy asked for relief, but was told to wait. The heat on the ramp was taking its toll; she was getting dehydrated.

Things continued to get progressively worse for both Ted and Cathy. The spare's engine wouldn't turn over, but the command post had Ted remain in the humid cockpit while they tried to raise the Director of Operations. Tired, hot and frustrated, Ted unleashed a torrent of slashing remarks to the trainee on the UHF radio.

Cathy stripped the threads on one of the panel screws and banged her knuckles. She threw her ratchet at the tires of the airplane, kicked her tool box over, and walked off. When her supervisor caught up with her, she cursed him out and said she was turning her paperwork in.

What are the expected and unexpected causes of anger in both of these cases? What impact does anger have on other people and the mission? There were several immediate and underlying factors that came together and erupted in a volcanic burst of verbal and nonverbal reactions which affected a large circle of people.

Anger affects all of us. Recognizing and releasing it in a healthy way has a direct impact on the safety of the mission. Furthermore, the interplay of personal and professional relationships can have an even greater affect on job performance.

Often problems at home do not get resolved and are brought to work. One is unaware that he or she has erroneously "displaced" feelings of anger onto other persons or circumstances. Conversely, pressures from work are brought home where they are unfairly vented on innocent family members. In both the work and home environments, a double portion of anger is unloaded because the problems were not solved at the place of origin in a timely and professional manner.

What is anger, and what are some causes of anger? Anger is a powerful emotion a person feels when they are rejected, accused, insulted, attacked, irritated, or dominated by individuals or events. One can additionally feel hurt, alone, frustrated, humiliated, or sad. The emotion takes control of the individual and causes physical and behavioral changes. There are two types of anger -- justified and unjustified. Unfortunately, in both cases one can become overly angry because of the combination of the immediate cause and a past unresolved situation.

Physically, one gets tense, stressed out and normal metabolism is upset. One gets stomach irritations, headaches, insomnia, or a stiff neck. In fact, we use the expressions daily - "you turn my stomach, you give me a headache, you are a pain in the neck, you give me ulcers."

Is anger always wrong? No. There are times when it is a normal reaction because someone has been wronged. However, many people wind themselves up like a clock. Their spring gets loaded and like Ted and Cathy, it only takes the wrong word or experience to pull the trigger that leads to an explosive outpouring of words or

gestures. The events of the two persons above were the results of being overworked for several weeks, fatigued from the long work schedule,

frustrated with supervisors and materials, and disappointed with the uncaring attitude of peers and bosses.

Furthermore, Cathy brought a lot of her unresolved hurt from her engagement to a busy NCO who seemed more involved with his job than her. Ted had a large reservoir of untapped anger that had built up during his wife's pregnancy. He had no one to talk to about her emotional shifts during the third trimester. She had changed drastically, and Ted felt harassed and hurt when he went home. The negative interplay of home and work is common but unfair. What could Cathy and Ted do to better deal with their anger?

First, anger is a choice; each person must take responsibility for his or her words and actions by recognizing and dealing with emotions. Second, separate home and work problems and try to talk to family members and supervisors at a calmer time and place. When the causes are realistic, confront what

causes the annoyance or hurt. When the causes are unrealistic, it becomes advisable to seek

Often problems at home do not get resolved and are brought to work. One is unaware that he or she has erroneously "displaced" feelings of anger onto other persons or circumstances. Conversely, pressures from work are brought home where they are unfairly vented on innocent family members. In both the work and home environments, a double portion of anger is unloaded because the problems were not solved at the place of origin in a timely and professional manner.

professional help.

When anger gets out of control, military members can end up hurting themselves and others or damaging expensive property -- all of which can ruin one's family, career, and paycheck. Fortunately, Cathy's NCOIC called the squadron chaplain and they were able to nip this problem in the bud. After several counseling sessions, they finally got to the root of her problem -- an absentee father and over-demanding mother who cared little for her. In Ted's case, both he and his wife grew up in step-families. Each dealt with accusations and differences by withholding feelings and avoiding their angry parents.

In both cases, their counselor recommended they take time off to get away and be with the one they loved. They learned some new approaches to talk over personal, home, and work issues. They started dealing with the immediate causes of anger on a daily basis and became involved in an exercise program to reduce stress. Ted and his wife walked three miles a day in the evening and they talked about their feelings. Cathy took classes at the local college. They all realized that anger has to be dealt with or it ultimately ends up hurting one's body, mind, and relationships.

When is anger justified? When an individual is attacked or victimized, it is natural and necessary to

release all anger. What can we as military members do to help each other deal with such anger? Getting professional help will explore healthy ways to release or deal with anger. It's erroneous to uncontrollably ventilate bottled up or immediate anger by yelling or breaking things. This school of psychology has been put to rest.

Finally, anger is a means individuals employ to control others. I have noticed several faces of anger among military members. Let me share a few character types in a humorous way.

First, Sgt Stern easily gets angry and stores it up to the point that his face is hardened. Individuals who work with this character type are always placed on the defensive; one feels as if they are surrounded by land mines waiting to explode.

Maj Martyr allows herself to take in all the pain and persecution from home or work and then makes others feel guilty about what they are doing to hurt her.

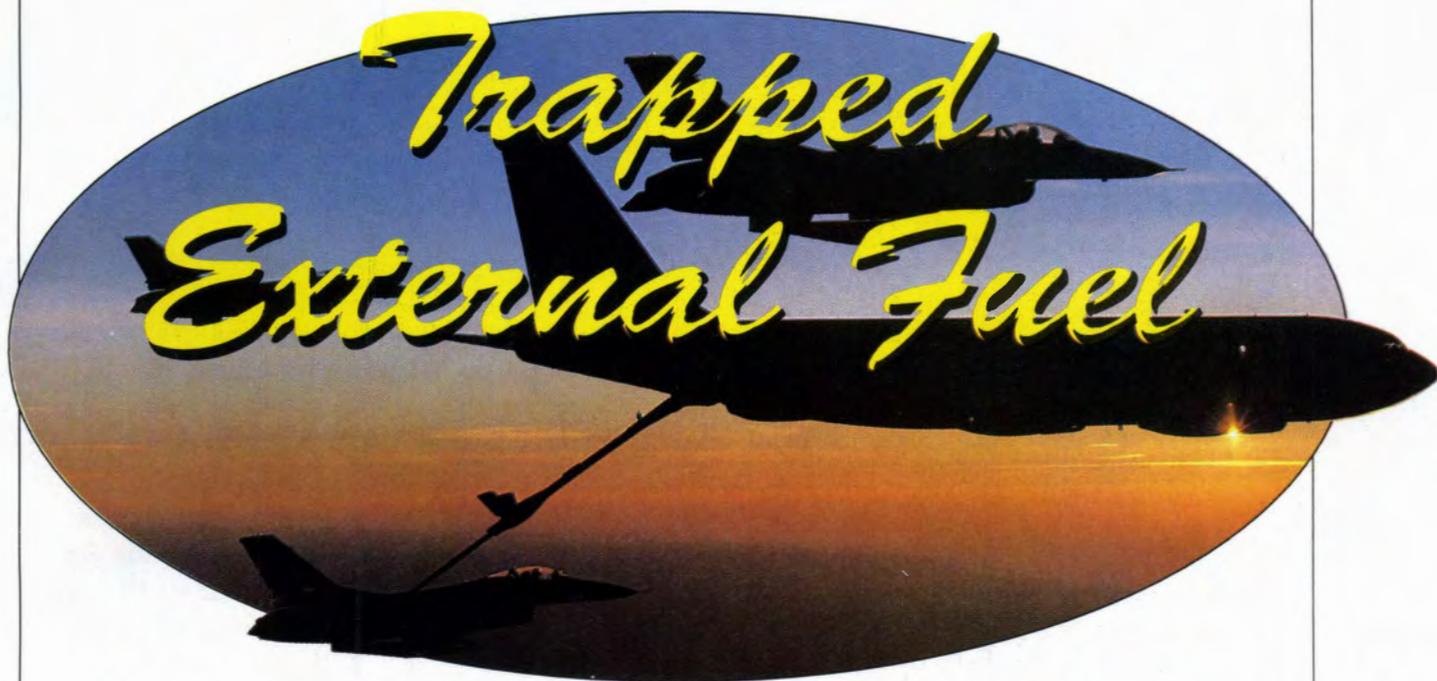
Col Condemnatory doesn't even allow his opponent the opportunity to complete their sentence. The colonel opens the verbal floodgates and lets his "opponent" know how much they messed up.

Lt Lightweight responds to frustration by denying the hurt she should feel. She gives the appearance that everything is O.K. but then talks about others maliciously. These various faces of anger can be uncovered through professional

counseling.

Anger that is born out of a proud and manipulative mind has a deeper level and needs to be dealt with for the sake of people and the mission. Hopefully, individuals who are suffering from various types of anger, or know someone who is, will realize that if it is not dealt with, it can have a great negative impact on productivity, the mission, and relationships with others.

■



A recent incident involving trapped external fuel prompted the need for a review of the F-16 fuel system. The F-16 fuel transfer system is primarily a siphon system with electrical pumps secondary. The system is pressurized by engine bleed air through the Environmental Control System (ECS) and normally provides 19-24 psig above ambient pressure for the external tanks and 4.7-6.4 psig above ambient pressure for the internal tanks. Internal pressures can be reduced approximately 1-3 psig by activating the tank inerting switch or opening the air refuel switch; but, unlike many other types of aircraft that “force” fuel from one tank to another by positive pressure, the F-16 utilizes the pressure differential to create a siphoning effect. As fuel is used from the reservoirs, it is replaced by fuel from the internal tanks through a standpipe system. Without getting too involved in the fluid dynamics of how the fuel moves from tank to tank under normal circumstances, fuel is depleted in order from the external tanks, wings, F-1/A-1, F-2/A-1 and then the FWD and AFT reservoirs. The reservoirs have some special interest items that should be addressed at this time. In very simple terms, each reservoir has two fuel sensors called “thermistors.” The upper thermistors control

the air ejector pumps (ECS air flows through a venturi, and the resulting low pressure provides the pumping action). The lower thermistors control illumination of the “FWD FUEL LOW” or “AFT FUEL LOW” caution lights. The function of the air ejector pumps is to remove air from the reservoirs so that the reservoirs remain full. When an upper thermistor has no fuel covering it, its respective air ejector is turned on. When the thermistor is covered by fuel, its air ejector is turned off. The air ejectors need ECS air to operate - the same air source used to pressurize external tanks. The on/off status of the air ejectors is not information which is provided directly to the pilot; however, if either reservoir is less than full, its air ejector should be functioning. These ejector pumps may open during certain maneuvering, extended afterburner operation and low fuel conditions without you knowing or having any indication the air ejectors were activated. For instance, suppose you were using afterburner and the fuel was being burned at a faster rate than it was being transferred from the external tanks. When the upper thermistor sensed air instead of fuel in the upper portion of the reservoir, it would command the air ejectors open and try to supply any available internal fuel. If you subsequently

There are numerous cases of fuel being trapped in the external tanks due to mechanical or electrical malfunctions and switch errors.

deselected afterburner and decreased fuel flow below the 6000 pound per hour (pph) capacity of the wing turbine pumps, the system could catch up with the transferring of fuel and close the air ejectors without giving you any indication the whole process occurred, assuming the fuel did not get low enough to uncover the lower thermistors and turn on one or both fuel low lights. During the time the air ejectors are operating, external fuel will not be siphon transferred due to an "air bubble" in the system preventing the siphoning effect. The wing turbine pumps (scavenge system) still works, but only at the 6000 pph rate. This point is critical to the understanding of the F-16 fuel system and trapped fuel.

Now that you understand the basics of how the fuel system works, let's address the trapped external fuel problem. There are numerous cases of fuel being trapped in the external tanks due to mechanical or electrical malfunctions and switch errors. There are at least eleven single point failure modes which can cause trapped external fuel in the Viper. Let's examine the most common error -- leaving the air refuel switch in the open position. If the air refuel switch is left in the open position, either during ground checks or post air refueling, there will be several indicators to alert you of the switch error. First, the aircraft will be in takeoff and landing gains, so your maximum AOA is reduced, your roll rate capability is limited, and you'll get buffet/oscillations when flying above 400 kts/0.85 Mach. Next, the air refueling "RDY" light will be illuminated. Last, the Fuel Quantity pointers will start decreasing before the totalizer reads approximately 5900 lbs (F-16 A/C) or 4600 pounds (F-16 B/D). If you do not recognize any of these indications and allow the "FWD FUEL LOW" and/or "AFT FUEL LOW" light(s) to illuminate (lower sensor), the upper thermistor will have already activated the air ejectors and any fuel in the external tanks may be trapped and unusable due to reduced ECS air available to pressurize the external tanks. At this point, you should consider your fuselage fuel to be the only available fuel, even if you correct the switch error. The ECS air which activates the air ejectors originates from the same air pressurizing the external tanks. With this bleed air going to the air ejectors, less air is available to pressurize the fuel trapped in the external tanks. This is why the new Interim Safety Supplement states: "If trapped external fuel condition is not discovered until either reservoir is less than full or a fuel low light is on, sufficient fuel transfer from the external tank(s) may not occur even if the problem is corrected. Consider fuselage fuel to be the only usable fuel."

Is there anything being done to alert the pilot of trapped fuel? The F-16 non-ADF block 10/15's have a modification (Z1A) that gives the pilot a HUD trapped fuel warning before the fuel low lights are illuminated. The ADF block 10/15's were scheduled to receive the modification (Z1B) in Apr 93.

block 40/42's are scheduled to receive this modification (40P4) in Dec 93 and the block 50/52's (less mini block 50A through 50C) in Sep 93 (50P2). The block 25/30/32's are scheduled to receive this modification (SCU-2) in Oct 94. We all think the above switch error could never happen to us; but unfortunately, there have been several cases through the years to support the fact that it has happened and continues to happen. Many pilots have found themselves with a flamed-out engine due to fuel starvation with fuel still in the external tanks.

In conclusion, the Air Force has acknowledged the need for a trapped external fuel warning system; but this does not relieve us of the responsibility to fly our jets safely and effectively. Hopefully, this review has helped some people understand the F-16 fuel system a little better so they won't have to accomplish a flameout landing due to fuel starvation. Let's review some lessons learned about the F-16 fuel system.

1. If the pointers start decreasing before the totalizer reads approximately 5900 lbs (F-16A/C) or approximately 4600 pounds (F-16 B/D) -- you have a fuel problem/trapped fuel.
2. The Bingo fuel warning is based either on fuselage fuel with the Fuel Quantity Selector (FQS) knob in NORM or on total fuel with the FQS knob out of NORM, depending on what block you fly.
3. The "fuel" warning (HOME mode) probably will not activate in time to be useful with trapped external fuel because the computations are based on total fuel.
4. Read and interpret what the fuel gauge is telling you as opposed to just giving it lip service and only looking at the totalizer.
5. If the "FWD FUEL LOW" and/or "AFT FUEL LOW" light(s) illuminate -- any fuel in the external tanks may be trapped and unusable.
6. Always complete the post air refueling checklist to keep yourself out of trouble.
7. If you start getting the fuel system "light show," call a Knock-It-Off and refer to your checklist to accomplish the steps. Keep mutual support alive.
8. Write-up the aircraft in detail so maintenance can correctly troubleshoot the jet. ■

If trapped external fuel condition is not discovered until either reservoir is less than full or a fuel low light is on, sufficient fuel transfer from the external tank(s) may not occur even if the problem is corrected.

